

Interreg



EUROPEAN UNION

North-West Europe

REAMIT

European Regional Development Fund

WP Management - Deliverable 3.1

REAMIT Project Reports

Improving Resources Efficiency of Agribusiness supply chains by Minimizing waste using Internet of Things sensors (REAMIT)



Project progress report NWE831 REAMIT

Project progress report identification

Title	Improving Resource Efficiency of Agribusiness supply chains by Minimising waste using Big Data and Internet of Things sensors
Acronym	REAMIT
Number	NWE831
Start date	10-01-2019
End date	30-06-2019
Priority	Priority Axis 3 Resource and materials efficiency
Specific objective	SO5: To optimise (re)use of material and natural resources in NWE
Lead partner	University of Bedfordshire
Contact person	University of Bedfordshire
Reporting period	Period 1 : 10-01-2019 - 31-12-2019

Highlights of main achievements

Administration & governance: recruited PM and COM Manager; 4 REAMIT positions advertised; 8 PPs appointed FLC, 4 PPs asked auditors for quotes; all partner organisations adjusted internal systems & procedures for financial management, control and reporting following funder's requirements; developed drafts of Project Handbook, advanced Key Control Register and Risk Register based on input from PPs, agreed memberships of RSC & RAC, agreed dates & locations of all RSC and RAC meetings, agreed dates & locations of 3 REAMIT networking events.

Cooperation: organised 2 project meetings attended by most PPs (Lille, April; Luton, May) resulting in increased communication among PPs, agreed cooperation plan and most urgent joint tasks (recruiting companies for pilot tests, drafting Open Challenge Call text, drafting White Paper on sensors), adapting existing sensors to fit REAMIT), strengthened cooperation spirit within partnership.

WP Long term: started preparations of REAMIT network prospectus.

WP Communication: started developing Communication Strategy, purchased domain www.reamit.eu, created REAMIT website under NWE Programme; created REAMIT social media accounts (Facebook, LinkedIn, Twitter) and dedicated email address reamit4nwe@gmail.com, developed REAMIT poster.

WPT1: Started work on miniature IOT platform; adaptation of existing sensor technologies based on optical methods to fit the purpose of Pilot Studies; carried tests on 2 food matrices (shrimps&chicken) resulting in developing technical specification of REAMIT equipment (to be purchased) with optimized parameters; started work on updating CyberBar technology to ensure relevance to Irish Pilot Study; a handbook for the trial of Cyberbar in Irish Pilot Study; preparations of the plan for first Pilot Study in IE, developed draft White Paper on sensor technologies; advertised Open Challenge Call on REAMIT website.

Project specific objectives

Project specific objectives	Level of achievement	Explanations
1 - To pilot test sensor technologies in agri-food supply chains in the five partner countries	to a large degree	Preparations for the first pilot test are advanced and the first pilot test will run in the UK at the end of October 2019 by 2 partners: UU and Dunbia. To prepare the first pilot test, all PPs have discussed different scenarios. Eventually PPs have jointly agreed 7 key elements of the first pilot test. These elements form a chain of events and actions that need to be taken to carry out the first pilot test from the start to the end of the pilot. They include: (1) specification of the type of sensor used in the pilot, (2) specification of the type of data collected by the sensor, (3) specification of how the cloud will be created, (4) specification in which form data from the cloud will be presented, (5) who will do data analytics and how it will be done, (6) how data bank will be created and who will host it, (7) what happens when there is an alert (about food soon to become waste) and how the system to support decision will work. PPs have agreed that each pilot test would be developed as much as possible taking account of the proposed template for the first pilot. PPs have identified technology providers and types of equipment needed to carry out the first pilot. PPs have agreed the timeline for the first pilot as well as which partners will be involved in the different steps of the first pilot (steps 1 to 7). Lessons learnt from the first pilot will feed into the execution of the remaining pilots, preparations of which are also underway. The calendar for the remaining pilots is as follows: Germany and NL pilots - end of 2019; France pilot May-June 2020; Ireland pilot spring/summer 2020.
2 - To develop Big Data infrastructure for analytics and decision support to reduce food waste	to a minor degree	REAMIT PPs have initiated discussion on developing Big Data infrastructure for analytics and decision support system to reduce food waste. PPs are reviewing equipment available in the market to develop specification of equipment most suitable for the purpose of REAMIT. Relevant equipment will be purchased in the coming weeks, technology PPs will then configure it to fit REAMIT purpose and adjust it to be suitable for installation in pilot tests.
3 - To bring the REAMIT combination of technologies closer to market	to a minor degree	This objective will be achieved at a later stage after pilot tests have been completed.

Project main outputs achievement

Programme output indicators	Sum of output indicator targets	Sum of achieved output indicators so far	Project main output indicator number	Project main output title	Project main output quantification target	Planned delivery	Achieved so far	Level of achievement
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	0.00	T1.1.1	Working prototypes of sensor technologies based on pilot tests with agribusiness users	5.00	10-06-2021	0.00	proceeding according to work plan
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	0.00	T2.4.1	Technology solutions developed	3.00	10-07-2022	0.00	not started
CO01. Number of enterprises receiving support	10.00	0.00	T1.2.2	Agribusiness companies supported in food waste reduction pilots	5.00	10-06-2021	0.00	proceeding according to work plan
CO01. Number of enterprises receiving support	10.00	0.00	T2.5.2	Companies supported in technology development	5.00	10-07-2021	0.00	not started
CO29. Number of enterprises supported to introduce new to the firm products	10.00	0.00	T3.2.1	Companies introduced to REAMIT business case	10.00	10-07-2022	0.00	not started

Target groups reached

Target groups	Target value	Target groups reached (prev. periods)	Target groups reached current period	Source of verification	Description of target group involvement	Target groups reached so far (%)
local public authority	10.00	0.00	10.00			100.00
regional public authority	5.00	0.00	5.00			100.00
national public authority	5.00	0.00	1.00			20.00
interest groups including NGOs	5.00	0.00	0.00			0.00
higher education and research	20.00	0.00	4.00			20.00
enterprise, excluding SME	10.00	0.00	0.00			0.00
SME	10.00	0.00	0.00			0.00
business support organisation	5.00	0.00	0.00			0.00
sectoral agency	5.00	0.00	0.00			0.00

Problems and solutions found

Information about the selection of REAMIT project for funding was received in Jan 2019 but the next 3 months were spent entirely in finalising Partnership Agreement and addressing technical requirements from JS. This has resulted in a delay of about 3 months to the project. As a knock on effect recruitment of new staff in REAMIT has been delayed, Project Handbook has not been finalised, information about Open Challenge Call has been published with a delay, too few agri-business companies have been recruited for pilot tests. Notwithstanding this delay, the project has progressed well in the first semester and delayed actions will be completed in the second semester.

The second challenge/risk of REAMIT project is the slow progress in reaching sufficient number of companies which transport food and/or store perishable foods. To address this risk the Open Challenge Call has been launched in June 2019 and information about it has been uploaded in REAMIT website and spread across partners' networks. Thanks to individual partners' efforts and directly contacting agri-food businesses in their regions, UoN has been engaging with an end-user in France but we are trying to reach more end-users in other four countries. To further enhance businesses' interest in participation in REAMIT pilot tests, the consortium will showcase tangible results from application of REAMIT technologies, which have been obtained in previous pilot tests. Too few companies participating in pilot tests will be also discussed at the REAMIT project meeting (Sept 2019) and the consortium will jointly seek for new ways to address this risk.

Horizontal Principles

Horizontal principles	Contribution in this reporting period	Description of the contribution
Equal opportunity and non-discrimination	as planned	Every effort has been made in REAMIT project to promote equal opportunities and non-discrimination.
Sustainable development (environment)	as planned	Initiation of development of new REAMIT technologies to be later applied in agri-food supply chain companies will have positive impact on environment due to reduced food waste thus reduced amount of used natural resources.
Equality between men and women	as planned	Every effort has been made in REAMIT project to promote equality between men and women. The REAMIT consortium consists of a mix of men and women and promotes equal participation wherever possible.

Fully implemented

Implemented (to be ticked at the last reporting period, only when the project has fully been achieved):	No
Implemented on:	

Reporting per WP overview

Start	End	Type	Title
Jan.2019	Jan.2019	preparation	Preparation
Jan.2019	Jul.2022	implementation	Long term
Jan.2019	Jul.2022	management	Project management
Mär.2019	Jun.2021	implementation	Adapting and pilot testing sensor technologies in agri-food supply chains
Jan.2019	Jul.2022	implementation	Big Data integration and applications to reduce food wastage.
Jan.2020	Jul.2022	implementation	Business development of REAMIT technologies
Jan.2019	Jul.2022	communication	Communication

Work Package Preparation (preparation)

WP no	Title	Start month	End month	WP Status
P	Preparation	01-2019	01-2019	not started

Partner's involvement

Abbreviation	Name
FD	FreshDetect (to be deleted)
BED	University of Bedfordshire (Lead Partner)
UCD	National University of Ireland, Dublin, University College Dublin
Levstone	Levstone Ltd.
Whysor	Whysor
ITT	Institute of Technology in Tralee
UoN	Université de Nantes
SenX	SenX
I&R	Images & Réseaux
NTU	Nottingham Trent University

Summary description of activities carried out and contribution of each partner

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Work Package Long term (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
LT	Long term	01-2019	07-2022	proceeding according to work plan	970.47	0.25

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

All partners have engaged in communicating about REAMIT project within their networks with the aim to recruit new industrial partners to test REAMIT technologies, to raise awareness about REAMIT and to attract business and institutional actors to follow and/or cooperate with the REAMIT consortium. Based on partners' own networks in their individual countries, preparation of REAMIT network prospectus has been started with a web presence and social media presence. The work on preparations of first REAMIT networking event (January 2020) has started. NTU is the responsible partner for organising this event and ideas for its format and content will be discussed at REAMIT meeting in September 2019. Efforts have been started to popularise the idea of REAMIT by engaging in discussions in various forums such as conferences, workshops, regional business development and competitiveness events (e.g. Production and Operations Management Conference USA; IoT and AI Summit Bangalore India; Agritech workshop in University of Roehampton UK; Annual day I&R competitiveness cluster (23 May 2019) with presentation of REAMIT project to I&R members; Pitch on the REAMIT project during a workshop "European projects" with participation of SenX and Valorial; Presentation of REAMIT poster at IMTA seminar, Brest 12-13 June 2019) in which REAMIT PPs participated.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Most work on REAMIT project has focused in the first semester of 2019 on WP Management, Communication and WPT1. The partnership needed this time 'to form' in order to start 'to perform'.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity LT.1	Creating a self-sustaining REAMIT Network	01-2019	07-2022	proceeding according to work plan
Deliverable LT.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Network prospectus		09-2020	proceeding according to work plan	
Deliverable description	BED as coordinator will engage partners to develop a network prospectus, setting out the principles by which the network will operate, and ensure financial sustainability based on a low-cost model of voluntary contributions from partners and members.			
Description of progress achieved	All partners have engaged in communicating about REAMIT project within their networks with the aim to recruit new industrial partners to test REAMIT technologies, to raise awareness about REAMIT and to attract business and institutional actors to follow and/or cooperate with REAMIT consortium. Based on partners' own networks in their individual countries, preparation of REAMIT network prospectus has been started with a web presence and social media presence.			
Evidence				
Deliverable LT.1.2				
Deliverable title		Planned delivery month	Deliverable status	
REAMIT networking events: 2019, 20 and 21 including invited lectures from experts		07-2021	proceeding according to work plan	
Deliverable description	Partners will bring together agribusiness & technology SMEs from REAMIT countries for a 1-day annual conference: (i) to ensure that REAMIT technologies keep pace with technology developments; and (ii) to maximize achievement of REAMIT's objectives.			
Description of progress achieved	Preparations of the first REAMIT networking event scheduled in January 2020 are under way. The PP responsible for this event is NTU. The concept for this event will be presented by NTU at REAMIT project meeting in September 2020. Based on ideas and feedback from PPs, the concept of the event will be finalised.			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.2	Regularly updating framework for measuring the impact of REAMIT technologies on food waste	01-2019	07-2022	not started
Deliverable LT.2.1				
Deliverable title		Planned delivery month	Deliverable status	
The agreed framework for measuring the impact of REAMIT technologies on food waste		12-2019	not started	
Deliverable description	The framework for measuring the impact of REAMIT technologies on food waste will be agreed at the first networking event in December 2019.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.3	Ensuring policy impact	01-2019	07-2022	not started
Deliverable LT.3.1				
Deliverable title		Planned delivery month	Deliverable status	

Policy briefings		03-2022	not started	
Deliverable description	Meetings or briefing papers issued jointly from the partnership to national or EU-level policy formers to engage in a dialogue over the fit of REAMIT technologies to national and EU food waste reduction targets and policies.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.4	Roll-out to other sectors	01-2019	07-2022	not started
Deliverable LT.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Cross-sector briefings		06-2022	not started	
Deliverable description	REAMIT partners will identify and engage with industry bodies or policy organisations from other sectors where REAMIT technologies may have an application (e.g. EU Medicines Agency, EU Federation of Pharma industries, national health regulators)			
Description of progress achieved				
Evidence				

Work Package Project management (management)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
M	Project management	01-2019	07-2022	proceeding according to work plan	4 096.05	0.55

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED as LP of REAMIT has coordinated REAMIT activities in the first semester of 2019. BED has organised two REAMIT project meetings after the project has been approved (April 2019 in Lille, REAMIT Kick-Off Meeting in May 2019 Luton). At Lille event (attended by BED, I&R, NTU, Levstone) requirements for financial reporting and communication were clarified, including project webpage setup and standards. BED coordinated organisation of Kick-Off Meeting with support of NTU. Kick-Off Meeting was attended by most partners (BED, I&R, Valoral, UCD, Levstone, NTU, ITT, UoN, SenX, UU, Whysor). BED facilitated discussion at Kick-Off Meeting on exchange on PPs individual contributions to REAMIT, project activities started, activities planned for the next semester, staff working on REAMIT and recruitment status of new personnel. Several key decisions were made jointly by REAMIT consortium i.e. on memberships of REAMIT Steering Committee (RSC) and Advisory Committee (RAC), dates and locations of RSC and RAC meetings until end of the project, dates and locations of 3 REAMIT networking events. Minutes from Kick-Off Meeting were drafted by BED, circulated for comments within the consortium and agreed within one month. BED has started work on developing a draft of REAMIT Project Handbook that contains all necessary information for project management purposes, including terms of reference of RSC and RAC, project procedures, reporting requirements, project evaluation, partnership

agreement, risk register, key control register, GDPR requirements. Elements of Project Handbook will be discussed at project meeting in Sept 2019. Feedback and input from PPs on the content of Project Handbook will be forwarded to Project Manager, who will complete Project Handbook as priority task in 2019. BED has developed and keep updating a written Risk Register which identifies key project risks (grouped into financial, management, delivery, partnership) with a risk rating and mitigation actions for each. Each risk shall have a risk owner, responsible for reporting on risk management at one RSC meeting per year. Risk Register forms an appendix to Project Handbook. Updated Risk Register will be discussed at REAMIT meeting in Sept 2019. BED has developed Key Control Register and its updated version will be discussed at REAMIT meeting in Sept 2019. To explain requirements for REAMIT project financial management, control and reporting, BED has organised finance training delivered by BED's Management Accountant at the Kick-Off Meeting (May 2019). Training covered reporting requirements, rules on eligibility of expenditure, roles of PPs and FLCs in ensuring project sound financial management. WPs leaders responsible for WP Management, Communication and WPT1 have coordinated work and tasks under each of these WPs. This resulted in cooperation among PPs and joint implementation of tasks. Details are available in WP sections. REAMIT Project Manager and Communication Manager have been recruited by BED and NTU and will start working on REAMIT on 1 October and 1 September respectively. 5 REAMIT positions have been advertised: Big Data Research Hub Coordinator (BED), Research Associate (UU), Advisory post on Spectrometry (UU), PhD student (UCD), Postdoctoral Researcher (UCD). Recruitment process will be completed by end of 2019. 8 PPs (BED, I&R, DUC, UoN, ITT, SenX, Whysor, UU) have appointed their FLC; 4 PPs (Levstone, NTU, Fresh Detect, Dunbia) have approached audit companies and requested quotes for carrying out FLC. BED assisted PPs with drafting first progress reports in eMS by sharing information about funder's requirements. Based on PPs reports BED has developed REAMIT project report for first reporting period January-June 2019.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Information about the selection of REAMIT project for funding was received in Jan 2019 but the next 3 months were spent entirely in finalising Partnership Agreement and addressing technical requirements from JS. This has resulted in a delay of about 3 months to the project. The following delays are reported for WP Project Management: Project Handbook is not ready as planned (Feb-2019). Developing Project Handbook is the task of the Project Manager. This will be a priority task for REAMIT Project Manager who will join the REAMIT team on 1st October 2019. The plan to minimise this delay is to present a first draft of the Project Handbook at RSC meeting in September 2019, collect feedback and ideas from partners, and use it to finalize the document in the second semester of 2019.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity M.1	General project management	01-2019	01-2022	proceeding according to work plan
Deliverable M.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Project handbook		02-2019	behind schedule	
Deliverable description	A document which will collate all necessary information for project management purposes, including terms of reference of groups, project procedures, reporting requirements, partnership agreements, GDPR requirements etc			
Description of progress achieved	The main deviation from this plan relates to knock on delays from a delay in actual starting of the project. Developing Project Handbook will be the key task of the PM at the start when she joins the REAMIT team on 1st of October 2019. The plan to minimise this delay is to present a first draft of the Project Handbook at RSC meeting in September 2019, collect feedback and ideas from partners, and use it to finalize the document in the second semester of 2019.			
Evidence				
Deliverable M.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Minutes of meetings of RSC, and RAC and WP meetings - minimum six meetings each. The meetings of RSC and RAC will provide overall strategic direction of the project.		01-2022	proceeding according to work plan	
Deliverable description	RSC and RAC will meet every six months -two in the UK and one each in the remaining four partner countries. WP meetings will be organized one day before RSC meetings. Minutes of all these meetings will be circulated & agreed within 1 month.			
Description of progress achieved	The first meetings of RSC, RAC and WP meeting will take place in September 2019. Minutes from these meetings will be finalised within one month after the meeting.			
Evidence				
Deliverable M.1.3				
Deliverable title		Planned delivery month	Deliverable status	
Intermediate Work Package coordination		01-2022	proceeding according to work plan	
Deliverable description	The leaders of WP will be in regular touch with partners via emails, website and social media sites.			

	Whenever needed, conference facilities via phone, Skype or similar technology will be organised out by leaders of each WP or partners on demand.			
Description of progress achieved	Leaders of WP Project Management, WP Communication and WPT1 Adapting and pilot-testing sensor technologies in agri-food supply chains, have been particularly active coordinating the work and tasks carried out in the past semester. This is confirmed by progress made in project activities falling under these 3 WPs. More details are available in the description of progress in each WP.			
Evidence				
Deliverable M.1.4				
Deliverable title		Planned delivery month	Deliverable status	
Key control register for Project Management		09-2019	proceeding according to work plan	
Deliverable description	A register of key control milestones will be prepared by LP and made available to all partners. This register will include useful information (e.g., timetable, risks, meetings, etc.). This will be available online and updated regularly.			
Description of progress achieved	Key control register has been updated after Kick-Off meeting and will be presented to PPs at REAMIT meeting in September 2019. It will be finalised based on feedback from PPs.			
Evidence				
Activity	Title	Start month	End month	Status
Activity M.2	Risk register and risk review	01-2019	07-2022	behind schedule
Deliverable M.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Risk register		03-2019	proceeding according to work plan	
Deliverable description	Development & partner sign-off of a written risk register, forming an appendix to the project handbook.			
Description of progress achieved	BED has developed and keep updating a written Risk Register which identifies key project risks (grouped into financial, management, delivery, partnership) with a risk rating and mitigation actions for each. Each risk has a risk owner who is responsible for reporting on risk management at one RSC meeting per year. Risk Register forms an appendix to Project Handbook. Updated Risk Register will be discussed at REAMIT meeting in Sept 2019.			
Evidence				
Deliverable M.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Annual risk reviews		01-2022	not started	
Deliverable description	Written notes of annual risk register reviews for 2020 & 2021.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity M.3	Record keeping and reporting	01-2019	07-2022	proceeding according to work plan
Deliverable M.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project reports		07-2022	proceeding according to work plan	
Deliverable description	Submission of complete, accurate & timely, activity & financial reports every six months by the LP partners.			
Description of progress achieved	LP manages the reporting process and ensures all information is provided on time by partners in their partner report in eMS. Based on PPs' inputs, LP develops a consolidated project report, and submits it to JS after the report has been verified by LP FLC.			
Evidence				
Deliverable M.3.2				
Deliverable title		Planned delivery month	Deliverable status	

Finance training for partners		04-2019	proceeding according to work plan
Deliverable description	An event for all finance managers of all partners, to clearly set out the processes & procedures for claims & payments, & the partners' financial obligations in the project.		
Description of progress achieved	Finance training was delivered to PPs by LP Management Accountant at REAMIT Kick-Off Meeting (May 2019). It covered reporting requirements, rules on eligibility of expenditure, roles and responsibilities of PP and FLC in preparing partners' and project report.		
Evidence			

Work Package Adapting and pilot testing sensor technologies in agri-food supply chains (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T1	Adapting and pilot testing sensor technologies in agri-food supply chains	03-2019	06-2021	behind schedule	93 079.27	5.58

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Pilot tests are the most important activities in the first year of the project. To boost number of companies participating in pilot testing, I&R have led development of a single, centralised open call for companies to voluntarily participate in the testing and trialing of REAMIT technologies. Open Challenge Call document was developed with input from BED, Valoral, UoN, Levstone and SenX. Its final version has been agreed jointly by REAMIT consortium and published on REAMIT website. I&R have translated it to French, while NTU will translate it to German and Dutch. PPs (BED, I&R, Valoral, UCD, UoN, NTU, Whysor, UU) had contacted agri-food businesses: met with 5 companies, contacted over 30 companies, spread information about REAMIT to over 300 companies via business development events. Targeted field of activity of these companies is food processing/production or refrigerated transportation. At Kick-Off Meeting BED organised a presentation on IoT sensors technology by GATEWAY Electronic Company (Gatewaycando.com), distributors of sensors from sensor manufacturers. It was noted that some modern sensors are solar powered which enhances their utility in remote locations. The aim of presentation was to demonstrate examples of sensors, routers and their capabilities and initiate a discussion among REAMIT partners on possible engagement of some of them in REAMIT pilot tests. Furthermore, presentation aimed to facilitate the work on White Paper on Sensors coordinated by UU. White Paper shall summarize appropriate sensor technology that is available for food quality analysis and could be used in REAMIT. Draft White Paper with a list of sensors was sent to partners and partners have been asked to contribute to the list. The Paper will be advanced based on partners' input at Workshop on Sensors & Big Data (Sept 2019) organised by BED. With regards to adaptation of current technologies, UoN started developing new approaches to sensors based on optical methods to evaluate food quality and understand the quality gap between the normal food and waste. UoN have developed technical specification of REAMIT equipment and carried out tests to optimize optical parameters on 2 food matrices (shrimps&chicken). Technical specification of REAMIT equipment's is now ready and equipment will be purchased by Oct 2019. UCD started work on updating CyberBar technology to ensure relevance to Irish Pilot Study, work on a handbook for the trial of Cyberbar in Irish Pilot Study, and preparations of the plan for first Pilot Study in IE. Levstone has worked on developing a standalone miniature prototype IOT platform to test bed towards the final pilot tests with agribusiness users with the objective to aid the launch of the first pilot. While preparing for first pilot testing several exchanges took place and/or are being planned: UoN has discussed with companies producing fresh food their transport constraints and protocol followed to certify cold channel (to help UoN increase precision in the scope to supply the Raman technology equipment); Whysor exchanged with BED and UCD and potential pilot-companies; UU has scheduled a trail with Dunbia to obtain initial understanding of issues involved in fitting various kinds of sensors (temperature, humidity, etc.) in trucks and warehouses; discussions with Dunbia, I&R and BED on procurement of sensors (including fitting charges); with Whysor and Levstone on making sensors wifi enabled and connecting to the cloud; with BED on

data collection in the cloud (BED's big data hub) and data cleaning with Levstone and BED; with BED and Levstone on Big Data analytics and smartphone linking; with UCD on evaluation, life-cycle assessment and business model; with Dunbia on the use of 3D Fluorescence sensors in tracking food quality; with I&R and BED on specially procured external advisory expertise.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

The main deviation from the plan for pilot testing technologies relates to knock on delays from a delay in actual starting of the project. The following delays occur in WPT1: 1. The publication of the Open Challenge Call has had almost 3 month of delay. However, REAMIT consortium believes we can recover the time lost mainly because a first pilot is already identified in the AF and we will not implement all the pilots at the same time. Also, direct discussions with agri-companies took place who have agreed to participate in pilot tests. For instance, in France 2 new pilots have been identified. 2. Development of 'Test roadmap' is delayed 3 months due to late start of the project. 'Test roadmap' document will be developed immediately after Workshop on Sensors and Big Data scheduled in September 2019. 3. The key plan to overcome delay in REAMIT start up is to have as much of the review of technology completed (White Paper on Sensors) before the Workshop on Sensors and Big Data (Sept 2019). The draft White Paper on Sensors has been sent out to partners for comments and input (August 2019).

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T1.1 Working prototypes of sensor technologies based on pilot tests with agribusiness users	Five prototypes that use traditional and new sensor technologies to monitor quality of fresh produce and sends the data over WiFi, Cat-M, NB-IOT (or other radio technology) will be produced with agribusiness users recruited through the open call (A1.1)	5.01. Number of efficient natural and material resources implemented and tested	06.2021	5.00			proceeding according to work plan	
T1.2 Agribusiness companies supported in food waste reduction pilots	Agribusiness companies will be recruited through an open call to participate in the pilot tests in A1.2. Each company will benefit from the installation of new technologies for the test period, giving reductions in waste and savings in their costs.	CO01. Number of enterprises receiving support	06.2021	5.00			proceeding according to work plan	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T1.1	Open call for Agri-business agribusiness user companies for pilot tests	03-2019	03-2020	behind schedule
Deliverable T1.1.1				
Deliverable title		Planned delivery month		Deliverable status
Publication of open call		03-2019		behind schedule
Deliverable description	Partners would develop an open call for participation from companies willing to offer their premises & equipment to the testing of technologies. The call would be issued on the project webspace and through partner networks so that Risk 2 is minimised.			
Description of progress achieved	To boost number of end users and companies participating in pilot testing, I&R have led development of a guidance document for the Open Challenge Call. Several partners have contributed to this task by providing input (BED, Valoral, UoN, Levstone and SenX). Final version of the guidance document has been agreed jointly by the REAMIT consortium and published on the REAMIT website (June 2019). Currently English and French versions have been finalised by I&R, German and Dutch versions will be provided by NTU. The Open Challenge Call Guidance document contains information introducing the REAMIT project and its proposed technologies; characteristics of candidate companies who will			

		participate in REAMIT pilot testing; information about how pilot testing will be conducted; benefits from participation in pilot testing; guidance on how to prepare and submit a proposal for participation in pilot testing; and contact information to REAMIT team. PPs have also sent out information about REAMIT Open Challenge Call to businesses in their respective networks.		
Evidence				
Deliverable T1.1.2				
Deliverable title		Planned delivery month		Deliverable status
Companies recruited from across agri-business supply chain. Minimum 4 companies will be recruited across NWE so that there is a total of 5 user companies (including the one UK agribusiness user (PP12) that is already a partner) for minimum 5 pilot tests.		03-2020		behind schedule
Deliverable description		Partners expect to recruit a minimum of 4 companies to participate in the technology tests, with a representative mix of locations, sub-sectors etc. A simple MoU would be issued to them; no funding is involved. One UK user company is already a partner.		
Description of progress achieved		Despite partners' efforts too few companies have been recruited for pilot testing. This will be addressed at REAMIT project meeting in Sept 2019.		
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.2	Transnational synthesis of sensor technologies (Raman Spectroscopy from UoN, 3D Fluorescence from Ulster and CyberBar from UCD) and big data integration	03-2019	01-2021	proceeding according to work plan
Deliverable T1.2.1				
Deliverable title		Planned delivery month		Deliverable status
Partner workshop on sensors and big data		06-2019		proceeding according to work plan
Deliverable description		A workshop between knowledge partners and sensor/big data SME partners will bring forward all available knowledge about technologies, applications and potential combinations for food supply chains. An internal workshop with around 20 attendees.		
Description of progress achieved		At Kick-Off Meeting (Luton, May 2019) BED organised an internal workshop focusing on IoT sensors technology. Guests speakers from GATEWAY Electronic Company (Gatewaycando.com) were invited to present different sensors available in the market e.g. sensors sensitive to vibrations, humidity or temperature. It was noted that some modern sensors are solar powered which enhances their utility in remote locations. The invited speakers confirmed that GATEWAY EC, being distributors of sensors from sensor manufacturers, is capable of addressing client's individual and sophisticated requirements for a sensor solution, connecting sensors and provision of a complete solution including hardware and software. Their services can thus be summarised as 'provision of suggestions in front of customers'. The aim of the presentation was to demonstrate examples of sensors, routers and their capabilities, and initiate a discussion among REAMIT partners on possible engagement of some of them in REAMIT pilot tests. Furthermore, this presentation was an introduction to the work on the White Paper on Sensors, coordinated by UU. The White Paper shall summarize appropriate sensor technology that is available for food quality analysis and could be used in REAMIT. The Draft White Paper with a list of sensors was sent to partners (August 2019) and partners have been asked to contribute to the list. The Paper will be advanced based on partners' input at Workshop on Sensors & Big Data (Sept 2019) organised by BED.		
Evidence				
Deliverable T1.2.2				
Deliverable title		Planned delivery month		Deliverable status
Test roadmap		09-2019		not started
Deliverable description		The output from the workshop will be the production of an internal 'test roadmap' combining the results from the call for test companies (so we know how many tests, what kind of companies, and where) with the optimum technologies combinations.		
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status

Activity T1.3	Adapting and pilot testing of sensor technologies with agribusiness users	10-2019	06-2021	proceeding according to work plan
Deliverable T1.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Working prototypes using sensor technology		06-2021	proceeding according to work plan	
Deliverable description	The sensor and scanning technologies will tested along with other traditional sensors where needed and adaptations carried out wherever needed. Data flow to be checked. At the end of the pilot test, new working prototypes will be developed.			
Description of progress achieved	UoN started developing new approaches to sensors based on optical methods to evaluate food quality and understand the quality gap between the normal food and waste. UoN have developed technical specification of REAMIT equipment and carried out tests to optimize optical parameters on 2 food matrices (shrimps&chicken). Technical specification of REAMIT equipment's is now ready and equipment will be purchased by Oct 2019. UCD started work on updating CyberBar technology to ensure relevance to Irish Pilot Study, work on a handbook for the trial of Cyberbar in Irish Pilot Study, and preparations of the plan for first Pilot Study in IE. Levstone has worked on developing a standalone miniature prototype IOT platform to test bed towards the final pilot tests with agribusiness users with the objective to aid the launch of the first pilot. While preparing for first pilot testing several exchanges took place and/or are being planned: UN has discussed with companies producing fresh food their transport constraints and protocol followed to certify cold channel (to help UN increase precision in the scope to supply the Raman technology equipment); Whysor exchanged with BED and UCD and potential pilot-companies; UU has scheduled a trail with Dunbia to obtain initial understanding of issues involved in fitting various kinds of sensors (temperature, humidity, etc.) in trucks and warehouses; discussions with Dunbia, I&R and BED on procurement of sensors (including fitting charges); with Whysor and Levstone on making sensors wifi enabled and connecting to the cloud; with BED on data collection in the cloud (BED's big data hub) and data cleaning with Levstone and BED; with BED and Levstone on Big Data analytics and smartphone linking; with UCD on evaluation, life-cycle assessment and business model; with Dunbia on the use of 3D Fluorescence sensors in tracking food quality; with I&R and BED on specially procured external advisor			
Evidence				
Deliverable T1.3.2				
Deliverable title		Planned delivery month	Deliverable status	
User manual for each pilot test		06-2021	behind schedule	
Deliverable description	A user manual documenting the experience of pilot test and a step-by-step guide of good practice in each pilot test will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				
Deliverable T1.3.3				
Deliverable title		Planned delivery month	Deliverable status	
Report on the pilot test and development of the sensor prototypes		06-2021	not started	
Deliverable description	A report on the 5 sensor-based pilot tests will be compiled by participating partners and posted on the project webspace. It will describe in detail the experiences with the pilot test and give recommendations for future pilot tests.			
Description of progress achieved				
Evidence				

Work Package Big Data integration and applications to reduce food wastage. (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T2	Big Data integration and applications to reduce food wastage.	01-2019	07-2022	behind schedule	10 132.83	0.91

Partner's involvement

Abbreviation	Name

BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Some work on WPT2 has been initiated. UoN and I&R have started discussing the high data production by the optical methods and consequence on the coupling between these data and the transmission of signals. In parallel with its research work on coordinating the creation of a list of suitable and available sensors technologies, UU has been also considering the capabilities of the technology to be integrated into a big data solution. SenX has carried out analysis of REAMIT project background to define potential implementation (i.e. the new extension) of Warp 10 technology in the short term. In particular, SenX has started to carry out analysis of functional needs of REAMIT project and the benefits of the proposed solution from the industrial perspective of development of Wrap 10. Whysor has been discussing with Telos (at a meeting in Amsterdam IoT-expo 20 June 2019 and via phone and e-mail) issues related to big data integration based on blockchain technology. Moreover, Whysor has contacted the management of Interreg NWE project "Blockstart" to discuss their approach to big data integration based on blockchain technology. A live meeting with Blockstart team was scheduled in August 2019.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

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Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T2.4 Technology solutions developed	3 solutions will be developed: 1) a Big Data platform to detect loss of food quality and understand underlying factors, 2) a Smartphone APP to alert truck drivers, warehouse managers and owners of the produce of the potential quality issues with food in transport and make decisions on rerouting, 3) an integrated IoT sensor and big data solution which will help monitor food quality, make rapid decisions to reroute the food if there is deteriorating quality, and save food waste.	5.01. Number of efficient natural and material resources solutions implemented and tested	07.2022	3.00			not started	
T2.5 Companies supported in technology development	In this WP, potential suppliers and consumers linked to REAMIT corridors can self-enrol to participate in tests and trials. Our network events will be	CO01. Number of enterprises receiving support	07.2021	5.00			not started	

	used to run proactive campaign to include users subject to resource availability.							
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Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T2.4	Develop an interface to collect sensor data and send to cloud	07-2019	07-2021	not started
Deliverable T2.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Creation and launch of interface		07-2021	not started	
Deliverable desription	An interface will be developed for each of the 5 pilot tests for collecting data from sensors and sending them to the cloud for use in a transnational Big Data infrastructure			
Description of progress achieved				
Evidence				
Deliverable T2.4.2				
Deliverable title		Planned delivery month	Deliverable status	
User Manual on launching the interface		07-2021	not started	
Deliverable desription	A user manual documenting the experience of creating and launching the interface and a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.5	Development of Big Data infrastructure for analytics of sensor data and for rerouting to minimise food waste	01-2020	07-2022	not started
Deliverable T2.5.1				
Deliverable title		Planned delivery month	Deliverable status	
A big data platform with capability to collect and store sensors data from all REAMIT corridors		07-2021	not started	
Deliverable desription	This big data platform will be used as the hub for conducting business analytics, and will create an understanding of complex, transnational supply chains. This will be hosted in BED.			
Description of progress achieved				
Evidence				
Deliverable T2.5.2				
Deliverable title		Planned delivery month	Deliverable status	
Reports on Big Data platform performance		07-2022	not started	
Deliverable desription	Partners leading the activity will provide regular annual reports on the performance of the platform.			
Description of progress achieved				
Evidence				
Deliverable T2.5.3				
Deliverable title		Planned delivery month	Deliverable status	
A web-interface with self-enrol facility for enrolment of potential suppliers and consumers of food produce		07-2022	not started	
Deliverable desription	Potential suppliers and consumers can self-enrol after approval from the lead partner. This will be augmented using Google Maps data to identify potential destinations for rerouting food that would otherwise become waste.			

Description of progress achieved				
Evidence				
Deliverable T2.5.4				
Deliverable title		Planned delivery month	Deliverable status	
User manuals for the big data platform and the web-interface highlighted in the two deliverables above		07-2022	not started	
Deliverable desription	The user manuals will document the experience of creating the big data platform and the web-interface and include a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.7	Development of smartphone APP for use by truck drivers and warehouses	01-2020	07-2021	not started
Deliverable T2.7.1				
Deliverable title		Planned delivery month	Deliverable status	
Launch of smartphone APP for linking to food owners, truck drivers and warehouses.		07-2021	not started	
Deliverable desription	This APP will be developed and tested to work in Android and Apple smartphones. This APP will also be used to link to all relevant stakeholders for long terms dissemination after getting GDPR consent from all parties.			
Description of progress achieved				
Evidence				
Deliverable T2.7.2				
Deliverable title		Planned delivery month	Deliverable status	
User manual for the use of the APP		07-2021	not started	
Deliverable desription	A user manual documenting the experience of creating and launching the APP and a step-by-step guide of good practice will be developed for the benefit of food owners, truck drivers and warehouse managers using the APP.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.8	Delivering the integrated IoT/Big Data technology with capabilities on analytics and decision support to help reduce food waste in NWE.	01-2019	07-2022	not started
Deliverable T2.8.1				
Deliverable title		Planned delivery month	Deliverable status	
Deployment of the integrated IoT/Big Data/analytics/Decision support technology		07-2022	not started	
Deliverable desription	This integrated technology will have the capability to bring together the outputs of sensor technology and analytics to provide decision support to owners of food at risk, truck drivers and warehouse managers via the Smartphone APP.			
Description of progress achieved				
Evidence				
Deliverable T2.8.2				

Deliverable title		Planned delivery month	Deliverable status
A user manual for the integrated IoT/Big Data/analytics/Decision support technology		07-2022	not started
Deliverable description	A user manual documenting the experience of creating and launching the integrated IoT/Big Data technology and a step-by-step guide of good practice will be developed for the benefit of future users willing to test REAMIT technologies.		
Description of progress achieved			
Evidence			

Work Package Business development of REAMIT technologies (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T3	Business development of REAMIT technologies	01-2020	07-2022	not started	3 259.76	0.70

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

The work on this WP is scheduled to start in January 2021. Partners however have started to discuss (UoN and Routhiau company) how to integrate REAMIT technology in the production process and what it will bring for the business plan of Routhiau company. UCD have begun work on developing the novel dynamic life cycle assessment model which will be applied and tested on one of the REAMIT Pilot Studies. This however is ahead of schedule.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

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Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T3.2 Companies introduced to REAMIT business case	The business cases will be used to encourage businesses to take up the REAMIT approach of combined technologies and turn them into marketable products. The output is the number of companies (not currently partners) benefitting from an in-depth introduction	CO29. Number of enterprises supported to introduce new to the firm products	07.2022	10.00			not started	

	to the REAMIT approach.							
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Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T3.1	Risk, technology and sustainability assessments of REAMIT technologies (led by UCD with support from NTU, UU and BED)	01-2021	07-2022	not started
Deliverable T3.1.1				
Deliverable title		Planned delivery month	Deliverable status	
An assessment report of REAMIT technologies including a comprehensive systematic review (mapping) of the technical and business landscape in the fresh produce food chain.		09-2021	not started	
Deliverable description	The assessment report will be an internal document for partners, used as the basis for the business models development (AT3.4)			
Description of progress achieved				
Evidence				
Deliverable T3.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Life Cycle Assessment (LCA) for REAMIT		07-2022	not started	
Deliverable description	The life cycle assessment system will allow environmental impact data to be integration with REAMIT IoT sensor and big data solutions.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.2	Future-proofing REAMIT Technologies (led by UCD with support from BED)	01-2020	07-2021	not started
Deliverable T3.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Current and identified future REAMIT technology assessment report		07-2021	not started	
Deliverable description	The Future-proof report will be made available to SME technology developers with a view to identifying both the bottlenecks and potential solutions that can be used to drive future food quality analysis technology developments.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.3	Market assessment (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Market readiness report.		07-2022	not started	
Deliverable description	A market analysis and foresight report identifying forthcoming opportunities for REAMIT technologies to be developed into marketable products			
Description of progress achieved				
Evidence				

Activity	Title	Start month	End month	Status
Activity T3.4	Development of business case (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Business prospectus		07-2022	not started	
Deliverable description	An outward-facing document will be made available to SME technology developers, to potential buyers of technology approaches (large agri-business and logistics companies) and potential investors who can see the possibilities for product development.			
Description of progress achieved				
Evidence				
Deliverable T3.4.2				
Deliverable title		Planned delivery month	Deliverable status	
Business case for achieving 40,000 tonnes of waste reduction		07-2022	not started	
Deliverable description	The business case will use REAMIT data from continual monitoring of sensor data for identifying/saving potential food waste and subsequent analytics to understand patterns of food waste in NWE with justification for saving 40,000 tonnes of food waste.			
Description of progress achieved				
Evidence				

Work Package Communication (communication)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
C	Communication	01-2019	07-2022	proceeding according to work plan	6 948.40	1.40

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

NTU as leader of Communication WP has led the work on creating channels for effective communication among REAMIT partners and to strengthen external project communication. Staff from NTU attended the first project meeting (Approved Projects Workshop, April 2019, Lille) where requirements and standards for communication were clarified by JS. NTU discussed with LP elements of Communication WP and in particular REAMIT Communication Strategy and roles and responsibilities of PPs in the implementation of REAMIT communication activities. This was then presented by NTU to PPs at REAMIT Kick-Off Meeting for feedback and created awareness of expected involvement from each PP. Following guidelines from JS, NTU have worked on

developing REAMIT presence in social media. REAMIT accounts have been created in social media platforms such as Twitter (#reamit4nwe), Facebook (www.facebook.com/reamit4nwe), and LinkedIn (<https://www.linkedin.com/company/reamit/>) to populate project activities and attract businesses from fresh-food sector to participate in pilot testing. REAMIT Facebook page and Twitter handle have been regularly visited and used by PPs to reach out to new actors. NTU has supported LP in maintaining high level of interaction among PPs to support project activities. A new and dedicated email account for REAMIT project has been created (reamit@gmail.com) to collect all REAMIT related information at one place. With the involvement of PPs a project poster was developed, to be used at project and external events and partners' premises. PPs were involved in choosing the theme of the poster to help enhance visibility of REAMIT. Some partners have already used the poster to promote REAMIT at external events (Presentation of REAMIT poster in IMTA seminar, Brest, 12-13 June 2019 by UoN). I&R helped develop REAMIT website hosted under Interreg NWE Programme; and following the consent of all REAMIT partners, I&R have purchased a dedicated website domain (www.reamit.eu). Such domain facilitates web search and allows actors interested in REAMIT directly contact REAMIT team (e.g. when they want to submit a proposal to participate in REAMIT technology testing or raise queries about REAMIT technologies). When looking for reamit.eu under an internet browser, users will be automatically redirected to Reamit website hosted by Interreg NWE Programme. Given limited staff resources at LP, NTU supported BED with organisation of REAMIT Kick-Off Meeting. NTU sent out invitation to the Meeting to REAMIT PPs, identified businesses potentially interested in REAMIT technologies and sent them invitation through Eventbrite. NTU have updated REAMIT website with information about Kick-Off Meeting hoping to reach out to new businesses and institutional actors engaged in preventing food waste. Good organisation, proposed programme of Kick-Off Meeting and marketing efforts resulted in high level of attendance of REAMIT partners and sub-partners. Kick-Off Meeting helped PPs get to know each other better and created a platform for intensive interaction among businesses and academics to kick-off the project work. Since then, there has been a steep increase in the level of communication among REAMIT PPs, and continuation of this momentum remains a top priority for NTU. All presentations from REAMIT events are available at REAMIT website (www.nweurope.eu/reamit) which has been regularly updated. In its news section, the website showcases REAMIT's achievements and events (e.g. launching of the Open Challenge Call). All social media pages have been updated with REAMIT recruitment news. Project related photos have been uploaded in FB and regular tweets are made in Twitter page and LinkedIn. REAMIT PI from BED has been interviewed by BBC 3 Counties Radio on 31 July on REAMIT project. NTU appointed Communication Manager who is due to start working on REAMIT on 1st September.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Deviations from the WP Communication work plan relate to knock on delays from a delay in actual starting of the project. The following delays occur in WP Communication: - REAMIT Communication Strategy (RCS) document was not finalised by end of first quarter of 2019. Instead it will be finalised in the second semester of 2019. Nevertheless the lead of WP Communication has presented ideas for REAMIT communication strategy and activities at the Kick-Off meeting (May 2019), collected input from partners, and started to implement communication activities with the support of partners. Even though the RCS document has not been finalised yet, its elements and actions have been actually implemented and are progressing. REAMIT Communication Manager has been appointed and will join the REAMIT team on 1 September 2019. We expect that from September we will catch up on all activities in the WP Communication work plan.

Communication objectives - what is the progress toward the communication objectives as defined in the application form? The level of achievement should be cumulative; however the explanation should describe achievements in this reporting period

Project specific objectives	Level of achievement	Explanations
To raise awareness on the potential of sensor technology to monitor food quality in food supply chains. While there has been significant improvements in the capabilities of sensors and their connectivity over the internet, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains.	to a large degree	Raising awareness about REAMIT project, its proposed technology and benefits for agri-food companies has been conducted through several channels: PPs individually met with at least 5 companies; PPs directly contacted over 30 companies; over 300 companies have been informed about REAMIT through attending regional business development and similar events in partners' countries; at least 6 HEI were informed about REAMIT project through PPs participation in research conferences and workshops (Roehampton UK, Henan University China, Indian Institute of Science Bangalore India, IFC Brazil, Production/Operations Management Conference in the USA, MTA seminar at Brest June 2019); issuing one press release about REAMIT; broadcasting an interview with REAMIT LP and PI by BBC 3 Counties Radio.
To convince agribusiness users using the results of pilot studies that food waste can be significantly reduced by adopting REAMIT's integrated IoT-Big Data-Analytics technology solution. REAMIT will conduct regular networking events with agribusiness users, popularise the benefits of using these new technologies, and showcase demonstrations to influence their attitude.	to a minor degree	The work on influencing attitude of agribusiness users to get involved in REAMIT and its pilot testing and use REAMIT proposed technologies has started and has been a key activity of the REAMIT partnership in the past months. To increase number of companies participating in pilot tests, PPs have jointly developed Open Challenge Call terms of reference and guidance documents, which were uploaded on REAMIT website and sent out to potentially interested businesses. Information about the Open Challenge Call is currently available in English and French, while German and Dutch versions will follow shortly. Businesses interested in participation in REAMIT pilot tests can directly contact REAMIT team via dedicated REAMIT email address. In parallel REAMIT Partners conducted individual discussions with their partner companies or companies within their networks, and 5 of these companies have agreed to participate in pilot tests. First pilot tests will be carried out in the second semester of 2019 and results from these tests will be communicated to REAMIT target groups during annual network event scheduled in January 2020. Despite joint efforts undertaken by all PPs to attract more businesses to participate in pilot tests, this remains the key challenge/risk for the REAMIT consortium. Nevertheless, it is hoped that first pilot tests and their results will attract more companies to participate in technology testing and to start using REAMIT technologies in their daily business.
To raise awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. As highlighted earlier, while there has been significant improvements in the capabilities of sensors, their connectivity over the internet, and the potential of conducting data analytics, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains, collecting huge volumes of data on food quality across the NWE region to identify patterns of food wastage, most frequent causes of food waste, and, likely actions that would have maximum impact in reducing food waste. Policy briefs will be	-	

developed to provide action oriented solutions that can be favourably considered by policy makers in NWE.		
Using the analytics algorithms and decision support, REAMIT will identify patterns on food waste in NWE and assess the most frequent causes of food wastage along supply chains. By regularly publishing this information through blogs, social media, project outputs and policy briefs, REAMIT will make efforts to change behaviour of relevant stakeholders. For example, targeted feedback of the results to owners of food, decision support on redistribution of food to avoid food becoming waster, etc. will help change behaviour of owners of food and members of food supply chains at micro levels. Policy briefings to suggest best ways of avoiding food waste and regulatory suggestions will help reduce food waste in the region at a macro level.	-	
Based on the risk and sustainability assessment, the project aims to convince agribusiness users of the value of REAMIT's technologies in reducing food waste and increase profitability of their businesses. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help influence their attitude.	-	
Understand the risks involved in the technologies, to help design future-proof technologies for food waste reduction and also the sustainability issues. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help increase knowledge about sustainability aspects of technologies, knowledge and benefits of saving food waste, and policy oriented activities.	-	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity C.1	Start-up activities including communication strategy	01-2019	01-2022	behind schedule
Deliverable C.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Communication strategy document		01-2022	behind schedule	
Deliverable description	A communication strategy approved by Steering Committee (RSC) including guidelines on local, regional and inter-regional strategies will be delivered in the first quarter, and reviewed annually. It will outline approach to reach all target groups.			
Description of progress achieved	First ideas for REAMIT Communication Strategy was presented at REAMIT Kick-Off Meeting in May 2019. REAMIT Communication Strategy document has been advanced based on REAMIT partners' comments and contributions. Final version of the Communication Strategy document will be finalised in the second semester of 2019 by the Communication Manager, who is due to join the REAMIT team on 1st of September 2019.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.2	Digital activities	03-2019	07-2022	proceeding according to work plan

Deliverable C.2.1

Deliverable title	Planned delivery month	Deliverable status
Website launch	03-2019	proceeding according to work plan
Deliverable description	In line with communication rules specified in Interreg documents, the REAMIT webspace will be developed within the Interreg NWE site. It will include updated information on benefit to target groups, operational & technical specifications of IoT/ Big Data	
Description of progress achieved	REAMIT website has been developed hosted by Interreg NWE Programme. Furthermore, following the consent of all REAMIT partners, a dedicated website domain (www.reamit.eu) has been purchased. Such domain facilitates web search and allows actors interested in REAMIT directly contact REAMIT team e.g. when they want to submit a proposal to participate in REAMIT technology testing or raise queries about REAMIT technologies. When looking for reamit.eu under an internet browser, users will be automatically redirected to Reamit website hosted by Interreg NWE Programme. Currently REAMIT website has sections: Overview, News, REAMIT Open Challenge Call and Project Handbook. Once we start conducting pilot tests, two new sections will be added to the website: Benefits for target groups and Operational & technical specifications of IoT / Big Data.	
Evidence		

Deliverable C.2.2

Deliverable title	Planned delivery month	Deliverable status
Social media	03-2019	completed and achieved as planned
Deliverable description	Social media - twitter, Whatsapp, and Facebook will be added to facilitate more active project communication. This will create opportunity for discussion on any technological development in IoT and operational success of food waste management.	
Description of progress achieved	To develop REAMIT presence in social media and attract businesses from fresh food sector to get involved in pilot testing, the following REAMIT accounts have been created in social media platforms: - Twitter (#reamit4nwe) - Facebook (www.facebook.com/reamit4nwe) - LinkedIn (https://www.linkedin.com/company/reamit/) REAMIT Facebook page and Twitter handle have been regularly visited and used by PPs to reach out to new actors.	
Evidence		

Activity	Title	Start month	End month	Status
Activity C.3	Promotional material	01-2019	07-2022	proceeding according to work plan

Deliverable C.3.1

Deliverable title	Planned delivery month	Deliverable status
Project banners, posters and flyers	07-2021	proceeding according to work plan
Deliverable description	Banners and posters about the project will be developed in 4 languages. Banners will be kept in partners' workplaces and also in event venues to create visibility of the project. Posters will be used to promote the project in all major events conducted	
Description of progress achieved	With the involvement of PPs a project poster was developed, to be used at project and external events and partners' premises. PPs were involved in choosing the theme of the poster to help enhance visibility of REAMIT. Some partners have already used the poster to promote REAMIT at external events (Presentation of REAMIT poster in IMTA seminar, Brest, 12-13 June 2019 by UoN).	
Evidence		

Deliverable C.3.2

Deliverable title	Planned delivery month	Deliverable status
Policy briefs	01-2022	not started
Deliverable description	Based on the analytics of sensor data, policy oriented briefs will be developed for each country on the best ways to reduce food waste.	
Description of progress achieved		
Evidence		

Activity	Title	Start month	End month	Status
Activity C.4	Public Event(s)	01-2019	07-2022	not started

Deliverable C.4.1

Deliverable title	Planned delivery month	Deliverable status
Reports on REAMIT Networking events	12-2021	proceeding according to work plan
Deliverable description	Three REAMIT networking events will be conducted (1 annually) to reach all target groups in all five countries. The reports will be widely published to reach more members of target groups using traditional and electronic channels.	
Description of progress achieved	The first REAMIT annual networking event is scheduled in January 2020 and the partner responsible for its organisation is NTU. Preparation works of this event are underway and event's format, content, target groups, venue, etc. will be concluded based on PPs exchange and input at the RSC meeting in September 2019.	
Evidence		

Activity	Title	Start month	End month	Status
Activity C.5	Publication(s)	01-2019	07-2022	not started

Deliverable C.5.1

Deliverable title	Planned delivery month	Deliverable status
Journal article	07-2022	not started
Deliverable description	Scientific publication will target high-level academic journal. At least 2 articles will be produced from the project results	
Description of progress achieved		
Evidence		

Project report tables

Project report expenditure summary

Programme co-financing	Project total budget	Previously Declared	Previously declared but found ineligible	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report
Total co-financing	2 955 102.35	30 000.00	0.00	30 000.00	71 092.05	101 092.05	3.42	2 854 010.30	72163.09	71092.05	71092.05
Of which ERDF	2 955 102.35	30 000.00	0.00	30 000.00	71 092.05	101 092.05	3.42	2 854 010.30	72163.09	71092.05	71092.05
Partner contribution	1 970 068.26	20 000.00	0.00	20 000.00	47 394.73	67 394.73	3.42	1 902 673.53	48108.75	47394.73	47394.73
Total eligible expenditure	4 925 170.61	50 000.00	0.00	50 000.00	118 486.78	168 486.78	3.42	4 756 683.83	120271.84	118486.78	118486.78

Project expenditure per budget line

Budget line	Project total budget	Previously Declared	Previously declared but found ineligible	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report
Staff costs	3 404 444.17	0.00	0.00	0.00	99 530.84	99 530.84	2.92	3 304 913.33	101052.61	99530.84	99530.84
Office and administration	510 666.23	0.00	0.00	0.00	14 929.60	14 929.60	2.92	495 736.63	15157.88	14929.60	14929.60
Travel and accommodation	251 386.42	0.00	0.00	0.00	3 440.92	3 440.92	1.37	247 945.50	3475.93	3440.92	3440.92
External expertise and services	426 942.13	50 000.00	0.00	50 000.00	585.42	50 585.42	11.85	376 356.71	585.42	585.42	585.42
Equipment	331 731.66	0	0	0.00	0.00	0.00	0	331 731.66	0	0	0
Infrastructure and works	0.00	0	0	0.00	0.00	0.00	0	0.00	0	0	0
Total	4 925 170.61	50 000.00	0.00	50 000.00	118 486.78	168 486.78	3.42	4 756 683.83	120271.84	118486.78	118486.78
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0	0	0
Total eligible expenditure	4 925 170.61	50 000.00	0.00	50 000.00	118 486.78	168 486.78	3.42	4 756 683.83	120271.84	118486.78	118486.78

Project expenditure per WP

WP number	Project total	Previously	Currently reported	Total reported	% of total budget	Remaining budget	Total amount	Total amount	Total amount
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	budget	reported (certified by CA)	(amount to be declared to the JS)				declared by partner(s)	certified by FLC	included in project finance report
WP P	50 000.00	0.00	0.00	0.00	0	50 000.00	0	0	0
WP T1	1 668 704.18	0.00	93 079.27	93 079.27	5.58	1 575 624.91	93811.34	93079.27	93079.27
WP C	495 021.22	0.00	6 948.40	6 948.40	1.40	488 072.82	7860.92	6948.40	6948.40
WP M	749 083.57	0.00	4 096.05	4 096.05	0.55	744 987.52	4427.43	4096.05	4096.05
WP T3	462 892.07	0.00	3 259.76	3 259.76	0.70	459 632.31	3259.76	3259.76	3259.76
WP LT	390 743.04	0.00	970.47	970.47	0.25	389 772.57	970.47	970.47	970.47
WP T2	1 108 726.53	0.00	10 132.83	10 132.83	0.91	1 098 593.70	9941.92	10132.83	10132.83
Total	4 925 170.61	50 000.00	118 486.78	168 486.78	3.42	4 756 683.83	120271.84	118486.78	118486.78
Net Revenue	0.00	0.00	0.00	0.00	0	0.00	0	0	0
Total eligible expenditure	4 925 170.61	50 000.00	118 486.78	168 486.78	3.42	4 756 683.83	120271.84	118486.78	118486.78

Project expenditure per WP per budget line

WP number	Staff costs	Office and administration	Travel and accommodation	External expertise and services	Equipment	Infrastructure and works	Total expenditure	(net revenue)	Total eligible expenditure
WP LT	843.89	126.58	0.00	0.00	0.00	0.00	970.47	0.00	970.47
WP M	3 111.15	466.66	518.24	0.00	0.00	0.00	4 096.05	0.00	4 096.05
WP T1	78 434.46	11 765.18	2 294.21	585.42	0.00	0.00	93 079.27	0.00	93 079.27
WP T2	8 811.16	1 321.67	0.00	0.00	0.00	0.00	10 132.83	0.00	10 132.83
WP T3	2 834.58	425.18	0.00	0.00	0.00	0.00	3 259.76	0.00	3 259.76
WP C	5 495.60	824.33	628.47	0.00	0.00	0.00	6 948.40	0.00	6 948.40
Total	99 530.84	14 929.60	3 440.92	585.42	0.00	0.00	118 486.78	0.00	118 486.78

Funds

Invoices outside the programme area

Programme co-financing	Project total budget	Previously Declared	Previously declared but found ineligible	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	>% of total budget	Total amount declared by partner(s)	>Total amount certified by FLC	Total amount included in project finance report
Of which ERDF	2 955 102.35	0	0	0.00	0.00	0.00	0.00	0	0	0
Total	2 955 102.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Funds Per Partner

ERDF

Partner abbreviation	Project total budget	Previously declared	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report
BED	638 118.04	0.00	0.00	30 975.75	30 975.75	4.85	607 142.29	30 975.75	30 975.75	30 975.75
I&R	346 819.50	0.00	0.00	12 335.13	12 335.13	3.56	334 484.37	12 369.75	12 335.13	12 335.13
UCD	256 072.83	0	0.00	0.00	0.00	0	256 072.83	0	0	0
UoN	326 917.68	0.00	0.00	17 541.17	17 541.17	5.37	309 376.51	17 541.17	17 541.17	17 541.17
Levstone	200 467.50	0	0.00	0.00	0.00	0	200 467.50	0	0	0
NTU	272 425.13	0	0.00	0.00	0.00	0	272 425.13	0	0	0
Whysor	177 947.55	0	0.00	0.00	0.00	0	177 947.55	0	0	0
FD	0.00	0	0.00	0.00	0.00	0	0.00	0	0	0
ITT	114 858.00	0	0.00	0.00	0.00	0	114 858.00	0	0	0
SenX	165 613.26	0.00	0.00	10 240.00	10 240.00	6.18	155 373.26	11 276.42	10 240.00	10 240.00
UU	396 088.08	0	0.00	0.00	0.00	0	396 088.08	0	0	0
DNI	59 774.78	0	0.00	0.00	0.00	0	59 774.78	0	0	0
Total	2 955 102.35	0.00	0.00	71 092.05	71 092.05	2.41	2 884 010.30	72 163.09	71 092.05	71 092.05

Funds Per Budgetline**ERDF**

Budget line	Project total budget	Previously declared	Previously reported	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report	Total amount approved by JS	Total amount approved by MA	Total amount approved by CA	Total declared but found ineligible	Total amount in pipeline	Remaining budget including pipeline
Staff costs	2 042 666.49	0.00	0.00	59 718.49	59 718.49	2.92	1 982 948.00	60 631.56	59 718.49	59 718.49	0.00	0.00	0.00	913.05	59 718.51	1 982 947.98
Office and administration	306 399.73	0.00	0.00	8 957.74	8 957.74	2.92	297 441.99	9 094.72	8 957.74	8 957.74	0.00	0.00	0.00	136.96	8 957.76	297 441.97
Travel and accommodation	150 831.84	0.00	0.00	2 064.54	2 064.54	1.37	148 767.30	2 085.55	2 064.54	2 064.54	0.00	0.00	0.00	21.00	2 064.55	148 767.29
External expertise and services	256 165.27	30 000.00	30 000.00	351.25	30 351.25	11.85	225 814.02	351.25	351.25	351.25	0.00	0.00	0.00	0.00	351.25	255 814.02

Equipment	199 038.99	0	0.00	0.00	0.00	0	199 038.99	0	0	0	0	0	0	0	0.00	199 038.99
Infrastructure and works	0.00	0	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0.00	0.00
Net Revenue	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2 955 102.35	0.00	0.00	71 092.05	71 092.05	2.41	2 884 010.30	72 163.09	71 092.05	71 092.05	0.00	0.00	0.00	1 071.03	71 092.06	2 884 010.29

Project expenditure per partner

Partner overview

Partner abbreviation	Project total budget	Previously declared	Previously declared but found ineligible	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report	Total amount approved by JS	Total amount approved by MA	Total amount approved by CA	Total declared but found ineligible	Total amount in pipeline	Remaining budget including pipeline
BED	1 063 530.07	0.00	0.00	0.00	51 626.26	51 626.26	4.85	1 011 903.81	51 626.26	51 626.26	51 626.26	0.00	0.00	0.00	0.00	51 626.26	1 011 903.81
I&R	578 032.50	0.00	0.00	0.00	20 558.55	20 558.55	3.56	557 473.95	20 616.25	20 558.55	20 558.55	0.00	0.00	0.00	57.70	20 558.55	557 473.95
UCD	426 788.05	0	0	0.00	0.00	0.00	0	426 788.05	0	0	0	0	0	0	0	0.00	426 788.05
UoN	544 862.80	0.00	0.00	0.00	29 235.29	29 235.29	5.37	515 627.51	29 235.29	29 235.29	29 235.29	0.00	0.00	0.00	0.00	29 235.29	515 627.51
Levstone	334 112.50	0	0	0.00	0.00	0.00	0	334 112.50	0	0	0	0	0	0	0	0.00	334 112.50
NTU	454 041.89	0	0	0.00	0.00	0.00	0	454 041.89	0	0	0	0	0	0	0	0.00	454 041.89
Whysor	296 579.25	0	0	0.00	0.00	0.00	0	296 579.25	0	0	0	0	0	0	0	0.00	296 579.25
FD	0.00	0	0	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0.00	0.00
ITT	191 430.00	0	0	0.00	0.00	0.00	0	191 430.00	0	0	0	0	0	0	0	0.00	191 430.00
SenX	276 022.10	0.00	0.00	0.00	17 066.68	17 066.68	6.18	258 955.42	18 794.04	17 066.68	17 066.68	0.00	0.00	0.00	1 727.36	17 066.68	258 955.42
UU	660 146.81	0	0	0.00	0.00	0.00	0	660 146.81	0	0	0	0	0	0	0	0.00	660 146.81
DNI	99 624.64	0	0	0.00	0.00	0.00	0	99 624.64	0	0	0	0	0	0	0	0.00	99 624.64
Total	4 925	0.00	0.00	0.00	118	118	2.41	4 806	120	118	118	0.00	0.00	0.00	1 785.06	118	4 806

	170.61			486.78	486.78		683.83	271.84	486.78	486.78				486.78	683.83
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Partner totals**Partner budget line**

Partner abbreviation	Staff costs	Office and administration	Travel and accommodation	External expertise and services	Equipment	Infrastructure and works	Total expenditure	(net revenue)	Total eligible expenditure
BED	43 437.90	6 515.70	1 087.24	585.42	0.00	0.00	51 626.26	0.00	51 626.26
I&R	16 280.97	2 442.14	1 835.44	0.00	0.00	0.00	20 558.55	0.00	20 558.55
UoN	25 422.01	3 813.28	0.00	0.00	0.00	0.00	29 235.29	0.00	29 235.29
SenX	14 389.96	2 158.48	518.24	0.00	0.00	0.00	17 066.68	0.00	17 066.68
Total	99 530.84	14 929.60	3 440.92	585.42	0.00	0.00	118 486.78	0.00	118 486.78

Partner workpackage

Partner	Total expenditure	(net revenue)	Total eligible expenditure
BED	51 626.26	0.00	51 626.26
I&R	20 558.55	0.00	20 558.55
UoN	29 235.29	0.00	29 235.29
SenX	17 066.68	0.00	17 066.68
Total	118 486.78	0.00	118 486.78

Partner in kind contribution

Partner Abbreviation	Previously reported (certified by CA)	Currently reported (amount to be declared to the js)	Total reported
BED	0.00	0.00	0.00
I&R	0.00	0.00	0.00
UoN	0.00	0.00	0.00
SenX	0.00	0.00	0.00
Total	0.00	0.00	0.00

Spending profile

Partner Abbreviation	Period Target Current Report	Currently reported (amount to be declared to the js)	Current Report Forecast	Cumulative Target	Previously Reported	Comparison	Comparison percent	Next Report Forecast
BED	268 383.49	51 626.26	0	318 383.49	0.00	266 757.23	16.22	268 383.49
I&R	168 206.00	20 558.55	0	168 206.00	0.00	147 647.45	12.22	65 000.00
UCD	94 703.25	0.00	0	94 703.25	0.00	94 703.25	0.00	264 391.60
UoN	172 232.45	29 235.29	0	172 232.45	0.00	142 997.16	16.97	142 997.16

Levstone	77 955.00	0.00	0	77 955.00	0.00	77 955.00	0.00	77 995.00
NTU	127 418.77	0.00	0	127 418.77	0.00	127 418.77	0.00	0
Whysor	73 206.75	0.00	0	73 206.75	0.00	73 206.75	0.00	50 000.00
FD	0.00	0.00	0	0.00	0.00	0.00	0	0
ITT	49 580.00	0.00	0	49 580.00	0.00	49 580.00	0.00	25 000.00
SenX	65 496.10	17 066.68	0	65 496.10	0.00	48 429.42	26.06	18 794.04
UU	187 075.33	0.00	0	187 075.33	0.00	187 075.33	0.00	108 544.50
DNI	28 162.87	0.00	0	28 162.87	0.00	28 162.87	0.00	0.00
Total	1 312 420.01	118 486.78	0.00	1 362 420.01	0.00	1 243 933.23	8.70	1 021 105.79

Project progress report NWE831 REAMIT

Project progress report identification

Title	Improving Resource Efficiency of Agribusiness supply chains by Minimising waste using Big Data and Internet of Things sensors
Acronym	REAMIT
Number	NWE831
Start date	30-06-2019
End date	30-12-2019
Priority	Priority Axis 3 Resource and materials efficiency
Specific objective	SO5: To optimise (re)use of material and natural resources in NWE
Lead partner	University of Bedfordshire
Contact person	University of Bedfordshire
Reporting period	Period 1 : 10-01-2019 - 31-12-2019

Highlights of main achievements

WP Project Management: recruited 4 staff members; advertised 3 more positions (Research Fellow & Big Data Hub Coordinator at BED, Postdoctoral Researcher for Dynamic Modelling of the Supply Chain at UCD, Research Assistant in the area of Data Analytics at ITT); all PPs appointed FLC; advanced Project Handbook; advanced Risk Log; submitted first REAMIT report and payment claim to JS; 1st RAC+RSC+RWP meeting attended by 10 PPs, 1 Sub-P, 2 APs (Sept-2019, Luton UK) resulting in better communication and cooperation among PPs; agreed cooperation plan on most urgent joint tasks (strategies to recruit companies for pilot tests, specification of parameters of pilot tests, launching pilot tests, creation and launch of interface to collect sensor data and send it to cloud, organisation of first REAMIT Symposium, developing REAMIT network prospectus); 6 bilateral meetings among PPs took place

WP Long Term: developed first REAMIT Symposium (9 Jan-2020, Nottingham UK), promoted REAMIT at 'NWE making an impact' (4-5 Dec-2019, Tourconing, France), developed first draft of framework for measuring impact of REAMIT technologies on reducing food waste, advanced work on REAMIT network prospectus

WP Communication: advanced Communication Strategy, improved and animated REAMIT website, developed REAMIT promotional materials (flyer, brochure, 2 videos, banners, newsletter), intensified REAMIT presence in social media.

WPT1: advanced preparatory work to launch pilot tests, advanced White Paper on sensor technologies and developed a draft of a conference paper on sensors, advertised Open Challenge Call on REAMIT website (EN, FR, DE, NL), developed section on 'benefits' from Pilot Tests, developed Pilot Test Roadmap

WPT2: created & launched interface to collect sensor data and send it to cloud, drafted specification of equipment for Big Data Hub

WPT3: conducted research into the state of the art in terms of life cycle assessment and food waste

Project specific objectives

Project specific objectives	Level of achievement	Explanations
1 - To pilot test sensor technologies in agri-food supply chains in the five partner countries	to a minor degree	Only 2 companies have been recruited so far (by Whysor) for pilot tests of REAMIT technologies - one company in Germany and one company in the NL. Both companies expect to have confidentiality agreement signed with REAMIT partner Whysor before pilot tests are commenced. In Feb-2020 BED approached JS for advise on the content of confidentiality agreement. In many other cases companies invited to pilot tests REAMIT technologies wish to know in advance what benefits they can expect from participation in REAMIT pilot tests. Although REAMIT partnership can only speculate about such benefits before actual pilot tests are carried on (this seems to be a catch 22 situation for REAMIT), REAMIT partnership is developing communication materials outlining potential benefits for food producer and food transporter companies from participation in REAMIT pilot tests. Communication materials include a new section in the Open Challenge Call document, infographics, video, and REAMIT elevator speech. All of these materials outline benefits for food producer and food transporter companies from participation in REAMIT pilot tests, and are classified as: financial benefits, technology benefits, image building benefits and benefits from accessing wide expertise and network. Recruiting more companies for REAMIT pilot test is an urgent priority for all partners for first months of 2020. Partners are discussing pilot testing with relevant companies (NTU with a company in UK, UCD with a company in IE, I&R with a company in France), so we expect to have at least 3 more pilot tests in pipeline.
2 - To develop Big Data infrastructure for analytics and decision support to reduce food waste	to a minor degree	REAMIT partnership commenced work towards achieving these objectives. In particular, work on implementation of WPT2 has so far been done by BED, Whysor, Levstone, SenX. BED finalised recruitment process of research fellow to manage and administer Big Data Hub at BED. Once the new colleague joins BED (March/April 2020), BED will purchase components to build Big Data Hub at BED. Whysor built a platform for REAMIT available via reamit.whysor.com . The platform is the base for receiving data from the sensors. From here, data can be made available for and/or forwarded to other parties for data cleansing and analytics. The connector of the platform has been prepared for connection with the gateways and event logger. Considering the choice of the LORA protocol for collecting data from sensors in at least two REAMIT pilot pilots, SenX has developed a component to ingest such data. Also, SenX has worked with Whysor on extending the use of LORA and supported BED with developing REAMIT Big Data platform to be ready to ingest data coming from different pilot tests. More intensified work in the implementation of WPT2 will take place in first semester of 2020, as foreseen in the AF. As soon as we have first pilot test running, we can start collecting data from sensors and send it to Big Data Hub at BED for analytics. Once we have first results from data analytics, we can model algorithms supporting decision making within agri food supply chain to redirect food and/or save food from becoming waste. We can then show case this to wide range of agri businesses end users across NWE region to attract more companies for pilot tests. Once we have all REAMIT components linked and in action, we can show case to policy actors how the REAMIT technology works in practice, how it creates (new) links among agri food supply chain actors to improve decision making and saves food from becoming waste. Progress of WPT2 is therefore strictly connected with progress of WPT1.
3 - To bring the REAMIT combination of technologies closer to market	not achieved	Work towards achieving this objective has not started yet.

Project main outputs achievement

Programme output indicators	Sum of output indicator targets	Sum of achieved output indicators so far	Project main output indicator number	Project main output title	Project main output quantification target	Planned delivery	Achieved so far	Level of achievement
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	0.00	T1.1.1	Working prototypes of sensor technologies based on pilot tests with agribusiness users	5.00	10-06-2021	0.00	behind schedule
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	0.00	T2.4.1	Technology solutions developed	3.00	10-07-2022	0.00	proceeding according to work plan
CO01. Number of enterprises receiving support	10.00	2.00	T1.2.2	Agribusiness companies supported in food waste reduction pilots	5.00	10-06-2021	2.00	behind schedule
CO01. Number of enterprises receiving support	10.00	2.00	T2.5.2	Companies supported in technology development	5.00	10-07-2021	0.00	not started
CO29. Number of enterprises supported to introduce new to the firm products	10.00	0.00	T3.2.1	Companies introduced to REAMIT business case	10.00	10-07-2022	0.00	not started

Target groups reached

Target groups	Target value	Target groups reached (prev. periods)	Target groups reached current period	Source of verification	Description of target group involvement	Target groups reached so far (%)
local public authority	10.00	0.00	0.00			0.00
regional public authority	5.00	0.00	0.00			0.00
national public authority	5.00	0.00	0.00			0.00

interest groups including NGOs	5.00	1.00	20.00	List of participants showing that REAMIT staff (BED, NTU, Whysor and UU) attended this event.	Several people of other projects were informed of the goals and targets of the REAMIT project at 'NWE making an Impact!' event on 4-5 Dec-2019 Tourcoing, France. Among them Idea, QCAP (Quality Control in fresh Agro Products), Blockstart, FoodHeroes, ST4W, UV-Robot, AgriwasteValue, Fabulous farmers, Mitecontrol, Happy Moo. Idea develop economic viable value chain based on micro-algae; QCAP are trying to measure VOC in higher sensitivities and lower cost. Blockstart uses blockchain for transactions between SMEs and foodheroes uses male meat to reduce food waste. UV Robot develops and implements pest management strategy for 3 crops, Agriwaste Value transform agrifood by-products into components to be used in cosmetics and chemistry, Fabulous Farmers decrease use of pesticides and chemical fertilisers, Mitecontrol focus on egg production, and Happy Moo develops tool to monitor cows welfare.	420.00
higher education and research	20.00	5.00	17.00	For UU: List of attendees, agenda, eventbrite confirmation of attendance. For NTU: List of attendees, email exchange.	UU informed people about REAMIT project at CINE event (4-8 Dec-2019, Donegal, UK). NTU attended the IoFT Conference, Lincoln Institute of Agri-food Technology, Lincoln (Sept-2019). Through this, NTU made connections with STFC Group, N8 Agrifood, TFC group including contacts from University of Nottingham, HMRC innovation lead and food & drink companies.	110.00
enterprise, excluding SME	10.00	0.00	8.00	Email exchanges, invitation to events hosted by these companies.	4 big companies were approached by NTU, (among them ADAS and Farming UK) and 4 by Whysor with communication about REAMIT project and its proposed approach. For NTU this resulted with an invitation to events hosted by these companies.	80.00
SME	10.00	0.00	7.00	Email exchanges.	I&R has been communicating with 4 SMEs in relation to developing the French Pilot Test. These are: Expertise center for agri-businesses (Sym'Previus tool); Food Producer SME - Jean Routhiau; Food transporting company STeF; IQRF sensor company. NTU has contacted 3 SMEs within agri food sector in UK (OLIO, Nottingham Good Food partnership, Sneinton Community Market) and invited them to pilot test REAMIT technologies.	70.00
business support organisation	5.00	0.00	0.00			0.00

sectoral agency	5.00	0.00	2.00	Agenda of the event; list of attendees, email exchanges	Through attending IoT Conference at Lincoln Institute of Agri-food Technology, Lincoln (Sept-2019), NTU obtained at least 15 key influential contacts that were later invited as speakers at REAMIT Symposium (i.e. Dermot Lynch from ABB Robotics, Caroline Wilcock from the N8 Agrifood network who has since invited NTU to their annual N8 Agrifood conference, Judith Batchelar, Director of Sainsbury's brand involved in largest supermarket chains to tackle issues like sustainable packaging and food waste). The most important message from this event was the importance of the mesh between digital technologies that enable digitalisation of food production and supply chain. The most influential contacts NTU has made were with Agrimax and Biovale.	40.00
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Problems and solutions found

First challenge has been recruitment of companies for pilot tests of REAMIT technologies. Even though Open Challenge Call document was translated to 4 languages (EN-FR-DE-NL), it did not help attract end user companies from across NWE region. End user companies wish to know what benefits they can gain from participation in REAMIT pilot tests, while REAMIT PPs cannot provide clear answers, until first pilot tests have run and provided data for analytics. Also, attracting end users for pilot tests is often a long discussion process, longer than foreseen by PPs. To address this challenge, PPs have developed text listing benefits for end users from participation in pilot tests and infographics presenting these benefits. Also, PPs brainstormed about REAMIT elevator pitch which lists benefits from using REAMIT technologies. All PPs would use their networks and make more efforts to recruit end user companies for pilot tests from within their networks.

Second challenge has been limited availability of Dunbia to carry out pilot tests in Dunbia trucks. At Dec-2019 meeting, Dunbia partner confirmed that no or little meat was wasted in Dunbia's trucks during transportation, hence pilot test with Dunbia needed to refocus. Dunbia suggested investigating ways to reduce production of dark cutter beef, which is rejected by consumers due to appearance, thus contributes to growing volume of wasted fresh beef meat. This involves some ethical issues (that need to be resolved) related to placing sensor inside cow's stomach. An alternative end user company is being sought for pilot test in UK, i.e. NTU invited 3 SMEs to pilot tests in UK.

Despite indicating new avenues for REAMIT pilot tests with Dunbia, Dunbia showed little support for REAMIT (did not attend RSC meetings in May-2019, Sept-2019, Jan-2020; REAMIT Symposium Jan-2020); did not contribute to activities carried out by PPs. Changing Dunbia status from PP to AP is being discussed.

Horizontal Principles

Horizontal principles	Contribution in this reporting period	Description of the contribution
Equal opportunity and non-discrimination	as planned	Every effort has been made in REAMIT project to promote equal opportunities and non-discrimination.
Equality between men and women	as planned	Every effort has been made in REAMIT project to promote equality between men and women. The REAMIT consortium consists of a mix of men and women and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (PM at BED, CM at NTU, PM at Whysor) and men (Research Fellow at UU, Research Fellow at BED).
Sustainable development (environment)	as planned	Initiation of development of new REAMIT technologies to be later applied in agri-food supply chain companies will have positive impact on environment due to reduced food waste thus reduced amount of used natural resources.

Fully implemented

Implemented (to be ticked at the last reporting period, only when the project has fully been achieved):	No
Implemented on:	

Reporting per WP overview

Start	End	Type	Title
Jan.2019	Jan.2019	preparation	Preparation
Jan.2019	Jul.2022	implementation	Long term
Jan.2019	Jul.2022	management	Project management
Mär.2019	Jun.2021	implementation	Adapting and pilot testing sensor technologies in agri-food supply chains
Jan.2019	Jul.2022	implementation	Big Data integration and applications to reduce food wastage.
Jan.2020	Jul.2022	implementation	Business development of REAMIT technologies
Jan.2019	Jul.2022	communication	Communication

Work Package Preparation (preparation)

WP no	Title	Start month	End month	WP Status
P	Preparation	01-2019	01-2019	not started

Partner's involvement

Abbreviation	Name
UoN	Université de Nantes
BED	University of Bedfordshire (Lead Partner)
UCD	National University of Ireland, Dublin, University College Dublin
NTU	Nottingham Trent University
ITT	Institute of Technology in Tralee
Levstone	Levstone Ltd.
FD	FreshDetect (to be deleted)
I&R	Images & Réseaux
Whysor	Whysor
SenX	SenX

Summary description of activities carried out and contribution of each partner

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Work Package Long term (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
LT	Long term	01-2019	07-2022	proceeding according to work plan	28 324.09	0.25

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Work on REAMIT network prospectus has progressed. BED and NTU approached organisations and networks involved in food waste reduction and as first step invited them as speakers at the REAMIT Symposium, to bilateral exchanges to seek synergies between their respective food waste reduction actions and to devise strategies for food waste reduction. Organisations who responded positively are WRAP, Sustainable Food Cities, ADAS, Farming UK and Interreg NWE project Food Heroes. NTU with the support from BED, UU, UoN, Levstone, I&R (Valorial), SenX, UCD, has developed first REAMIT Symposium (9 Jan-2020, Nottingham UK). It hosted 50 participants from industry, food companies, academia. Staff from three industries strategic for REAMIT attended the Symposium: food, logistics and technology. REAMIT partners have supported NTU in promoting the REAMIT Symposium among their networks. BED, with support of NTU, UU, UoN and Whysor, formulated REAMIT's input to 'NWE making an impact' (4-5 Dec-2019, Turconing, France). BED, with support of NTU, UU and Whysor, set up REAMIT stand, presented REAMIT video, two posters (from UU and UoN) and flyer. They presented REAMIT to visitors and actively promoted REAMIT through liaising with organisations involved in other Interreg NWE projects focused on food and food waste reduction. Possibilities for cooperation with new organisations and capitalisation of REAMIT approach were explored. Visitors at REAMIT stand were interested in Raman Spectroscopy and the idea of having an APP connecting all critical links in food supply chains necessary for quick decision making and redirecting food. I&R and UCD started to prepare second (5th Nov-2020, Nantes, France) and third (2021, Dublin, Ireland) REAMIT Symposia by establishing new contacts with agribusinesses and technology companies (which will be exposing at Symposia) and national and EU projects in the field of food waste, to enable development of future collaborations. BED has developed first draft of framework for measuring the impact of REAMIT technologies on food waste. It was sent to partners for feedback in Dec-2019. REAMIT team presented REAMIT project regularly at external events (BED attended conference at Swansea University, UK), UNT and BED delivered guest lectures to create awareness of REAMIT (UNT, Nottingham, UK; IITM, India); NTU attended the IoFT Conference in Lincoln, UK (Sep-2019) arranged by the Lincoln Institute of Agri-food Technology. Through this, NTU made connections with STFC Group, N8 Agrifood, TFC group including contacts from the University of Nottingham, HMRC innovation lead and food & drink companies. NTU have obtained at least 15 key influential contacts that were invited as speakers at REAMIT Symposium (9 Jan-2020 Nottingham, UK), such as Dermot Lynch from ABB Robotics, Caroline Wilcock from the N8 Agrifood network who then invited NTU to annual N8 Agrifood conference; Judith Batchelar, Director of Sainsbury's brand, involved in challenges of largest supermarket chains to tackle issues like sustainable packaging and food waste. The most important message from this event was the importance of the mesh between digital technologies that enable digitalisation of the food production and supply chain. The most influential contacts NTU has made were with Agrimax and Biovale. PPs engaged in communicating about REAMIT within their networks with the aim to recruit new industrial partners to test REAMIT technologies, to raise awareness about REAMIT and to attract business and institutional actors to follow up and cooperate with REAMIT. NTU extended their networking with other academics (University of Lincoln) and non-academic (ADAS) organisations working on food waste reduction through contacts from N8 Agrifood conference; Levstone established a new contact with a food charity.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

No deviations to report.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity LT.1	Creating a self-sustaining REAMIT Network	01-2019	07-2022	proceeding according to work plan
Deliverable LT.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Network prospectus		09-2020	proceeding according to work plan	
Deliverable description	BED as coordinator will engage partners to develop a network prospectus, setting out the principles by which the network will operate, and ensure financial sustainability based on a low-cost model of voluntary contributions from partners and members.			
Description of progress achieved	Work on REAMIT network prospectus has progressed. Especially BED and NTU approached organisations and networks involved in food waste reduction and as first step invited them as speakers at the REAMIT Symposium, to bilateral exchanges to seek synergies between their respective food waste reduction actions, and to devise strategies for food waste reduction. Organisations who responded positively are WRAP, Sustainable Food Cities, ADAS, Farming UK and Interreg NWE project Food Heroes. Other organisations who responded positively and are keen to have a dialogue with REAMIT are STFC Group, N8 Agrifood, TFC group, HMRC innovation lead and food & drink companies, ABB Robotics, Sainsbury's, Agrimax and Biovale. Furthermore, NTU is developing self-enrollment function at REAMIT website to enable interested actors to enroll in the REAMIT network.			
Evidence				
Deliverable LT.1.2				
Deliverable title		Planned delivery month	Deliverable status	
REAMIT networking events: 2019, 20 and 21 including invited lectures from experts		07-2021	proceeding according to work plan	

Deliverable description	Partners will bring together agribusiness & technology SMEs from REAMIT countries for a 1-day annual conference: (i) to ensure that REAMIT technologies keep pace with technology developments; and (ii) to maximize achievement of REAMIT's objectives.			
Description of progress achieved	In the second semester of 2019, NTU with help of BED, UU, Levstone, I&R (and Valorial), SenX, UoN and UCD, developed REAMIT first Symposium scheduled on 9 Jan-2020 in Nottingham, UK. All REAMIT partners promoted the Symposium within their networks. Given the Symposium was scheduled early in Jan-2020, most of the preparatory work to develop the content of the event was done in 2019. In particular, NTU with support of BED, approached several organisations and individuals in UK and EU, with an invitation to speak and present at the Symposium. In consequence, there were 13 presentations made by speakers representing academia, Agri-Food businesses and consultancies, technology companies; and 6 exhibitions, where invited SMEs presented their technology applicable to food waste reduction. The first REAMIT Symposium was aimed at Agribusiness stakeholders, IoT practitioners, Academics and actors in Agri-food supply chains. Seven REAMIT partners attended as speakers i.e. Ulster University (UK), Levstone (UK), Valorial (FR), UCD (IE), BED (UK), SenX and NTU (UK). The Symposium was an opportunity to build networks within Food Supply Chain industry, explore common challenges in reducing food waste, explore the role of IoT and Big Data technologies in food supply chain and promote collaboration and networking. More about the first REAMIT Symposium (details about the content, presentations, pictures, and follow up actions) will be presented in the next reporting round covering the period Jan-July 2020.			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.2	Regularly updating framework for measuring the impact of REAMIT technologies on food waste	01-2019	07-2022	proceeding according to work plan
Deliverable LT.2.1				
Deliverable title		Planned delivery month		Deliverable status
The agreed framework for measuring the impact of REAMIT technologies on food waste		12-2019		proceeding according to work plan
Deliverable description	The framework for measuring the impact of REAMIT technologies on food waste will be agreed at the first networking event in December 2019.			
Description of progress achieved	BED has developed first draft of framework for measuring the impact of REAMIT technologies on food waste. It was sent to partners for feedback in Dec-2019 and discussed for the first time with all partners at REAMIT Steering Committee meeting on 16 January 2020 in Rennes.			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.3	Ensuring policy impact	01-2019	07-2022	not started
Deliverable LT.3.1				
Deliverable title		Planned delivery month		Deliverable status
Policy briefings		03-2022		not started
Deliverable description	Meetings or briefing papers issued jointly from the partnership to national or EU-level policy formers to engage in a dialogue over the fit of REAMIT technologies to national and EU food waste reduction targets and policies.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.4	Roll-out to other sectors	01-2019	07-2022	not started
Deliverable LT.4.1				
Deliverable title		Planned delivery month		Deliverable status
Cross-sector briefings		06-2022		not started

Deliverable description	REAMIT partners will identify and engage with industry bodies or policy organisations from other sectors where REAMIT technologies may have an application (e.g. EU Medicines Agency, EU Federation of Pharma industries, national health regulators)
Description of progress achieved	
Evidence	

Work Package Project management (management)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
M	Project management	01-2019	07-2022	proceeding according to work plan	68 659.10	0.55

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

As LP, BED was responsible for general project management in second semester of 2019. BED coordinated partners' activities according to Work Plan and Work Packages, coordinated communication between partnership and JS, checked quality standards during first reporting round, wrote and submitted to JS REAMIT first report and payment claim; based on feedback from JS, BED corrected REAMIT project first report and forwarded relevant information to affected partners. BED informed selected PPs about the need to improve quality of future reports. In Dec-2019 BED sent out to REAMIT partners information about calendar and requirements for second REAMIT reporting round covering July-Dec 2019. Based on input from PPs, BED advanced REAMIT Project Handbook; with support from NTU, BAD organised and hosted first meeting of RAC+RWP+RSC (11-12 Sept 2019, Luton, UK); with support of I&R, BED organised second RAC+RWP+RSC meetings hosted by I&R (15-16 Jan-2020, Rennes, France). Minutes and actions resulting from both REAMIT meetings were circulated to partners. BED supported two remaining PPs with appointment of FLC. By now all REAMIT PPs have appointed their FLC auditors. Recruitment: on 1 Oct-2019 Project Manager joined REAMIT team at BED; BED re-advertised Research Fellow post for Big Data Hub Coordinator, interviews were held on 28 Jan-2020 and new staff member will join BED in March/April 2020 (subject to obtaining visa); UU hired Research Associate to work full time on REAMIT and placed out a proposal to bring French foreign exchange student onto REAMIT project; Whysor hired Project Manager from 1 Dec-2019; UCD is in the process of recruiting Postdoctoral Researcher (Dynamic Modelling of Supply Chain); ITT commenced the process of hiring Research Assistant in the area of Data Analytics. 6 bilateral meetings between REAMIT PPs took place in the past semester: UCD, ITT and Whysor met on 19 Sep-2019, Dublin; BED, NTU, UU and Whysor met on 4-5 Dec-2019 at 'NWE making an impact', Tourcoing; UU met with Dunbia on 9 Oct-2019, UK; UU met with Cottagequinn Farms on 25 Oct-2019 and 11 Nov-2019, UK; UU, BED and Cottagequinn Farms met on 3 Dec-2019, UK; SenX met with Valorial, I&R and UoN. BED assisted WP leaders with coordination of implementation of activities in WPs, which resulted in joint implementation of WPs. WP Communication: BED supported NTU with restructuring and updating REAMIT website, developing REAMIT first Symposium (9 Jan-2020, Nottingham, UK), developing REAMIT first Newsletter, designing and developing REAMIT flyer and Brochure, designing and developing two REAMIT videos, designing REAMIT's roll-ups. WP Long Term: BED, leader of this WP, based on inputs from pilot test leads (UU and UoN), formulated REAMIT's input to 'NWE making an impact' (4-5 Dec-2019, France); BED has developed first draft of REAMIT measurement framework and sent it to partners for feedback. WP T1: BED assisted I&R with translation of Open Challenge Call document to Dutch (with Whysor's help) and German (with NTU's help); BED supported I&R with development of Pilot Test Road Map document; based on input from UoN I&R and Valorial, BED developed a template to describe each pilot test; based on input from Associated Partner (East NL Development Agency), BED developed section in Open Challenge Call on 'Benefits for food producer and transporter companies from participation in pilot tests' and text for infographics; BED coordinated work of pilot test leads (UU, I&R, UoN and Whysor) when designing and developing pilot tests including specification and purchase of sensors. WPT2: BED as lead of this WP finalised recruitment of Research Fellow for Big Data Hub, coordinated the work of Levstone on developing self-enrol function and Smart Phone App. BED reviewed REAMIT risks and updated REAMIT Risk Log based on input from JS. It was presented to PPs at RSC meeting (15-16 Jan-2020, Rennes) and further updated based on partners feedback.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

No delays and deviations.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity M.1	General project management	01-2019	01-2022	proceeding according to work plan
Deliverable M.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Project handbook		02-2019	proceeding according to work plan	
Deliverable description	A document which will collate all necessary information for project management purposes, including terms of reference of groups, project procedures, reporting requirements, partnership agreements, GDPR requirements etc			
Description of progress achieved	BED has substantially advanced REAMIT Project Handbook. Its aim is to guide partners in their joint implementation of the REAMIT project throughout its lifetime, and to address partners’ queries related to REAMIT decision-making, administrative and financial management, monitoring, reporting and control calendar and procedures. REAMIT Project Handbook is a living document – it grows with time as the implementation of the REAMIT project unfolds. It becomes a repository of information, good practice examples, lessons learnt and guidance collected throughout the REAMIT project lifetime from individual experiences of REAMIT project partners, collective experience of the REAMIT partnership and input from JS. Development and updates of the Handbook are the responsibility of the Lead Partner. Nevertheless, all REAMIT partners are encouraged to co-develop this Handbook and suggest new themes to be covered, so it becomes a handy and useful tool in daily work on project implementation. Project Handbook is available at REAMIT website. With the help of NTU the Handbook has been edited and presented in line with the funder's publicity requirements.			
Evidence				
Deliverable M.1.2				

Deliverable title	Planned delivery month	Deliverable status
Minutes of meetings of RSC, and RAC and WP meetings - minimum six meetings each. The meetings of RSC and RAC will provide overall strategic direction of the project.	01-2022	proceeding according to work plan
Deliverable description	RSC and RAC will meet every six months -two in the UK and one each in the remaining four partner countries. WP meetings will be organized one day before RSC meetings. Minutes of all these meetings will be circulated & agreed within 1 month.	
Description of progress achieved	Minutes of REAMIT Advisory Committee, Work Packages and Steering Committee meetings on 11-12 September 2019 in Luton, UK. Minutes have been approved by REAMIT Steering Committee on 15-16 January 2020 in Rennes, France.	
Evidence		

Deliverable M.1.3

Deliverable title	Planned delivery month	Deliverable status
Intermediate Work Package coordination	01-2022	proceeding according to work plan
Deliverable description	The leaders of WP will be in regular touch with partners via emails, website and social media sites. Whenever needed, conference facilities via phone, Skype or similar technology will be organised out by leaders of each WP or partners on demand.	
Description of progress achieved	BED assisted WP leaders with coordination of implementation of activities in WPs, which resulted in joint implementation of WPs. WP Communication: BED supported NTU with restructuring and updating REAMIT website, developing REAMIT first Symposium (9 Jan-2020, Nottingham, UK), developing REAMIT first Newsletter, designing and developing REAMIT flyer and brochure, designing and developing two REAMIT videos, designing REAMIT's roll-ups. NTU as the lead of WP Communication was in regular contact with PPs to obtain their inputs. WP Long Term: BED, leader of this WP, based on inputs from pilot test leads (UU and UoN), formulated REAMIT's input to 'NWE making an impact' (4-5 Dec-2019, France); BED has developed first draft of REAMIT measurement framework and sent it to partners for feedback. WP T1: I&R coordinated translation of Open Challenge Call document to Dutch (with Whysor's help) and German (with NTU's help); BED supported I&R with development of Pilot Test Road Map document and helped I&R obtain input from pilot test leads on each pilot test; based on input from UoN, I&R and Valorial, BED developed a template to describe each pilot test that was used at WP meeting chaired by I&R to present progress of each pilot test; based on input from Associated Partner (East NL Development Agency), BED developed section in Open Challenge Call on 'Benefits for food producer and transporter companies from participation in pilot tests' and text for infographics; BED coordinated work of pilot test leads (UU, I&R, UoN and Whysor) when designing and developing pilot tests including specification and purchase of sensors. WPT2: BED as lead of this WP finalised recruitment of Research Fellow for Big Data Hub, coordinated the work of Levstone on developing self-enrol function and Smart Phone App.	
Evidence		

Deliverable M.1.4

Deliverable title	Planned delivery month	Deliverable status
Key control register for Project Management	09-2019	proceeding according to work plan
Deliverable description	A register of key control milestones will be prepared by LP and made available to all partners. This register will include useful information (e.g., timetable, risks, meetings, etc.). This will be available online and updated regularly.	
Description of progress achieved	Key control register is part of REAMIT Project Handbook. It contains timetable for reporting in each reporting round, dates and venues of meetings of REAMIT Advisory Committee, Work Packages and Steering Committee until the end of the project, issues partners need to pay special attention during reporting (e.g. time needed to complete FLC audit, requirements for audit), input from JS on improvements needed in future reporting rounds. Information in key control register is updated regularly by PM in each reporting round based on current information as well as feedback and lessons learnt from the previous reporting period.	
Evidence		

Activity	Title	Start month	End month	Status
Activity M.2	Risk register and risk review	01-2019	07-2022	proceeding according to work plan

Deliverable M.2.1

Deliverable title	Planned delivery month	Deliverable status
Risk register	03-2019	proceeding according to work plan

Deliverable description	Development & partner sign-off of a written risk register, forming an appendix to the project handbook.
Description of progress achieved	REAMIT Risk Log contains six risks: three risks have been identified in REAMIT Application Form, five risks have been added following second RSC meeting (Sept-2019, Luton), and two risks have been removed following RSC meeting (Jan-2020, Rennes): 1. Technological risk linked to adapting sensor and big data technologies 2. Lack of companies participating in tests 3. Lack of roll-out potential 4. Risk related to effectiveness of sensors in providing genuine new information 5. Risk related to maintaining confidentiality of the sensor data on food quality from end-users 6. Risk of not using the correct sensor for a given application 7. Though we strive to reroute food before it becomes bad, there is risk involved as the food might become waste during rerouting. REAMIT Partners agreed to remove this risk from Risk Log as it is outside the cope of REAMIT and REAMIT partners have no influence over this risk. 8. Risk that receiving store does not accept the food (PPs suggested that a closer store might not accept the food in the lorry. For example, Auchan will not accept and sell food from Intermarche, if such food is on the way and in risk of becoming waste. One PP said that the REAMIT APP needs to have a function, which links food owners with food consumers. Also, ultimately end users of REAMIT will use REAMIT to improve food quality rather than to reroute waste. One PP said that some food companies in France are asking food certificate at two moments (1) before food is on the move and (2) when food arrives at a destination. In this way they control freshness of food during the journey. One PP highlighted that this risk is also beyond the control of the REAMIT consortium. REAMIT will try to link owners and food demand points but the negotiations between the two is out of REAMIT control.
Evidence	

Deliverable M.2.2

Deliverable title	Planned delivery month	Deliverable status
Annual risk reviews	01-2022	proceeding according to work plan
Deliverable description	Written notes of annual risk register reviews for 2020 & 2021.	
Description of progress achieved	This is done as part of Risk Log review at bi-annual REAMIT Steering Committee meetings, as well as on regular basis by PM and Lead Investigator based on lessons learnt from daily implementation of REAMIT project. PPs are also invited to report to LP any risks, which might influence implementation of the project. For example, I&R reported (Dec-2019 report) new potential risk in REAMIT, mainly difficulties in recruiting companies in France for pilot tests due to length of the process and limited staff resources needed for this purpose. The risk may be that PPs might have underestimated staff time needed to engage with end user companies to convince them to pilot test REAMIT technologies. Second, Levstone has reported a risk of catch 22 situation for REAMIT, meaning that companies will not agree to participate in pilot tests unless they know exactly what benefits they can expect from it. However, REAMIT may know what these benefits are until the first pilot test is commenced. Hence, Levstone suggested developing information (i.e. elevator pitch, clear section on REAMIT website on benefits, infographics, video) as part of the REAMIT campaign communicating benefits for food producer and food transporter companies from participation in REAMIT pilot tests. BED takes notes of both these new risks reported by PPs and suggested actions to support both partners. BED will also include these risks in the discussion by REAMIT partnership at the next RSC meeting in July-2020.	
Evidence		

Activity	Title	Start month	End month	Status
Activity M.3	Record keeping and reporting	01-2019	07-2022	proceeding according to work plan

Deliverable M.3.1

Deliverable title	Planned delivery month	Deliverable status
Project reports	07-2022	proceeding according to work plan
Deliverable description	Submission of complete, accurate & timely, activity & financial reports every six months by the LP partners.	
Description of progress achieved	First REAMIT report and payment claim was submitted to JS in September 2019. It was processed by JS and first payment was made to BED by NWE Programme CA in Feb-2020. BED has paid immediately and in full amounts due to each of the three (French) partners: I&R, UoN and SenX.	
Evidence		

Deliverable M.3.2

Deliverable title	Planned delivery month	Deliverable status
Finance training for partners	04-2019	completed and achieved as planned
Deliverable description	An event for all finance managers of all partners, to clearly set out the processes & procedures for claims & payments, & the partners' financial obligations in the project.	

Description of progress achieved	
Evidence	

Work Package Adapting and pilot testing sensor technologies in agri-food supply chains (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T1	Adapting and pilot testing sensor technologies in agri-food supply chains	03-2019	06-2021	behind schedule	215 075.77	5.58

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED supported I&R, lead of WPT1, in coordinating partners' activities under this WP. Partnership made the following progress in the implementation of WPT1. To attract end-users to test REAMIT solutions, 2 documents for Open Challenge Call were published on REAMIT website (June-2019): Open Call text with general information about the call, and Information Guide with detailed information for applicants on the Open Challenge Call. Following advice from REAMIT Associated Partners, DE and NL versions of both documents were developed (NTU and I&R) and published on REAMIT website (Sept-2019). BED developed text on benefits for agri-food producer & transport companies from participation in REAMIT Pilot Tests. PPs were asked for feedback on it. With help of NTU, text on 'benefits' will be supported by infographics and will be communicated through REAMIT partners' networks to attract end users. 7 pilot tests are being prepared in REAMIT to start in 2020. All pilot tests will use traditional sensors measuring temperature, humidity, vibrations, lightening, and will be equipped in GPS. Some pilots will also use new sensors. Pilot UK: UU started preparations of pilot test with Dunbia. At Dec-2019 visits at Dunbia (UU, BED, Dunbia) Dunbia confirmed there was no or minimum meat wasted during transportation in Dunbia trucks because meat was vacuum packed and reached destination within a few hours. It was concluded that pilot test would refocus to analyse how Dunbia can minimise production of dark cutter beef, which is turned down by consumers due to appearance. In consequence, retailers had a lot of wasted beef meat. UU started to investigate using another sensor (Bolar) to be placed in a cow's stomach to measure if animal is hungry or stressed. Pilot DE and NL: Whysor recruited 2 companies for pilot tests: Weyers GmbH specialises in selling fresh vegetables in DE; Picnic specialises in delivering fruits & vegetables to households in NL for a small fee. Both companies asked for confidentiality agreement with Whysor. In Feb-2020 BED asked JS for advice on the content of confidentiality agreement. Pilot tests with Weyers and Picnic will start as soon as confidentiality agreement is signed. Pilot test FR: UoN, with assistance of SenX, purchased new traditional sensors to supplement their Raman sensors. UoN will use traditional sensors and Raman sensors in pilot test (Jan-2020). Whysor and SenX will help UoN collect data from sensors, Whysor will develop cloud system, Levstone will help UoN develop smart phone APP. Next step and challenge for UoN will be to carry out data collection on meat quality with portable Raman spectroscopy sensor during meat transportation. Pilot test IE: UCD is responsible for Cyberbar demonstrations and are working with a large food processor in Ireland on demonstration of pilot. UCD will start the pilot towards end of 2020. UCD, with input from ITT, is working on imprinting QR codes onto chicken fillets without damaging meat. Cyberbar can be read on a smart phone and creates traceability of chicken meat. Information about expiry date will be imprinted on chicken meat without having to refer to packaging information. Pilot test FR: I&R faced difficulties in attracting companies for pilot tests without demonstrating benefits from using REAMIT technology. LP requested I&R to keep trying to find end user companies in France to pilot test REAMIT technologies and asked I&R to specify the support they needed from REAMIT partnership. Pilot test UK: UU with support of BED will carry out pilot test using 3D Fluorescence Spectrometers. Based on input from BED, UU, UoN, Whysor, SenX, UCD, Levstone, I&R have developed Pilot Test road map with information about each pilot structured as: objective of pilot, partners involved and their roles, specification of equipment, calendar. Levstone developed standalone miniature prototype iot platform to adapting and sensor testing.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Main challenge was change of focus of the first pilot test with Dunbia. At a meeting in Dungannon, UK in Dec-2019 Dunbia confirmed there is no or minimum food waste during meat transportation in Dunbia's trucks. There is no need therefore to install sensors in Dunbia's trucks to analyse reasons why food is wasted during transportation in Dunbia's trucks. Dunbia suggested to refocus the pilot test and analyse reasons why animals produce dark cutter meat. REAMIT partnership is considering whether this new idea is in line with REAMIT's objectives. Still, Dunbia will be asked whether REAMIT sensors can be installed in Dunbia's trucks to collect data, mainly to check the quality of data obtained by REAMIT sensors, quality of data when it is sent to cloud and made ready for processing. Second challenge has been recruitment of end user company for pilot test in France by I&R partner. I&R confirmed that companies in France are not really available to participate in REAMIT pilot tests. They want to know up front what they can benefit from it, they are concerned about their image and reputation and that participation in REAMIT pilot tests can signal to their competitors that they have problems, and that overall it is a lengthy process, which has been underestimated by REAMIT partnership (and not costed correctly in PPs budgets). PPs agreed that the best way to recruit end user companies for pilot tests seems to be through individual networks and contacts. BED asked I&R and other partners to specify how exactly partnership can help with recruiting new end user companies. To address this situation, NTU has approach 3 end user companies in UK (OLIO, Nottingham Good Food partnership, Sneinton Community Market) and invited them to participate in REAMIT Pilot Tests. They are companies from NTU's network. Once pilot tests start (e.g. in DE, NL and UK), PPs will be able to show case the results (and benefits) to more sceptical companies in FR.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T1.1 Working prototypes of sensor technologies based on pilot tests with agribusiness users	Five prototypes that use traditional and new sensor technologies to monitor quality of fresh produce and sends the data over WiFi, Cat-M, NB-IOT (or other radio technology) will be produced with agribusiness users recruited through the open call (A1.1)	5.01. Number of efficient natural and material resources solutions implemented and tested	06.2021	5.00			behind schedule	
T1.2 Agribusiness companies supported in food waste reduction pilots	Agribusiness companies will be recruited through an open call to participate in the pilot tests in A1.2. Each company will benefit from the installation of new technologies for the test period, giving reductions in waste and savings in their costs.	CO01. Number of enterprises receiving support	06.2021	5.00			behind schedule	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T1.1	Open call for Agri-business agribusiness user companies for pilot tests	03-2019	03-2020	proceeding according to work plan
Deliverable T1.1.1				
Deliverable title		Planned delivery month		Deliverable status
Publication of open call		03-2019		proceeding according to work plan
Deliverable description	Partners would develop an open call for participation from companies willing to offer their premises & equipment to the testing of technologies. The call would be issued on the project webspace and through partner networks so that Risk 2 is minimised.			
Description of progress achieved	Open Challenge Call document was developed jointly by REAMIT partners, under the leadership of I&R, and published on REAMIT website in June 2019 in English and French. Based on input from REAMIT Associated Partner East NL Development Agency, in October 2019 the document was translated to			

	German and Dutch and uploaded at REAMIT website. Also, in November 2019 BED developed a new section in the Open Challenge Call document focusing on 'benefits for food producer and food transporter companies from participation in REAMIT pilot tests'. BED presented the new section to partners for feedback at RSC meeting in Jan-2020 in Rennes, France. With the help of Whysor and I&R it will be translated to German, Dutch and French. With the help of NTU, it will be accompanied by infographics presenting these benefits in simple and transparent way. The updated Open Challenge Call document with infographics will then be offered in 4 languages, presented at REAMIT website and communicated to end user companies across the north West Europe region through REAMIT partners' networks.
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Evidence

Deliverable T1.1.2

Deliverable title	Planned delivery month	Deliverable status
Companies recruited from across agri-business supply chain. Minimum 4 companies will be recruited across NWE so that there is a total of 5 user companies (including the one UK agribusiness user (PP12) that is already a partner) for minimum 5 pilot tests.	03-2020	behind schedule

Deliverable description	Partners expect to recruit a minimum of 4 companies to participate in the technology tests, with a representative mix of locations, sub-sectors etc. A simple MoU would be issued to them; no funding is involved. One UK user company is already a partner.
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Description of progress achieved	Two companies have been recruited by Whysor for pilot tests of REAMIT technologies in Germany and the NL. German company - Weyers GMBH specialises in selling vegetables. The Dutch company - Picnic is an online supermarket which delivers groceries to homes in small electric vehicles. Both companies requested that a confidentiality agreement is signed with Whysor before pilot tests start. Once this is signed, pilot test with Weyers GMBH can start; while pilot test with Picnic is still at the stage of defining the operational process. Presentation attached shows the food chain of Weyers GMBH and Picnic. Weyers GMBH: Vegetables are stored at the farmers warehouse. From there they are transported to a transfer warehouse by truck. From warehouse they are transported to a supermarket. Wyers wishes to have sensors in the whole chain to continuously monitor the quality of transported goods: at farmer's premises, inside truck, in warehouse, and at delivery point in supermarket. Staff in food supply chain can provide data about food (a photo of veg taken by farmer, sensoric data on how veg smells with help of portable NIR device). Weyers truck will be equipped with VOC-sensor (measuring VOC, carbon dioxide, humidity, temperature, pressure and illuminance) and GPS-sensor. Data from sensors is sent via gateway to cloud. Picnic is data driven company which collects data at different stages of food supply chain, but not yet during food delivery journey to customer. Picnic's supply chain starts at fulfilment centre where in the morning crates or boxes are filled by so called Shoppers according to a customer's order. Fresh products are kept cool in separate boxes. Small trucks called Runners deliver these boxes with groceries to customer's home. Picnic wishes to monitor temperature of groceries inside each box. Whysor then suggests to equip every cool box with a temperature-sensor and e-truck with GPS sensor. Data from sensors is sent to REAMIT cloud via gateway.
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Evidence

Activity	Title	Start month	End month	Status
Activity T1.2	Transnational synthesis of sensor technologies (Raman Spectroscopy from UoN, 3D Fluorescence from Ulster and CyberBar from UCD) and big data integration	03-2019	01-2021	proceeding according to work plan

Deliverable T1.2.1

Deliverable title	Planned delivery month	Deliverable status
Partner workshop on sensors and big data	06-2019	completed and achieved as planned

Deliverable description	A workshop between knowledge partners and sensor/big data SME partners will bring forward all available knowledge about technologies, applications and potential combinations for food supply chains. An internal workshop with around 20 attendees.
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Description of progress achieved	BED organised Sensors and Big Data workshop that was attended by 10 REAMIT partners on 12 Sep-2019 in Luton, UK. Workshop started with two technology demonstrations. First demonstration was made by Peter Marchant from Review Display Systems Ltd. and Šimon Chudoba from IQRF Alliance. They specialise in developing specialised and generalised sensors. Example of sensors installed in an airport in Prague was given, whereby the installation period took only six hours as opposed to six months. Sensors were installed in hospital freezers where medicines were kept in order to ensure that the right temperature was maintained. The sensors measured things like CO ₂ , temperature etc., results were uploaded onto a cloud devices through a gateway at regular intervals. Presentation elicited interest from several PPs, who engaged in further discussions with IQRF. Second demonstration was made by BED researcher on an aquaculture project being carried out by BED with partners in Brazil. Sensors made by a British Company called Seneye were installed into ponds to
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		detect their PH value, light, temperature etc. Data gets uploaded on the cloud devices which could be assessed using an app. Measurements in real time were shown. This presentation showed PPs the ability of technology to upload real time information on the cloud that will facilitate further real-time analytics. Draft of a white paper titled “Review of Potential Sensor Technology for Continuous Monitoring of Food Quality in Transport” has been prepared by Partners at UU, with inputs from Levstone and ITT. It was highlighted that the white paper should be improved further with inputs from all the partners, and should form the basis for selection of sensors for REAMIT pilot tests. When the paper is sufficiently improved with practical insights from REAMIT pilot tests, it should be submitted to a suitable journal.		
Evidence				
Deliverable T1.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Test roadmap		09-2019	behind schedule	
Deliverable description	The output from the workshop will be the production of an internal 'test roadmap' combining the results from the call for test companies (so we know how many tests, what kind of companies, and where) with the optimum technologies combinations.			
Description of progress achieved	REAMIT Pilot Tests Roadmap describes all pilot tests that are carried out by the REAMIT project consortium in different REAMIT corridors and countries: UK, Ireland, Germany, the NL and France. The Roadmap illustrates key components of each pilot test (description, calendar, roles, and equipment) and steps taken in the execution of the pilot. The Roadmap is the REAMIT project delivery under Work Package Implementation T1 “Adapting and pilot testing sensor technologies in agri-food supply chains”. It is a living document, developed jointly by BED, I&R who are the lead of WP T1, and all Project Partners throughout the REAMIT project lifetime. It is developed based on continuous dialogue and exchange between PPs and end user companies participating in pilot tests, at all stages of each pilot test lifecycle (specification of operational process of a pilot test, pilot test execution, pilot test closure, pilot test evaluation). A shared aim of all pilot tests is to assess how the proposed technology can improve monitoring of food quality in food supply chains and contribute to reducing food waste. Presentation of each pilot test is structured according to the scheme: Short pilot description, Partners Involved, Equipment, Implementation time schedule. Delay in finalisation of this deliverable has been caused by a delay in development and execution of REAMIT pilot tests.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.3	Adapting and pilot testing of sensor technologies with agribusiness users	10-2019	06-2021	proceeding according to work plan
Deliverable T1.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Working prototypes using sensor technology		06-2021	proceeding according to work plan	
Deliverable description	The sensor and scanning technologies will tested along with other traditional sensors where needed and adaptations carried out wherever needed. Data flow to be checked. At the end of the pilot test, new working prototypes will be developed.			
Description of progress achieved	Levstone has developed a standalone miniature prototype iot platform to 'adapting and sensor testing'. The prototype to test bed towards the final pilot tests with agribusiness users, with the objective to aid the launch of the first pilot early 2020, we will be working with our partners for this pilot to be tested in real environment. Levstone have implemented a test device to generate some temperature and humidity data using a WISE 4220 module. This is suitable for vehicle or trailer mounting where there is a 12V to 24V DC power supply in conjunction with the Teltonika RUT-850 mobile router. This is currently developed and tested at Levstone's in house cloud platform and the results are available on Levstone's 'Sandbox' platform. The device now sends secure SSL internet packets device to Levstone's LeviOT server where the data is logged into Levstone's cloud database. Levstone has build a small battery powered unit that contains all the relevant hardware which can be placed inside a truck to measure temperature, humidity, due, pressure. They have carried out limited testing, but all measurements require verifications in the real environment. Further work on the pilot will be to incorporate GPS and possibly trailer ID via rafid tag. It is worth noting that from this research different variant sensor devices will have their own protocols and characteristics when communicating with middle ware services like LeviOT server. Since other PPs have selected their sensors it may be possible to utilise Levstone platform to provide an idle environment to test 'pilot trials'. Levstone will require specification and configuration of each sensor to incorporate this functionality. This type of approach only applies to 'off the self' sensors which support IoT technology. The more complex sensors like the Ramon spectroscopy or 3D Fluorescence requires further in depth study how any middleware like the LeviOT server can access the data on demand.			
Evidence				
Deliverable T1.3.2				

Deliverable title		Planned delivery month	Deliverable status
User manual for each pilot test		06-2021	not started
Deliverable description	A user manual documenting the experience of pilot test and a step-by-step guide of good practice in each pilot test will be developed for the benefit of users willing to test REAMIT technologies in the future.		
Description of progress achieved			
Evidence			
Deliverable T1.3.3			
Deliverable title		Planned delivery month	Deliverable status
Report on the pilot test and development of the sensor prototypes		06-2021	not started
Deliverable description	A report on the 5 sensor-based pilot tests will be compiled by participating partners and posted on the project webspace. It will describe in detail the experiences with the pilot test and give recommendations for future pilot tests.		
Description of progress achieved			
Evidence			

Work Package Big Data integration and applications to reduce food wastage. (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T2	Big Data integration and applications to reduce food wastage.	01-2019	07-2022	behind schedule	52 063.63	0.91

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Some work on the implementation of WPT2 has been done mainly by BED, Whysor, Levstone and SenX. BED has finalised the recruitment process of research fellow to manage and administer Big Data Hub at BED. Interviews were held in BED on 28 Jan-2020 and the new colleague should join BED in March/April 2020 depending on his visa. BED will purchase Big Data Hub components once the new colleague has joined the BED team. Whysor built a platform for REAMIT, which is available via reamit.whysor.com. The platform is the base for receiving data from the sensors. From here, the data can be made available for and/or forwarded to other parties. The connector of the platform has been prepared for connection with the gateways and eventlogger. Whysor extended the platforms management functions with gateway. Whysor is developing the front-end (appearance of the dashboard for end-users) to a better and more flexible base to add applications like GIS for the purpose of GPS-tracking. Whysor and BED have been discussing the possibilities for building and operation a big-data-hub at BED. Considering the choice of the LORA protocol for collecting data from sensors in at least two pilot tests, SenX has developed a component to ingest such data. To do so, SenX worked with Whysor on extending the use of LORA. SenX also has supported BED and advised about building REAMIT Big Data platform in order to be ready to ingest data coming from different pilots. SenX exchanged with partners (in particular with UU, BED) on the data architecture and the position of Warp 10. Warp 10 is a program made by SenX to store and analyse time series data. Data produced by sensors are typical of time series data. Depending on the architecture of each pilot, Warp 10, hosted by SenX, can be used as a primary storage for data coming from sensors or as a kind of secondary storage if sensors are proprietary and must send their data to a specific server. As SenX is also responsible for

some of the data analytics done in REAMIT, Warp 10 will be used to analyse the data coming from the sensors. Levstone has started the work on developing a smartphone APP for linking food owners, truck drivers and warehouses. Moreover, Levstone has also started the work on developing a number of elements for Big Data integration: (a) cloud gateway - service to connect and receive sensor measurements from the standalone sensor box; (b) cloud data repository - cloud database to securely save sensor measurements, (c) Web App - dashboard to display sensor measurements, and (d) Driver App - to collect GPS data. Most of the work in the implementation of WPT2 will however start in the first semester of 2020, as foreseen in the AF.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T2.4 Technology solutions developed	3 solutions will be developed: 1) a Big Data platform to detect loss of food quality and understand underlying factors, 2) a Smartphone APP to alert truck drivers, warehouse managers and owners of the produce of the potential quality issues with food in transport and make decisions on rerouting, 3) an integrated IoT sensor and big data solution which will help monitor food quality, make rapid decisions to reroute the food if there is deteriorating quality, and save food waste.	5.01. Number of efficient natural and material resources solutions implemented and tested	07.2022	3.00			proceeding according to work plan	
T2.5 Companies supported in technology development	In this WP, potential suppliers and consumers linked to REAMIT corridors can self-enrol to participate in tests and trials. Our network events will be used to run proactive campaign to include users subject to resource availability.	CO01. Number of enterprises receiving support	07.2021	5.00			not started	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T2.4	Develop an interface to collect sensor data and send to cloud	07-2019	07-2021	proceeding according to work plan
Deliverable T2.4.1				
Deliverable title		Planned delivery month		Deliverable status
Creation and launch of interface		07-2021		proceeding according to work plan
Deliverable description	An interface will be developed for each of the 5 pilot tests for collecting data from sensors and sending them to the cloud for use in a transnational Big Data infrastructure			
Description of progress achieved	Whysor built a platform for REAMIT, which is available via reamit.whysor.com. The platform is the base for receiving data from the sensors. From here, the data can be made available for and/or forwarded to other parties. The connector of the platform has been prepared for connection with the gateways			

	and event logger. Whysor extended the platforms management functions with gateway. Whysor is developing the front-end (appearance of the dashboard for end-users) to a better and more flexible base to add applications like GIS for the purpose of GPS-tracking. Whysor had a live meeting with the programme management of NWE-Interreg project "Blockstart", about big data integration, based on blockchain technology. Whysor has registered as an associate partner to stay connected to this initiative. https://www.nweurope.eu/projects/project-search/blockstart/ Whysor and BED are in contact about the possibilities for a big-data-hub. Work with other partners is now central for Levstone and Whysor to develop common datasets and underpin basic blocks for big data. Levstone and Whysor will be working on developing mobile app and dashboard for the end users and researching into developing a suitable solution how to interlink different datasets to a common data source i.e. link all the clouds in real time.
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Evidence

Deliverable T2.4.2

Deliverable title	Planned delivery month	Deliverable status
User Manual on launching the interface	07-2021	not started
Deliverable description	A user manual documenting the experience of creating and launching the interface and a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.	
Description of progress achieved		
Evidence		

Activity	Title	Start month	End month	Status
Activity T2.5	Development of Big Data infrastructure for analytics of sensor data and for rerouting to minimise food waste	01-2020	07-2022	not started

Deliverable T2.5.1

Deliverable title	Planned delivery month	Deliverable status
A big data platform with capability to collect and store sensors data from all REAMIT corridors	07-2021	ahead of schedule
Deliverable description	This big data platform will be used as the hub for conducting business analytics, and will create an understanding of complex, transnational supply chains. This will be hosted in BED.	
Description of progress achieved	Considering the choice of the LORA protocol for collecting data from sensors in at least two pilot tests, SenX has developed a component to ingest such data. To do so, SenX worked with Whysor on extending the use of LORA. SenX also has supported BED and advised about building REAMIT Big Data platform in order to be ready to ingest data coming from different pilots. Senx exchanged with partners (in particular with UU, BED) on the data architecture and the position of Warp 10. Warp 10 is a program made by SenX to store and analyse time series data. Data produced by sensors are typical of time series data. Depending on the architecture of each pilot, Warp 10, hosted by SenX, can be used as a primary storage for data coming from sensors or as a kind of secondary storage if sensors are proprietary and must send their data to a specific server. As SenX is also responsible for some of the data analytics done in REAMIT, Warp 10 will be used to analyse the data coming from the sensors. On 28 Jan-2020 BED held interviews and finalised recruitment process for Big Data Hub coordinator who will build and administer Big Data Hub at UOB. New colleague shall join BED in March/April 2020 (depending on obtaining a visa).	
Evidence		

Deliverable T2.5.2

Deliverable title	Planned delivery month	Deliverable status
Reports on Big Data platform performance	07-2022	not started
Deliverable description	Partners leading the activity will provide regular annual reports on the performance of the platform.	
Description of progress achieved		
Evidence		

Deliverable T2.5.3

Deliverable title	Planned delivery month	Deliverable status
A web-interface with self-enrol facility for enrolment of potential suppliers and consumers of food produce	07-2022	ahead of schedule
Deliverable description	Potential suppliers and consumers can self-enrol after approval from the lead partner. This will be augmented using Google Maps data to identify potential destinations for rerouting food that would	

	otherwise become waste.			
Description of progress achieved	Levstone has started the work on developing a number of elements for Big Data integration: (a) cloud gateway - service to connect and receive sensor measurements from the standalone sensor box; (b) cloud data repository - cloud database to securely save sensor measurements, (c) Web App - dashboard to display sensor measurements, and (d) Driver App - to collect GPS data.			
Evidence				
Deliverable T2.5.4				
Deliverable title		Planned delivery month		Deliverable status
User manuals for the big data platform and the web-interface highlighted in the two deliverables above		07-2022		not started
Deliverable desription	The user manuals will document the experience of creating the big data platform and the web-interface and include a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.7	Development of smartphone APP for use by truck drivers and warehouses	01-2020	07-2021	ahead of schedule
Deliverable T2.7.1				
Deliverable title		Planned delivery month		Deliverable status
Launch of smartphone APP for linking to food owners, truck drivers and warehouses.		07-2021		ahead of schedule
Deliverable desription	This APP will be developed and tested to work in Android and Apple smartphones. This APP will also be used to link to all relevant stakeholders for long terms dissemination after getting GDPR consent from all parties.			
Description of progress achieved	Levstone has started the work on developing a smartphone APP for linking food owners, truck drivers and warehouses.			
Evidence				
Deliverable T2.7.2				
Deliverable title		Planned delivery month		Deliverable status
User manual for the use of the APP		07-2021		not started
Deliverable desription	A user manual documenting the experience of creating and launching the APP and a step-by-step guide of good practice will be developed for the benefit of food owners, truck drivers and warehouse managers using the APP.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.8	Delivering the integrated IoT/Big Data technology with capabilities on analytics and decision support to help reduce food waste in NWE.	01-2019	07-2022	not started
Deliverable T2.8.1				
Deliverable title		Planned delivery month		Deliverable status
Deployment of the integrated IoT/Big Data/analytics/Decision support technology		07-2022		not started
Deliverable desription	This integrated technology will have the capability to bring together the outputs of sensor technology and analytics to provide decision support to owners of food at risk, truck drivers and warehouse managers via the Smartphone APP.			
Description of progress achieved				

Evidence		
Deliverable T2.8.2		
Deliverable title	Planned delivery month	Deliverable status
A user manual for the integrated IoT/Big Data/analytics/Decision support technology	07-2022	not started
Deliverable desription	A user manual documenting the experience of creating and launching the integrated IoT/Big Data technolgy and a step-by-step guide of good practice will be developed for the benefit of future users willing to test REAMIT technologies.	
Description of progress achieved		
Evidence		

Work Package Business development of REAMIT technologies (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T3	Business development of REAMIT technologies	01-2020	07-2022	proceeding according to work plan	24 311.76	0.70

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Work under this WP is scheduled to start in 2020 and 2021. So far some work has been done by UCD ahead of schedule, mainly research into the state of the art in terms of life cycle assessment and food waste has been conducted. The REAMIT Sensor Review Report has been analysed by UCD to identify the methods of measurement of relevant parameters for the LCA study.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

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Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T3.2 Companies introduced to REAMIT business case	The business cases will be used to encourage businesses to take up the REAMIT approach of combined technologies and turn them into marketable products. The output is the number of	CO29. Number of enterprises supported to introduce new to the firm products	07.2022	10.00			not started	

	companies (not currently partners) benefitting from an in-depth introduction to the REAMIT approach.							
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Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T3.1	Risk, technology and sustainability assessments of REAMIT technologies (led by UCD with support from NTU, UU and BED)	01-2021	07-2022	not started
Deliverable T3.1.1				
Deliverable title		Planned delivery month	Deliverable status	
An assessment report of REAMIT technologies including a comprehensive systematic review (mapping) of the technical and business landscape in the fresh produce food chain.		09-2021	not started	
Deliverable description	The assessment report will be an internal document for partners, used as the basis for the business models development (AT3.4)			
Description of progress achieved				
Evidence				
Deliverable T3.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Life Cycle Assessment (LCA) for REAMIT		07-2022	ahead of schedule	
Deliverable description	The life cycle assessment system will allow environmental impact data to be integration with REAMIT IoT sensor and big data solutions.			
Description of progress achieved	UCD has started research into the state of the art in terms of life cycle assessment and food waste. In this context, UCD has analysed REAMIT Sensor Review Report to identify the methods of measurement of relevant parameters for the LCA study.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.2	Future-proofing REAMIT Technologies (led by UCD with support from BED)	01-2020	07-2021	not started
Deliverable T3.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Current and identified future REAMIT technology assessment report		07-2021	not started	
Deliverable description	The Future-proof report will be made available to SME technology developers with a view to identifying both the bottlenecks and potential solutions that can be used to drive future food quality analysis technology developments.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.3	Market assessment (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Market readiness report.		07-2022	not started	
Deliverable description	A market analysis and foresight report identifying forthcoming opportunities for REAMIT technologies			

		to be developed into marketable products		
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.4	Development of business case (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.4.1				
Deliverable title		Planned delivery month		Deliverable status
Business prospectus		07-2022		not started
Deliverable description	An outward-facing document will be made available to SME technology developers, to potential buyers of technology approaches (large agri-business and logistics companies) and potential investors who can see the possibilities for product development.			
Description of progress achieved				
Evidence				
Deliverable T3.4.2				
Deliverable title		Planned delivery month		Deliverable status
Business case for achieving 40,000 tonnes of waste reduction		07-2022		not started
Deliverable description	The business case will use REAMIT data from continual monitoring of sensor data for identifying/saving potential food waste and subsequent analytics to understand patterns of food waste in NWE with justification for saving 40,000 tonnes of food waste.			
Description of progress achieved				
Evidence				

Work Package Communication (communication)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
C	Communication	01-2019	07-2022	proceeding according to work plan	98 262.91	1.40

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

REAMIT Communication Manager (CM) started her full time role at NTU on 1 Sept-2019. Since then REAMIT communication activities have intensified and CM has supported REAMIT Communication leader at NTU. Based on feedback from JS, NTU has

advanced REAMIT Communication Strategy which covers guidance for PPs on communication activities, channels, messages and target groups. It was presented to partners at RSC meeting (Jan-2020, Rennes, France) and updated based on obtained feedback. Communication Strategy aims to help partners reach out to stakeholders and businesses involved in food waste reduction projects. NTU with support from BED have improved REAMIT website by restructuring it, ordering it and keeping it up to date. Information about REAMIT news and events is uploaded regularly on the REAMIT website. REAMIT's presence in social media has intensified through active communication about REAMIT's news and activities. On social media sites such as LinkedIn, Twitter and FB, NTU based on input from REAMIT partners, has regularly uploaded information about REAMIT's events (e.g. first Symposium 9 Jan-2020 Nottingham, UK; RSC meeting 15-16 Jan-2020 Rennes, France), REAMIT recruitment (BED and UCD), REAMIT video, REAMIT stand at 'Interreg NWE making an impact' event (4-5 Dec-2019, Tourcoing), REAMIT Newsletter No 1-2019, etc. The aim of communicating about REAMIT in social media is to link to new stakeholders and businesses in agri food supply chains across NWE region. PPs were reminded about it at the recent RSC meeting (Jan-2020, Rennes) and requested to make at list five activities per partner in social media platforms in each semester. All PPs agreed to report on it at the next RSC meeting (July-2020). NTU with the support from BED, UU, UCD, UoN, ITT, Levstone, Whysor, SenX and Dunbia has developed new REAMIT promotional materials: a second banner, two videos, REAMIT flyer and REAMIT brochure. REAMIT flyer, brochure and newsletter have been displayed and distributed at both - REAMIT and external events. UU and UoN have developed two posters detailing their research work with Dunbia and Raman Spectroscopy respectively. Both posters have been presented at 'NWE making an impact' (4-5 Dec-2019, France) and REAMIT Symposium (Jan-2020, UK). A White Paper on Sensors has been advanced by BED with input from UU, Levstone and ITT, and in Dec-2019 it was sent for comments to REAMIT partners. Based on this, a conference paper on sensors is being prepared. Other communication related activities undertaken by REAMIT partners include: New staff at Whysor working on the REAMIT project have adjusted email signatures to include REAMIT logo; Levstone's website and banners were updated to include REAMIT logo; UU promoted REAMIT at the CINE event (4-8 Dec-2019, Donegal, UK); SenX promoted REAMIT at the Global Forum in Angers, France on 7-8 October 2019 while chairing the session on IoT perspectives. During this conference SenX invited other companies to explore cooperation opportunities with REAMIT and distributed the REAMIT flyer. Following feedback from JS in REAMIT Monitoring Report, all PPs were requested to include REAMIT logo in their organisation websites. NTU's marketing team created special piece of news on REAMIT, which was published in NTU news page: <https://www.ntu.ac.uk/about-us/news/news-articles/2019/12/agri-food-businesses-wanted-for-food-waste-reduction-study>, REAMIT website www.reamit.eu, LinkedIn and some agri-food related sites (Farming UK and Fig Food Trends).

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

No deviations and no delays so far.

Communication objectives - what is the progress toward the communication objectives as defined in the application form? The level of achievement should be cumulative; however the explanation should describe achievements in this reporting period

Project specific objectives	Level of achievement	Explanations
To raise awareness on the potential of sensor technology to monitor food quality in food supply chains. While there has been significant improvements in the capabilities of sensors and their connectivity over the internet, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains.	to a minor degree	Despite individual and collective efforts of REAMIT partners, REAMIT did not yet manage to attract five companies for pilot testing of REAMIT technologies, but only two (one in Germany and one in the NL). However, REAMIT partnership strongly believes that with all the communication activities undertaken in the recent months (i.e. REAMIT website substantially improved and animated, REAMIT promotional materials developed and distributed across NWE region, REAMIT videos developed and promoted in various networks, news about REAMIT published in various communication channels, partners promoting REAMIT at external events and among agri-food businesses in their individual networks, REAMIT Symposium and follow up cooperation and actions, etc.) we will be able to recruit more companies for pilot tests in different REAMIT corridors (at least one per country). We believe this will be possible thanks to results obtained from two pilot tests (in Germany and in the NL scheduled to start early in 2020) which will be promoted across potential end users of REAMIT technologies. Moreover, BED with support from REAMIT PPs has recently developed a section on 'benefits for food producer and food transporter companies from participation in REAMIT Pilot Tests' and once it is supported by infographics and elevator speech (developed jointly by PPs at RSC meeting in Rennes 15-16 Jan-2020) presented as a video, they can attract more end user companies for REAMIT pilot tests.
To convince agribusiness users using the results of pilot studies that food waste can be significantly reduced by adopting REAMIT's integrated IoT-Big Data-Analytics technology solution. REAMIT will conduct regular networking events with agribusiness users, popularise the benefits of using these new technologies, and showcase demonstrations to influence their attitude.	not achieved	Since REAMIT Pilot Tests have not started yet, we do not yet have the results which we would be able to communicate to agribusinesses users. We hope to have first results in mid 2020 and will then be able to communicate them to agribusiness end users and attract more end users to participate in pilot tests.
To raise awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. As highlighted earlier, while there has been significant improvements in the capabilities of sensors, their connectivity over the internet, and the potential of conducting data analytics, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains, collecting huge volumes of data on food quality across the NWE region to identify patterns of food wastage, most frequent causes of food waste, and, likely actions that would have maximum impact in reducing food waste. Policy briefs will be developed to provide action oriented solutions that can be favourably considered by policy makers in NWE.	to a minor degree	Despite a delayed start of REAMIT project and subsequent delay in implementation of REAMIT pilot tests, several project partners (NTU, I&R, Valorial, BED) have actively promoted REAMIT project, its theme and ideas within their networks. For example, NTU has requested NTU marketing team to create a special news on REAMIT and publish it in NTU news page: https://www.ntu.ac.uk/about-us/news/news-article/s/2019/12/agri-food-businesses-wanted-for-food-waste-reduction-study ; NTU has promoted REAMIT when talking to businesses and business organisation (i.e. FarmingUK, Fig Food Trends) in order to raise awareness of the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains.
Using the analytics algorithms and decision support, REAMIT will identify patterns on food waste in NWE and assess the most frequent causes of food wastage along supply chains. By regularly publishing this information through blogs, social media, project outputs and policy	not achieved	REAMIT partnership needs to carry out pilot tests first in order to obtain data for analytics to identify patterns of food waste. Once pilot tests have commenced, data has been collected and analysed, food waste patterns can be identified. Only then can REAMIT partnership communicate

briefs, REAMIT will make efforts to change behaviour of relevant stakeholders. For example, targeted feedback of the results to owners of food, decision support on redistribution of food to avoid food becoming waster, etc. will help change behaviour of owners of food and members of food supply chains at micro levels. Policy briefings to suggest best ways of avoiding food waste and regulatory suggestions will help reduce food waste in the region at a macro level.		their results and influence behaviour of food owners and members of food supply chain to avoid food waste by the use of REAMIT technologies.
Based on the risk and sustainability assessment, the project aims to convince agribusiness users of the value of REAMIT's technologies in reducing food waste and increase profitability of their businesses. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help influence their attitude.	not achieved	Not started yet.
Understand the risks involved in the technologies, to help design future-proof technologies for food waste reduction and also the sustainability issues. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help increase knowledge about sustainability aspects of technologies, knowledge and benefits of saving food waste, and policy oriented activities.	not achieved	Not started yet.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity C.1	Start-up activities including communication strategy	01-2019	01-2022	proceeding according to work plan
Deliverable C.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Communication strategy document		01-2022	proceeding according to work plan	
Deliverable description	A communication strategy approved by Steering Committee (RSC) including guidelines on local, regional and inter-regional strategies will be delivered in the first quarter, and reviewed annually. It will outline approach to reach all target groups.			
Description of progress achieved	The aim of REAMIT Communication Strategy is to support REAMIT partners in their communication and dissemination activities to reach out to agribusiness companies and stakeholders involved in food waste reduction at various governance levels across the NWE region. The second aim of REAMIT Communication Strategy is to reach out to other regional, national or EU funded projects focusing on food waste reduction to identify synergies and possibilities to work together towards the common goal. At RSC meeting in Rennes (Jan-2020) NTU invited partners to input to REAMIT CS, especially with regards to communication messages and communication channels PPs use when they communicate with different target groups. CS will be updated based on PPs' input.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.2	Digital activities	03-2019	07-2022	proceeding according to work plan
Deliverable C.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Website launch		03-2019	proceeding according to work plan	
Deliverable description	In line with communication rules specified in Interreg documents, the REAMIT webspace will be			

	developed within the Interreg NWE site. It will include updated information on benefit to target groups, operational & technical specifications of IoT/ Big Data			
Description of progress achieved	REAMIT website at www.reamit.eu has been substantially improved and animated in the past semester. It is now being updated regularly by REAMIT CM with up to date information about REAMIT news, events and activities. Two new sections on the REAMIT website have been created: 'REAMIT Benefits for Stakeholders' and 'REAMIT Operational Specifications'. They will be populated with materials which have been presented and discussed at RSC meeting (Jan-2020, Rennes, France) i.e. Text on 'benefits for food producer and food transporter companies from participation in REAMIT Pilot Tests, Infographics on the benefits from participation in REAMIT pilot tests, and REAMIT evevator speech presented in the form of a video.			
Evidence				
Deliverable C.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Social media		03-2019	completed and achieved as planned	
Deliverable desription	Social media - twitter, Whatsapp, and Facebook will be added to facilitate more active project communication. This will create opportunity for discussion on any technological development in IoT and operational success of food waste management.			
Description of progress achieved	REAMIT social media accounts (Twitter, Facebook, LinkedIn) are up and running and they are regularly updated by Communication Manager and REAMIT PPs. At recent RSC meeting (Jan-2020, Rennes), all PPs have been requested to increase their presence in REAMIT social media accounts by making at least 5 actions per partner in each semester. PPs have been asked to report on this action at the next RSC meeting (July-2020). In this way we aim to achieve at least 55 comunication actions about REAMIT in social media in each semster.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.3	Promotional materiel	01-2019	07-2022	proceeding according to work plan
Deliverable C.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project banners, posters and flyers		07-2021	proceeding according to work plan	
Deliverable desription	Banners and posters about the project will be developed in 4 languages. Banners will be kept in partners' workplaces and also in event venues to create visibility of the project. Posters will be used to promote the project in all major events conducted			
Description of progress achieved	All PPs have been requested to produce REAMIT project banners. So far BED and NTU have developed their banners. Other partners were reminded about it at recent RSC meeting (Jan-2020, Rennes, France). REAMIT project banners were used at 'NWE making an impact' (4-5 Dec 2019, France), at first REAMIT Symposium (9 Jan-2020, Nottingham, UK) and at RSC meeting (15-16 Jan-2020 Rennes, France). Two REAMIT posters were developed by UU and UoN. UU's poster presents initial ideas for the first pilot test with Dunbia. UoN's poster presents UoN experiments to collectdata for REAMIT pilot test with the use of Raman Spectroscopy. Both posters were presented at 'NWE making an impact' (4-5 Dec 2019, France), at first REAMIT Symposium (9 Jan-2020, Nottingham, UK) and at RSC meeting (15-16 Jan-2020 Rennes, France). NTU, with the help of BED, has developed REAMIT flyer. It was presented at 'NWE making an impact' (4-5 Dec 2019, France), at first REAMIT Symposium (9 Jan-2020, Nottingham, UK) and at RSC meeting (15-16 Jan-2020 Rennes, France). NTU with the help of PPs have developed REAMIT brochure outlining aims of the project and presenting all REAMIT partners and their role in the implementation of the project. 3 REAMIT videos have been produced so far. The first one was develope by REAMIT CM at NTU with input from BED. It is available at REAMIT webiste (under Overview). The second video was developed by I&R and focuses on food waste reduction form farm to supermarket. In this video partners from UoN and I&R talk about the theme of REAMIT. This video is in French (currently on YouTube only) https://www.youtube.com/watch?v=p0Y2KB_iosl but soon it will available also on REAMIT website. The third video is being produced by a professional video making company. Its draft version was presented to PPs at RSC meeting (15-16 Jan-2020, Rennes) and feedback from PPs was sent to video producer. The video will be improved based on this collective feedback.			
Evidence				
Deliverable C.3.2				
Deliverable title		Planned delivery month	Deliverable status	
Policy briefs		01-2022	not started	
Deliverable desription	Based on the analytics of sensor data, policy oriented briefs will be developed for each country on the best ways to reduce food waste.			

Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity C.4	Public Event(s)	01-2019	07-2022	proceeding according to work plan
Deliverable C.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Reports on REAMIT Networking events		12-2021	proceeding according to work plan	
Deliverable desription	Three REAMIT networking events will be conducted (1 annually) to reach all target groups in all five countries. The reports will be widely published to reach more more members of target groups using traditional and electronic channels.			
Description of progress achieved	Most of the work to prepare the first REAMIT Symposium took place in the second semester of 2019 under the leadership of NTU. BED supported NTU with the organisation of this event (development of the agenda, identification of speakers, development of the REAMIT flyer, brochure and newsletter, The Symposium was organised on 9 Jan-2020 in Nottingham, UK and apart from BED, also other REAMIT partners (UU, Levstone, SenX, UoN, Valorial and UCD) and Associated Partners (QCAP project) supported NTU by delivering presentations. The Symposium was an opportunity to build networks within the Food Supply Chain industry, explore common challenges in reducing food waste, understand the importance of IoT and Big Data technologies in food supply chain and promote collaboration and networking among partners from academia and private companies involved in food supply chains. More information about the Symposium will be provided in the next reporting round (given the Symposium actually took place in the reporting round Jan-June 2020).			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.5	Publication(s)	01-2019	07-2022	proceeding according to work plan
Deliverable C.5.1				
Deliverable title		Planned delivery month	Deliverable status	
Journal article		07-2022	proceeding according to work plan	
Deliverable desription	Scientific publication will target high-level academic journal. At least 2 articles will be produced from the project results			
Description of progress achieved	A White Paper on Sensors has been advanced by BED with input from UU, Levstone and ITT, and in Dec-2019 it was sent for comments to REAMIT partners. Based on the White Paper, a conference paper on sensors is being prepared.			
Evidence				

Project report tables

Project report expenditure summary

Programme co-financing	Project total budget	Previously Declared	Previously declared but found ineligible	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report
Total co-financing	2 955 102.35	102 163.09	1 071.03	101 092.05	292 018.33	393 110.38	13.30	2 561 991.97	290003.92	292018.33	0.00
Of which ERDF	2 955 102.35	102 163.09	1 071.03	101 092.05	292 018.33	393 110.38	13.30	2 561 991.97	290003.92	292018.33	0.00
Partner contribution	1 970 068.26	68 108.75	714.03	67 394.73	194 678.93	262 073.66	13.30	1 707 994.60	193336.02	194678.93	0.00
Total eligible expenditure	4 925 170.61	170 271.84	1 785.06	168 486.78	486 697.26	655 184.04	13.30	4 269 986.57	483339.94	486697.26	0.00

Project expenditure per budget line

Budget line	Project total budget	Previously Declared	Previously declared but found ineligible	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report
Staff costs	3 404 444.17	101 052.61	1 521.77	99 530.84	400 761.42	500 292.26	14.70	2 904 151.91	360965.59	400761.42	0.00
Office and administration	510 666.23	15 157.88	228.28	14 929.60	60 114.12	75 043.72	14.70	435 622.51	0	60114.12	0.00
Travel and accommodation	251 386.42	3 475.93	35.01	3 440.92	10 305.52	13 746.44	5.47	237 639.98	122374.35	10305.52	0.00
External expertise and services	426 942.13	50 585.42	0.00	50 585.42	11 298.27	61 883.69	14.49	365 058.44	0	11298.27	0.00
Equipment	331 731.66	0	0	0.00	4 217.93	4 217.93	1.27	327 513.73	0	4217.93	0.00
Infrastructure and works	0.00	0	0	0.00	0.00	0.00	0	0.00	0	0	0
Total	4 925 170.61	170 271.84	1 785.06	168 486.78	486 697.26	655 184.04	13.30	4 269 986.57	483339.94	486697.26	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0	0	0
Total eligible expenditure	4 925 170.61	170 271.84	1 785.06	168 486.78	486 697.26	655 184.04	13.30	4 269 986.57	483339.94	486697.26	0.00

Project expenditure per WP

WP number	Project total	Previously	Currently reported	Total reported	% of total budget	Remaining budget	Total amount	Total amount	Total amount
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	budget	reported (certified by CA)	(amount to be declared to the JS)				declared by partner(s)	certified by FLC	included in project finance report
WP T3	462 892.07	3 259.76	24 311.76	27 571.52	5.96	435 320.55	0	24311.76	0.00
WP LT	390 743.04	970.47	28 324.09	29 294.56	7.50	361 448.48	51020.38	28324.09	0.00
WP T2	1 108 726.53	10 132.83	52 063.63	62 196.46	5.61	1 046 530.07	0	52063.63	0.00
WP P	50 000.00	0.00	0.00	0.00	0	50 000.00	0	0	0
WP T1	1 668 704.18	93 079.27	215 075.77	308 155.04	18.47	1 360 549.14	46599.01	215075.77	0.00
WP C	495 021.22	6 948.40	98 262.91	105 211.31	21.25	389 809.91	65216.62	98262.91	0.00
WP M	749 083.57	4 096.05	68 659.10	72 755.15	9.71	676 328.42	320503.93	68659.10	0.00
Total	4 925 170.61	168 486.78	486 697.26	655 184.04	13.30	4 269 986.57	483339.94	486697.26	0.00
Net Revenue	0.00	0.00	0.00	0.00	0	0.00	0	0	0
Total eligible expenditure	4 925 170.61	168 486.78	486 697.26	655 184.04	13.30	4 269 986.57	483339.94	486697.26	0.00

Project expenditure per WP per budget line

WP number	Staff costs	Office and administration	Travel and accommodation	External expertise and services	Equipment	Infrastructure and works	Total expenditure	(net revenue)	Total eligible expenditure
WP LT	23 666.21	3 549.93	293.66	814.29	0.00	0.00	28 324.09	0.00	28 324.09
WP M	51 345.36	7 701.78	3 641.17	5 788.97	181.82	0.00	68 659.10	0.00	68 659.10
WP T1	178 184.14	26 727.60	3 057.32	3 070.60	4 036.11	0.00	215 075.77	0.00	215 075.77
WP T2	44 930.07	6 739.49	5.05	389.02	0.00	0.00	52 063.63	0.00	52 063.63
WP T3	21 140.67	3 171.09	0.00	0.00	0.00	0.00	24 311.76	0.00	24 311.76
WP C	81 494.97	12 224.23	3 308.32	1 235.39	0.00	0.00	98 262.91	0.00	98 262.91
Total	400 761.42	60 114.12	10 305.52	11 298.27	4 217.93	0.00	486 697.26	0.00	486 697.26

Funds

Invoices outside the programme area

Programme co-financing	Project total budget	Previously Declared	Previously declared but found ineligible	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	>% of total budget	Total amount declared by partner(s)	>Total amount certified by FLC	Total amount included in project finance report
Of which ERDF	2 955 102.35	0	0	0.00	352.62	352.62	0.01	365.23	352.62	0.00
Total	2 955 102.35	0.00	0.00	0.00	352.62	352.62	0.01	365.23	352.62	0.00

Funds Per Partner

ERDF

Partner abbreviation	Project total budget	Previously declared	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report
BED	638 118.04	30 975.75	30 975.75	48 183.46	79 159.21	12.41	558 958.83	48 183.46	48 183.46	0.00
I&R	346 819.50	12 369.75	12 335.13	27 771.66	40 106.79	11.56	306 712.71	27 959.40	27 771.66	0.00
UCD	256 072.83	0	0.00	0.00	0.00	0	256 072.83	0	0	0
UoN	326 917.68	17 541.17	17 541.17	50 278.83	67 820.00	20.75	259 097.68	50 430.55	50 278.83	0.00
Levstone	200 467.50	0	0.00	47 658.31	47 658.31	23.77	152 809.19	47 658.31	47 658.31	0.00
NTU	272 425.13	0	0.00	39 129.97	39 129.97	14.36	233 295.16	39 129.97	39 129.97	0.00
Whysor	177 947.55	0	0.00	22 994.05	22 994.05	12.92	154 953.50	22 994.05	22 994.05	0.00
FD	0.00	0	0.00	0.00	0.00	0	0.00	0	0	0
ITT	114 858.00	0	0.00	0.00	0.00	0	114 858.00	0	0	0
SenX	165 613.26	11 276.42	10 240.00	25 574.43	35 814.43	21.63	129 798.83	23 035.96	25 574.43	0.00
UU	396 088.08	0	0.00	30 427.62	30 427.62	7.68	365 660.46	30 612.22	30 427.62	0.00
DNI	59 774.78	0	0.00	0.00	0.00	0	59 774.78	0	0	0
Total	2 955 102.35	72 163.09	71 092.05	292 018.33	363 110.38	12.29	2 591 991.97	290 003.92	292 018.33	0.00

Funds Per Budgetline**ERDF**

Budget line	Project total budget	Previously declared	Previously reported	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report	Total amount approved by JS	Total amount approved by MA	Total amount approved by CA	Total declared but found ineligible	Total amount in pipeline	Remaining budget including pipeline
Staff costs	2 042 666.49	60 631.56	59 718.49	240 456.81	300 175.30	14.70	1 742 491.19	216 579.32	240 456.81	0.00	0.00	0.00	0.00	-2 065.14	218 644.48	1 824 022.03
Office and administration	306 399.73	9 094.72	8 957.74	36 068.44	45 026.18	14.70	261 373.55	0	36 068.44	0.00	0.00	0.00	0.00	-309.77	309.79	306 089.96
Travel and accommodation	150 831.84	2 085.55	2 064.54	6 183.29	8 247.83	5.47	142 584.01	73 424.60	6 183.29	0.00	0.00	0.00	0.00	360.52	73 064.09	77 767.76
External expertise and services	256 165.27	30 351.25	30 351.25	6 778.94	37 130.19	14.49	219 035.08	0	6 778.94	0.00	0.00	0.00	0.00	0.00	0.00	256 165.27

Equipment	199 038.99	0	0.00	2 530.74	2 530.74	1.27	196 508.25	0	2 530.74	0.00	0.00	0.00	0.00	0.00	0.00	199 038.99
Infrastructure and works	0.00	0	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0.00	0.00
Net Revenue	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2 955 102.35	72 163.09	71 092.05	292 018.33	363 110.38	12.29	2 591 991.97	290 003.92	292 018.33	0.00	0.00	0.00	0.00	-2 014.40	292 018.33	2 663 084.03

Project expenditure per partner

Partner overview

Partner abbreviation	Project total budget	Previously declared	Previously declared but found ineligible	Previously reported (certified by CA)	Currently reported (amount to be declared to the JS)	Total reported	% of total budget	Remaining budget	Total amount declared by partner(s)	Total amount certified by FLC	Total amount included in project finance report	Total amount approved by JS	Total amount approved by MA	Total amount approved by CA	Total declared but found ineligible	Total amount in pipeline	Remaining budget including pipeline
BED	1 063 530.07	51 626.26	0.00	51 626.26	80 305.78	131 932.04	12.41	931 598.03	80 305.78	80 305.78	0.00	0.00	0.00	0.00	0.00	80 305.78	983 224.29
I&R	578 032.50	20 616.25	57.70	20 558.55	46 286.10	66 844.65	11.56	511 187.85	46 599.01	46 286.10	0.00	0.00	0.00	0.00	312.91	46 286.10	531 746.40
UCD	426 788.05	0	0	0.00	0.00	0.00	0	426 788.05	0	0	0	0	0	0	0	0.00	426 788.05
UoN	544 862.80	29 235.29	0.00	29 235.29	83 798.05	113 033.34	20.75	431 829.46	84 050.93	83 798.05	0.00	0.00	0.00	0.00	252.88	83 798.05	461 064.75
Levstone	334 112.50	0	0	0.00	79 430.53	79 430.53	23.77	254 681.97	79 430.53	79 430.53	0.00	0.00	0.00	0.00	0.00	79 430.53	254 681.97
NTU	454 041.89	0	0	0.00	65 216.62	65 216.62	14.36	388 825.27	65 216.62	65 216.62	0.00	0.00	0.00	0.00	0.00	65 216.62	388 825.27
Whysor	296 579.25	0	0	0.00	38 323.42	38 323.42	12.92	258 255.83	38 323.42	38 323.42	0.00	0.00	0.00	0.00	0.00	38 323.42	258 255.83
FD	0.00	0	0	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0.00	0.00
ITT	191 430.00	0	0	0.00	0.00	0.00	0	191 430.00	0	0	0	0	0	0	0	0.00	191 430.00
SenX	276 022.10	18 794.04	1 727.36	17 066.68	42 624.05	59 690.73	21.63	216 331.37	38 393.27	42 624.05	0.00	0.00	0.00	0.00	-4 230.78	42 624.05	233 398.05
UU	660 146.81	0	0	0.00	50 712.71	50 712.71	7.68	609 434.10	51 020.38	50 712.71	0.00	0.00	0.00	0.00	307.67	50 712.71	609 434.10
DNI	99 624.64	0	0	0.00	0.00	0.00	0	99 624.64	0	0	0	0	0	0	0	0.00	99 624.64
Total	4 925	120	1 785.06	118	486	605	12.29	4 319	483	486	0.00	0.00	0.00	0.00	-3 357.32	486	4 438

	170.61	271.84		486.78	697.26	184.04		986.57	339.94	697.26					697.26	473.35
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Partner totals**Partner budget line**

Partner abbreviation	Staff costs	Office and administration	Travel and accommodation	External expertise and services	Equipment	Infrastructure and works	Total expenditure	(net revenue)	Total eligible expenditure
BED	65 217.89	9 782.69	553.31	3 596.31	1 155.58	0.00	80 305.78	0.00	80 305.78
I&R	38 402.63	5 760.38	1 623.09	500.00	0.00	0.00	46 286.10	0.00	46 286.10
UoN	68 670.98	10 300.61	1 247.04	3 170.60	408.82	0.00	83 798.05	0.00	83 798.05
Levstone	66 230.12	9 934.50	406.15	1 097.09	1 762.67	0.00	79 430.53	0.00	79 430.53
NTU	52 656.49	7 898.47	2 611.98	2 049.68	0.00	0.00	65 216.62	0.00	65 216.62
Whysor	31 770.32	4 765.53	1 605.75	0.00	181.82	0.00	38 323.42	0.00	38 323.42
SenX	36 553.36	5 482.99	587.70	0.00	0.00	0.00	42 624.05	0.00	42 624.05
UU	41 259.63	6 188.95	1 670.50	884.59	709.04	0.00	50 712.71	0.00	50 712.71
Total	400 761.42	60 114.12	10 305.52	11 298.27	4 217.93	0.00	486 697.26	0.00	486 697.26

Partner workpackage

Partner	Total expenditure	(net revenue)	Total eligible expenditure
BED	80 305.78	0.00	80 305.78
I&R	46 286.10	0.00	46 286.10
UoN	83 798.05	0.00	83 798.05
Levstone	79 430.53	0.00	79 430.53
NTU	65 216.62	0.00	65 216.62
Whysor	38 323.42	0.00	38 323.42
SenX	42 624.05	0.00	42 624.05
UU	50 712.71	0.00	50 712.71
Total	486 697.26	0.00	486 697.26

Partner in kind contribution

Partner Abbreviation	Previously reported (certified by CA)	Currently reported (amount to be declared to the js)	Total reported
BED	0.00	0.00	0.00
I&R	0.00	0.00	0.00
UoN	0.00	0.00	0.00
Levstone	0.00	0.00	0.00
NTU	0.00	0.00	0.00
Whysor	0.00	0.00	0.00

SenX	0.00	0.00	0.00
UU	0.00	0.00	0.00
Total	0.00	0.00	0.00

Spending profile

Partner Abbreviation	Period Target Current Report	Currently reported (amount to be declared to the js)	Current Report Forecast	Cumulative Target	Previously Reported	Comparison	Comparison percent	Next Report Forecast
BED	268 383.49	0.00	0	318 383.49	51 626.26	266 757.23	16.22	424 383.49
I&R	168 206.00	0.00	0	168 206.00	20 558.55	147 647.45	12.22	130 000.00
UCD	94 703.25	0.00	0	94 703.25	0.00	94 703.25	0.00	636 927.05
UoN	172 232.45	0.00	0	172 232.45	29 235.29	142 997.16	16.97	242 997.16
Levstone	77 955.00	0.00	0	77 955.00	0.00	77 955.00	0.00	188 984.00
NTU	127 418.77	0.00	0	127 418.77	0.00	127 418.77	0.00	53 915.83
Whysor	73 206.75	0.00	0	73 206.75	0.00	73 206.75	0.00	177 180.25
FD	0.00	0.00	0	0.00	0.00	0.00	0	0
ITT	49 580.00	0.00	0	49 580.00	0.00	49 580.00	0.00	50 127.00
SenX	65 496.10	0.00	0	65 496.10	17 066.68	48 429.42	26.06	18 794.04
UU	187 075.33	0.00	0	187 075.33	0.00	187 075.33	0.00	168 544.50
DNI	28 162.87	0.00	0	28 162.87	0.00	28 162.87	0.00	0.00
Total	1 312 420.01	0.00	0.00	1 362 420.01	118 486.78	1 243 933.23	8.70	2 091 853.32

Project progress report NWE831 REAMIT

Project progress report identification

Title	Improving Resource Efficiency of Agribusiness supply chains by Minimising waste using Big Data and Internet of Things sensors
Acronym	REAMIT
Number	NWE831
Start date	01-01-2020
End date	01-07-2020
Priority	Priority Axis 3 Resource and materials efficiency
Specific objective	
Lead partner	
Contact person	
Reporting period	Period 2 : 01-01-2020 - 31-12-2020

Highlights of main achievements

WP T1: developed new section in Open Challenge Call supported by infographics on benefits from Pilot Tests; recruited 5 companies and advanced developing 6 pilot tests; initiated dialogue with 6 new companies for pilot tests; developed 'Pilot Impact Assessment' summarising the impact of COVID-19 on each pilot test; developed 'Companies recruited' document presenting companies involved and focus of each pilot test; advanced work on developing working prototypes using sensor technology in 6 pilot tests.

WP T2: decided on equipment for Big Data Hub and placed order with 2 suppliers; tested the interface to collect sensor data and send it to cloud; advanced developing smartphone APP for linking food owners, truck drivers and warehouses.

WP T3: conducted research into the state of the art in terms of life cycle assessment and food waste.

WP M: recruited research fellow responsible for Big data hub development and coordination at BED; updated Project Handbook and Risk log; organised 2nd RAC/WP/RSC round of meetings (15-16/01/2020 Rennes, France); carried out coordination of WPs; drafted and submitted 2nd REAMIT report and transferred funds to partners; prepared 3rd RAC/WP/RSC online meetings on 8-9/07/2020; advanced 3rd REAMIT report; held bi-weekly online meetings of REAMIT sub-group; actioned exit of Dunbia and Cottagequinn Farms LLP from REAMIT and WD Meats joining REAMIT as sub-partners of UU; developed a document assessing impact of COVID-19 on REAMIT; submitted to funder request for a 12-month project extension.

WP C: developed 3 newsletters, 1 quiz, 2 videos and 3 banners; created and populated new sections on REAMIT website; intensified communication about REAMIT in social media; presented REAMIT at 10 external events; advanced 4 journal papers; developed 2 bids; applied for stand in 2 exhibitions.

WP LT: organised 1st Symposium (9/01/2020, Nottingham, UK) and advanced work on 2nd Symposium (5/11/2020, Nantes, France).

Project specific objectives

Project specific objectives	Level of achievement	Explanations
1 - To pilot test sensor technologies in agri-food supply chains in the five partner countries	to a minor degree	Despite individual and collective efforts of REAMIT partners, REAMIT consortium did not yet attract five companies for pilot testing of REAMIT technologies, but only three (one in Germany, one in the NL and one in the UK).). In addition, efforts are under way on using more advanced sensors (Raman spectroscopy in France and 3D fluorescence in the UK) for additional pilot tests. Unfortunately, the lockdown caused by COVID-19 pandemic has made it impossible to carry out with the implementation of these 3 pilot tests as well as very challenging to engage with new companies (6 companies in the pipeline) to develop new pilot tests. REAMIT consortium hopes that with intensified communication tools (i.e. REAMIT website substantially improved and animated, new REAMIT promotional materials including specification of benefits to agri-food companies from using REAMIT technologies, new REAMIT videos, newsletters, partners efforts to promote REAMIT at more and more external online events) we will be able to raise greater awareness on the potential of sensor technology to monitor food quality and convince agribusinesses to engage in pilot tests in different REAMIT corridors (at least one per REAMIT country). We believe this will be possible especially thanks to results we aim to obtain from three pilot tests (Germany, NL and UK reassuming in autumn 2020) which will be promoted across new end-users. Whether REAMIT consortium succeeds in achieving this objective now fully depends on whether EU will be hit by the second wave of COVID-19 in autumn/winter 2020/2021.
2 - To develop Big Data infrastructure for analytics and decision support to reduce food waste	to a minor degree	Since REAMIT pilot tests have been frozen during COVID-19 lockdown, REAMIT consortium does not yet have adequate results. REAMIT partnership has specified equipment necessary to build Big Data hub for analytics, and the consortium hopes that pilot tests will start sending data to Big Data hub for analytics in autumn-2020 (as some pilot tests are reassuming the work with REAMIT in September 2020). As soon as results from data analysis from pilot tests are available, they will be communicated to agribusiness end-users to attract more end-users to participate in new pilot tests. More and more companies in agri-food supply chains seem interested in participating in REAMIT pilot tests (at least 6 companies have expressed interest in REAMIT pilot tests). However, work with them on developing new pilot tests had to be put on hold at the start of COVID-19 pandemic. Many of these companies seem to prioritise their core business now (not research), hence the work with REAMIT does not yet seem to be their priority. Nevertheless, REAMIT partners stay in touch with all these companies (and communicate with them at least once a month not to irritate them but to maintain contact) hoping that within the next months it will be possible to develop and launch new pilot tests.
3 - To bring the REAMIT combination of technologies closer to market	not achieved	This objective links to WP T3. However work on WP T3 has not started yet due to delay in the implementation of WP T1 and WP T2.

Project main outputs achievement

Programme output indicators	Sum of output indicator targets	Sum of achieved output indicators so far	Project main output indicator number	Project main output title	Project main output quantification target	Planned delivery	Achieved so far	Level of achievement
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	0.00	T1.1.1	Working prototypes of sensor technologies based on pilot tests with agribusiness users	5.00	10-06-2021	0.00	behind schedule
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	0.00	T2.4.1	Technology solutions developed	3.00	10-07-2022	0.00	behind schedule
CO01. Number of enterprises receiving support	10.00	6.00	T1.2.2	Agribusiness companies supported in food waste reduction pilots	5.00	10-06-2021	3.00	behind schedule
CO01. Number of enterprises receiving support	10.00	6.00	T2.5.2	Companies supported in technology development	5.00	10-07-2021	3.00	behind schedule
CO29. Number of enterprises supported to introduce new to the firm products	10.00	0.00	T3.2.1	Companies introduced to REAMIT business case	10.00	10-07-2022	0.00	not started

Target groups reached

Target groups	Target value	Target groups reached (prev. periods)	Target groups reached current period	Source of verification	Description of target group involvement	Target groups reached so far (%)
local public authority	10.00	0.00	1.00		REAMIT was promoted among local communities and authorities through an interview in BBC Three Counties Radio at 5.32 pm on Wednesday 31st July 2019 (REAMIT PI from BED was interviewed for an interview by BBC Three Counties Radio).	10.00
regional public authority	5.00	0.00	0.00			0.00
national public authority	5.00	0.00	0.00			0.00

interest groups including NGOs	5.00	21.00	2.00	Email exchange	In Feb-2020, BED's application for REAMIT stand was approved at Chartered Association for Business Schools (CABS) Research Exhibition on 18/03/2020 in Nottingham, UK. BED with NTU, UU, Whysor, UoN developed REAMIT stand. REAMIT PI was invited as key note lecturer at 3rd International Conference on Industrial Engineering & Operation Research, Turkey http://ieconferences.com/ . Both events were opportunities to promote REAMIT. Due to COVID-19 both events were postponed.	460.00
higher education and research	20.00	22.00	3.00	Email exchanges, scheduled meetings.	PI at BED reached out to two major academic institutions in Brazil (Getúlio Vargas Foundation in Rio de Janeiro and Federal Institute of Santa Catarina in Balneariu-Comboriu) and more Brazil academic members during his visit to Brazil (Feb-2020) when he also talked about REAMIT. PI from BED promoted REAMIT at CASS Business School at London City University during the invited lecture 6/02/2020.	125.00
enterprise, excluding SME	10.00	8.00	9.00	Email exchanges, list of presenters at REAMIT 1st Symposium.	BED and UU approached 2 companies in Germany to participate in pilot tests. Tsenso assesses freshness of food and developed "Fresh Index" – new, real-time shelf life indicator for food, which calculates if food is fresh and suitable for sale and consumption. Metro is beef production company. BED and NTU invited 2 companies in UK (Tesco and Pepsico) to participate in pilot tests. Talks with all 4 companies were interrupted by COVID-19. NTU contacted local agri-business companies, IoT companies and organisations working with wider public such as OLIO, FarmingUK; Nottingham Good Food Partnership and invited them to Symposium. ADAS presented at the Symposium. Avgo Bio-tech Ltd actively participated in follow-up activities.	170.00
SME	10.00	7.00	0.00			70.00
business support organisation	5.00	0.00	0.00			0.00
sectoral agency	5.00	2.00	0.00			40.00

Problems and solutions found

Due to lockdown caused by COVID-19, implementation of pilot tests has been delayed by 6 months (category A delay). Since industrial partners prioritise their core business now, their communication with REAMIT consortium about reassuming work on developing and implementing pilot tests remains slow and limited. REAMIT consortium expect that rebuilding relations (to pre-COVID-19 level) with industrial partners will take time, causing additional delay for WP T1 (category B delay). Accumulation of delays (A and B) in the implementation of WP T1 of up to 12 months automatically causes 12-month delay in the implementation of WP T2, WP T3, WP LT, WP C and WP M. COVID-19 and lockdown have had negative impact on the progress of the REAMIT project implementation i.e.: work on running pilot tests has been frozen, work on developing new pilot tests has been put on hold, there was no equipment (sensors) in the market, procurement of equipment at HEIs was frozen, responses from industrial partners were few and rare (as companies prioritized their core business, not research), there was no data from pilot tests for analytics, slow internal communication within BED caused delays in transferring 2nd tranche of funds to partners, small partners faced liquidity problems, on-site work and PI's visits to pilot tests' sites were cancelled, participation in external events and exhibitions to promote REAMIT was cancelled/postponed, recruitment processes of staff dedicated to REAMIT at ITT and UCD was suspended, partners underspent. Based on input from partners on category A risks and category B risks, BED estimated a minimum 12-month delay in the implementation of REAMIT project. In order to implement REAMIT project in line with the AF, REAMIT project would need a min 12-month extension. Consequently, in June 2020 BED asked JS for a 12-month project extension.

Horizontal Principles

Horizontal principles	Contribution in this reporting period	Description of the contribution
Sustainable development (environment)	as planned	This depends on the success of pilot tests, 5 of which are under way currently. We will document the food waste saved and the corresponding impact on savings in carbon emissions, which will then be linked to sustainable development.
Equality between men and women	as planned	Every effort has been made in REAMIT project to promote equality between men and women. The REAMIT consortium consists of a mix of men and women and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (PM at BED, CM at NTU, PM at Whysor) and men (Research Fellow at UU, Research Fellow at BED).
Equal opportunity and non-discrimination	as planned	Initiation of development of new REAMIT technologies to be later applied in agri-food supply chain companies will have positive impact on environment due to reduced food waste thus reduced amount of used natural resources.

Fully implemented

Implemented (to be ticked at the last reporting period, only when the project has fully been achieved):	No
Implemented on:	

Reporting per WP overview

Start	End	Type	Title
Jan.2019	Jan.2019	preparation	Preparation
Jan.2019	Jul.2022	implementation	Long term
Jan.2019	Jul.2022	management	Project management
Mär.2019	Jun.2021	implementation	Adapting and pilot testing sensor technologies in agri-food supply chains
Jan.2019	Jul.2022	implementation	Big Data integration and applications to reduce food wastage.
Jan.2020	Jul.2022	implementation	Business development of REAMIT technologies
Jan.2019	Jul.2022	communication	Communication

Work Package Preparation (preparation)

WP no	Title	Start month	End month	WP Status
P	Preparation	01-2019	01-2019	not started

Partner's involvement

Abbreviation	Name
I&R	Images & Réseaux
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
FD	FreshDetect (to be deleted)
SenX	SenX
BED	University of Bedfordshire (Lead Partner)
ITT	Institute of Technology in Tralee
Whysor	Whysor
UCD	National University of Ireland, Dublin, University College Dublin

Summary description of activities carried out and contribution of each partner

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Work Package Long term (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
LT	Long term	01-2019	07-2022	behind schedule	19 380.89	7.50

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

REAMIT partners have jointly implemented several activities within WP LT. BED, NTU, UU, Whysor, UoN, I&R, Valorial contacted new businesses, food charities and NGOs, public support organisations, local authorities, etc. with the invitation to join the REAMIT network and participate in pilot tests. NTU has established connections with Nottingham Good Food Partnership, which has put NTU in contacts with local agri-food business (Tesco, Avgo) interested in pilot testing REAMIT technologies in 2020-21. However, due to COVID-19 most of these links have been weakened and communication has been put on hold as businesses now prioritise their core activities rather than research, as they are recovering from the downturn caused by the pandemic and lock-down. NTU with support from BED, Levstone, UoN, Valorial, UU, UCD, organised and hosted 1st REAMIT Symposium (9/01/2020, Nottingham, UK). BED supported NTU with developing content of the Symposium, identifying speakers, sending out invitations to speakers and facilitating the Symposium. 13 speakers and over 50 attendees attended, representing agri-food businesses, academia and IoT companies. Presentations included 'Sustainable Agriculture through Innovative Vertical Farming', presentation of ADAS company, presentation of Food Heroes project (funded by Interreg NWE Programme), presentation of QCAP project (funded by Interreg NWE Programme). REAMIT partners (UU, Valorial, UCD, SenX, Levstone) have also presented their work in REAMIT. Apart from presentations, IoT and Big Data companies exhibited their technology i.e. IQR Alliance and Gas Sensing Solutions Ltd. All presentations from 1st REAMIT Symposium are available on the REAMIT website: www.reamit.eu NTU developed promotional materials for the Symposium based on input from all REAMIT partners: REAMIT brochure, newsletter, video and information pack. BED and NTU are supporting I&R and Valorial with organisation of 2nd REAMIT Symposium on 5/11/2020 in Nantes, France. Online meeting was held (26/06/2020) attended by I&R, Valorial and NTU on the organisation of 2nd Symposium. NTU shared with I&R and Valorial experience from organisation of 1st Symposium. UCD has begun preparations for the third REAMIT Symposium in Dublin (between Oct-Dec. 2021). The aim of 3rd Symposium will be to disseminate results from REAMIT Pilot Trials and invite agribusiness and technology suppliers to exchange and debate on REAMIT's objectives and achievements. National and EU projects in the field of food waste will be invited to present their work, enabling the development of future collaborations related to REAMIT. Identification of suitable agribusiness and technology suppliers and projects has begun. By exploiting the contacts generated in the REAMIT project, BED with support from NTU, UU, Levstone and WD Meats has developed a new research proposal to study how technology is supporting fresh food supply chains in the UK in the light of Covid-19 restrictions. It was submitted to UK Research and Innovation in May 2020. BED collaborated as a project partner on a large scale European proposal led by UCD - but it was not successful.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Since all REAMIT pilot tests have been frozen during the pandemic, no data has been generated by the pilot tests. Hence it was not possible to analyse the data and based on it develop briefings for policy, governance and sector actors, about the technology proposed and tested by REAMIT. It was also challenging to expand REAMIT's network as companies (and end users) stopped communicating with REAMIT partners during the pandemic. Some of them went into administration, and others focused resources on their core business, not research. Furthermore, due to the pandemic, most events where REAMIT was supposed to be presented and promoted, were cancelled or postponed until next year. Consequently, as in the case of other WPs, also implementation of WP LT has been delayed. Based on inputs from partners, BED has estimated a minimum of 12-months delay in the implementation of WP LT. BED has estimated that a 12-month project extension will enable the consortium to deliver what has been promised in the AF. Consequently, in June 2020 BED has asked JS for a 12-month project extension.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity LT.1	Creating a self-sustaining REAMIT Network	01-2019	07-2022	behind schedule
Deliverable LT.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Network prospectus		09-2020	behind schedule	
Deliverable desription	BED as coordinator will engage partners to develop a network prospectus, setting out the principles by which the network will operate, and ensure financial sustainability based on a low-cost model of voluntary contributions from partners and members.			
Description of progress achieved	BED, NTU, UU, Whysor, UoN, I&R, Valorial contacted new businesses, food charities and NGOs, public support organisations, local authorities, etc. with the invitation to join the REAMIT network and participate in pilot tests. NTU alone has established connections with Nottingham Good Food Partnership, which has put NTU in contacts with local agri-food business (Tesco, Avgo, etc) interested in pilot testing REAMIT technologies in 2020-21. NTU has sent out emails to 19 companies inviting them to participate in REAMIT pilot tests. However, due to COVID-19 most of these links have been weakened and communication has been put on hold as businesses prioritized their core activities, not research, to recover from the pandemic and lock-down.			
Evidence				
Deliverable LT.1.2				
Deliverable title		Planned delivery month	Deliverable status	
REAMIT networking events: 2019, 20 and 21 including invited lectures from experts		07-2021	proceeding according to work plan	

Deliverable description	Partners will bring together agribusiness & technology SMEs from REAMIT countries for a 1-day annual conference: (i) to ensure that REAMIT technologies keep pace with technology developments; and (ii) to maximize achievement of REAMIT's objectives.			
Description of progress achieved	NTU with support from BED, Levstone, UoN, Valorial, UU, UCD, organised and hosted 1st REAMIT Symposium (9/01/2020, Nottingham, UK). BED supported NTU with developing content of Symposium, identifying speakers, sending out invitations to speakers and facilitating Symposium. 13 speakers and over 50 attendees attended, representing agri-food businesses, academia and IoT companies. Presentations included "Sustainable Agriculture through Innovative Vertical Farming", "ADAS company", "Food Heroes project" (funded by Interreg NWE Programme), "QCAP project" (funded by Interreg NWE Programme). REAMIT partners (UU, Valorial, UCD, SenX, Levstone, BED) presented their work in REAMIT. Apart from presentations, IoT and Big Data companies exhibited their technology (IQRF Alliance and Gas Sensing Solutions Ltd). Due to size, only some presentations were uploaded in eMS. All presentations are available on the REAMIT website at www.reamit.eu NTU developed promotional materials for Symposium based on input from all REAMIT partners: REAMIT brochure, newsletter, video and information pack. BED and NTU are supporting I&R and Valorial with organisation of 2nd REAMIT Symposium on 5/11/2020 in Nantes, France. Online meeting was held (26/06/2020) attended by I&R, Valorial and NTU on the organisation of 2nd Symposium. NTU shared with I&R and Valorial experience from organisation of 1st Symposium. UCD begun preparations for 3rd Symposium in Dublin (winter 2021). Aim of 3rd Symposium - to disseminate results from REAMIT Pilot Trials and invite agribusiness and technology suppliers to exchange and debate on REAMIT's objectives and achievements. National and EU projects in field of food waste will present their work, enabling the development of future collaborations related to REAMIT.			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.2	Regularly updating framework for measuring the impact of REAMIT technologies on food waste	01-2019	07-2022	behind schedule
Deliverable LT.2.1				
Deliverable title		Planned delivery month	Deliverable status	
The agreed framework for measuring the impact of REAMIT technologies on food waste		12-2019	behind schedule	
Deliverable description	The framework for measuring the impact of REAMIT technologies on food waste will be agreed at the first networking event in December 2019.			
Description of progress achieved	During RSC meeting on 15-16 January 2020, BED shared with partners the first draft of the agreed framework for measuring the impact of REAMIT technologies on food waste. However, the framework has not been finalised yet, as no data has been available from pilot tests and the proposed framework could not have been tested in real life conditions of pilot tests.			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.3	Ensuring policy impact	01-2019	07-2022	not started
Deliverable LT.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Policy briefings		03-2022	not started	
Deliverable description	Meetings or briefing papers issued jointly from the partnership to national or EU-level policy formers to engage in a dialogue over the fit of REAMIT technologies to national and EU food waste reduction targets and policies.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.4	Roll-out to other sectors	01-2019	07-2022	not started
Deliverable LT.4.1				

Deliverable title	Planned delivery month	Deliverable status
Cross-sector briefings	06-2022	not started
Deliverable description	REAMIT partners will identify and engage with industry bodies or policy organisations from other sectors where REAMIT technologies may have an application (e.g. EU Medicines Agency, EU Federation of Pharma industries, national health regulators)	
Description of progress achieved		
Evidence		

Work Package Project management (management)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
M	Project management	01-2019	07-2022	proceeding according to work plan	165 178.46	9.71

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

In March 2020 BED completed recruitment process of research fellow responsible for Big data hub development and coordination at BED. Dr Lohit M. Lohithaksha joined REAMIT team at BED on 11/03/2020. Based on inputs from PPs, BED updated Project Handbook with information on common mistakes in financial reports in eMS, calendar for 3rd report, funder's procurement rules below € 5000. Project Handbook is available at www.reamit.eu in password protected section. BED with support of NTU and I&R organised 2nd RAC/WP/RSC round of meetings (15-16/01/2020 Rennes, France), drafted minutes and circulated it to PPs. Minutes from RAC/RWP/RSC meetings on 15-16/01/2020 were approved at RSC meeting on 9/07/2020. BED's coordination of WPs has been limited as due to lockdown there has been little progress in WPs implementation. Nevertheless, BED has been in regular contact with leads of all WPs. To facilitate joint work, BED has purchased annual subscription to Zoom to host online meetings of the REAMIT consortium and REAMIT sub-groups. As for WP T1, BED supported I&R with developing a paper on impact of COVID-19 on pilot tests; BED supported Whysor with purchasing 20 sensors for pilot test with Picnic; BED supported UU in establishing cooperation with Tsenso, developing pilot tests with WD Meats and exploring possibilities for developing 3D Fluorescence pilot test. WP T2: based on inputs from partners, BED developed specifications of equipment and software necessary to build Big Data hub at BED and approached suppliers asking for quotes. WP C: BED supported NTU with developing January, April and June newsletters, developing REAMIT quiz, creating and populating new sections on REAMIT website. WP LT: BED supported NTU with organisation of 1st REAMIT Symposium (9/01/2020, Nottingham, UK). WP M: BED prepared 3rd RAC/WP/RSC online meetings on 8-9/07/2020 hosted by Whysor; BED started work on 3rd REAMIT report and agreed reporting timeline with PPs; BED initiated bi-weekly online meetings of REAMIT sub-group composed of fixed term full time staff in REAMIT (at BED, NTU and UU); BED has coordinated exit of Dunbia and Cottagequinn Farms LLP from REAMIT and WD Meats joining REAMIT as sub-partners of UU and has done paper work necessary for project modifications in eMS. Following funder's request, based on inputs from 9 partners (I&R, UU, NTU, Levstone, UoN, SenX, Whysor, ITT and BED), BED developed a document assessing the impact of COVID-19 on the REAMIT project. BED assessed that COVID-19 will cause a minimum of 12-month delay in REAMIT. BED sent the assessment document to funder on 5/06/2020 and based on it requested a 12-month extension of the project. Based on inputs from PPs, BED has revised REAMIT risk log and included risks related to exit of Dunbia (Partner) and Cottagequinn Farms LLP (Associated Partner) and COVID-19. REAMIT risk log was discussed at RSC online meeting on 9/07/2020. New risks mainly due to COVID-19 include delays in the implementation of running pilot tests, delays in recruiting new companies for pilot tests, losing pilot tests and companies in the pipeline (i.e. since companies currently prioritize their daily business not research), lack of data from pilot tests to be sent to Big data hub for analytics, delay in payments made by LP to PPs, delays in employment of staff dedicated to REAMIT at ITT and UCD. These risks imply that REAMIT partnership may not be able to deliver REAMIT project according to originally agreed timeline and budget. Based on input from partners, BED developed 2nd REAMIT report and payment claim and submitted it to funder in March 2020. Following funder's request, BED submitted to funder clarifying information to accompany 2nd REAMIT report, explained to partners errors they made when reporting in eMS and developed customised materials to support them with improving quality of reporting in eMS in the future. On 3/06/2020 BED transferred to partners second tranche from funder.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Due to lockdown caused by COVID-19, BED experienced considerable slowdown in the internal communication within BED. This delayed the payment approval process and in consequence resulted in delaying transfer of funds (2nd tranche) from BED to partners. In the future BED will work closer with finance team at BED to avoid bottlenecks and delays in transferring funds to partners. BED has been communicating with project partners via email, but responses were slower than normal due to lockdown. Due to COVID-19, RAC/WP/RSC meetings on 8-9/07/2020 took place online, and not at Whysor's office in the NL as planned. In June, BED purchased annual subscription to Zoom and has since then organised frequently REAMIT related meetings online which has substantially improved communication and exchange among partner, as well as facilitated work within WP T1, T2, C and M. UCD, the lead of WP T3, due to suspended recruitment process caused by COVID-19, still has not employed staff dedicated to REAMIT. Hence, activities of UCD in the implementation of WPs (and ie WP T3) have been limited. This is also reflected by UCD not submitting payment claim to JS. Since the implementation of WP T3 should start later in the REAMIT project lifetime, JS has agreed that UCD would submit in 2020 an accumulated claim covering expenses incurred in the first 2 reporting periods. However, the outbreak of COVID-19 and inability to recruit a researcher at UCD dedicated to REAMIT, has further deepened underspending at UCD. JS has been informed that once again UCD would not be submitting payment claim as the cost of FLC would be disproportionately high to the amount claimed.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity M.1	General project management	01-2019	01-2022	proceeding according to work plan
Deliverable M.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Project handbook		02-2019	proceeding according to work plan	
Deliverable description	A document which will collate all necessary information for project management purposes, including terms of reference of groups, project procedures, reporting requirements, partnership agreements, GDPR requirements etc			

Description of progress achieved	Based on inputs from PPs, BED updated Project Handbook with information on common mistakes in financial reports in eMS (based on funder's feedback from 2nd REAMIT report and REAMIT monitoring report), calendar for 3rd report, funder's procurement rules below € 5000.			
Evidence				
Deliverable M.1.2				
Deliverable title		Planned delivery month		Deliverable status
Minutes of meetings of RSC, and RAC and WP meetings - minimum six meetings each. The meetings of RSC and RAC will provide overall strategic direction of the project.		01-2022		proceeding according to work plan
Deliverable description	RSC and RAC will meet every six months -two in the UK and one each in the remaining four partner countries. WP meetings will be organized one day before RSC meetings. Minutes of all these meetings will be circulated & agreed within 1 month.			
Description of progress achieved	BED with support of NTU and I&R organised 2nd RAC/WP/RSC meetings (15-16/01/2020 Rennes, France), drafted minutes and circulated it to PPs. The meetings were attended by 10 PPs (BED, I&R, Valorial, UoN, SenX, Whysor, NTU, UCD, Levstone, UU) and ITT attended part of the meetings online. The minutes from RAC/RWP/RSC meetings on 15-16/01/2020 were approved at RSC meeting on 9/07/2020.			
Evidence				
Deliverable M.1.3				
Deliverable title		Planned delivery month		Deliverable status
Intermediate Work Package coordination		01-2022		proceeding according to work plan
Deliverable description	The leaders of WP will be in regular touch with partners via emails, website and social media sites. Whenever needed, conference facilities via phone, Skype or similar technology will be organised out by leaders of each WP or partners on demand.			
Description of progress achieved	BED's coordination of WPs was limited as due to lockdown there was little progress in WPs implementation. Nevertheless, BED has been in regular contact with leads of all WPs and purchased annual subscription to Zoom to host REAMIT online and WPs meetings. BED supported I&R with developing a paper on impact of COVID-19 on pilot tests. BED supported Whysor with purchasing 20 sensors for pilot test with Picnic. BED supported UU in establishing cooperation with Tsenso. BED supported NTU with developing January, April and June newsletters, developing REAMIT quiz and creating new sections on REAMIT website (Documents to share, Media & Publications, Funding Opportunities, impact of COVID-19 on food waste and food supply chains). BED supported NTU with organisation of 1st REAMIT Symposium (9/01/2020). BED prepared 3rd RAC/WP/RSC online meetings (8-9/07/2020). BED started work on 3rd REAMIT report and agreed reporting timeline with PPs. BED initiated bi-weekly online meetings of REAMIT sub-group (fixed term full time staff in REAMIT at BED, NTU and UU). 2 online meeting of sub-group took place in June and covered: content of RAC/WP/RSC meetings (8-9/07/2020), status of REAMIT pilot tests and recruiting new companies for pilot tests, REAMIT related research, content of June newsletter, new section on REAMIT website on effects of COVID-19 on food waste and food-supply chains. BED has coordinated exit of Dunbia and Cottagequinn Farms from REAMIT, and WD Meats joining REAMIT (and updated project AF in eMS). Following funder's request, based on inputs from 9 partners (I&R, UU, NTU, Levstone, UoN, SenX, Whysor, ITT and BED), BED developed a document assessing the impact of COVID-19 on the REAMIT project. BED assessed that COVID-19 will cause a 12-month delay in REAMIT and that the project would need a 12-month extension to deliver what is indicated in the AF. BED sent the assessment document to funder (5/06/2020) and based on it requested a 12-month extension of the project.			
Evidence				
Deliverable M.1.4				
Deliverable title		Planned delivery month		Deliverable status
Key control register for Project Management		09-2019		proceeding according to work plan
Deliverable description	A register of key control milestones will be prepared by LP and made available to all partners. This register will include useful information (e.g., timetable, risks, meetings, etc.). This will be available online and updated regularly.			
Description of progress achieved	Timetable for REAMIT meetings, symposia and reporting calendar has been agreed with all partners at REAMIT kick-off meeting in May 2019. Regular updates are also repeated via email and included in REAMIT Project Handbook updated each semester and available at www.reamit.eu .			
Evidence				
Activity	Title	Start month	End month	Status
Activity M.2	Risk register and risk review	01-2019	07-2022	proceeding according to work plan

Deliverable M.2.1				
Deliverable title		Planned delivery month		Deliverable status
Risk register		03-2019		proceeding according to work plan
Deliverable desription	Development & partner sign-off of a written risk register, forming an appendix to the project handbook.			
Description of progress achieved	Based on inputs from PPs, BED has revised REAMIT risk log and included risks related to exit of Dunbia (Partner) and Cottagequinn Farms LLP (Associated Partner) and COVID-19. REAMIT risk log was discussed at RSC meeting on 9/07/2020. New risks caused mainly by COVID-19 include delays in the implementation of running pilot tests, delays in recruiting new companies for pilot tests, losing pilot tests and companies in the pipeline (i.e. since companies currently prioritize their daily business not research), lack of data from pilot tests to be sent to Big data hub for analytics, delay in payments made by LP to PPs, delays in employment of staff dedicated to REAMIT at ITT and UCD . These risks imply that REAMIT partnership may not be able to deliver REAMIT project according to originally agreed timeline and budget.			
Evidence				
Deliverable M.2.2				
Deliverable title		Planned delivery month		Deliverable status
Annual risk reviews		01-2022		proceeding according to work plan
Deliverable desription	Written notes of annual risk register reviews for 2020 & 2021.			
Description of progress achieved	Due to multiple risks, we carry out REAMIT risk assessment more frequently ie every semester at RSC meeting.			
Evidence				
Activity	Title	Start month	End month	Status
Activity M.3	Record keeping and reporting	01-2019	07-2022	proceeding according to work plan
Deliverable M.3.1				
Deliverable title		Planned delivery month		Deliverable status
Project reports		07-2022		proceeding according to work plan
Deliverable desription	Submission of complete, accurate & timely, activity & financial reports every six months by the LP partners.			
Description of progress achieved	Based on input from partners, in March 2020 BED developed and submitted 2nd certified REAMIT report to JS. Following feedback and requirements from REAMIT officer at JS, BED clarified parts of the report and ensured that relevant information was sent to partners. BED resubmitted the report to JS in April 2020.			
Evidence				
Deliverable M.3.2				
Deliverable title		Planned delivery month		Deliverable status
Finance training for partners		04-2019		completed and achieved as planned
Deliverable desription	An event for all finance managers of all partners, to clearly set out the processes & procedures for claims & payments, & the partners' financial obligations in the project.			
Description of progress achieved				
Evidence				

Work Package Adapting and pilot testing sensor technologies in agri-food supply chains (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T1	Adapting and pilot testing sensor technologies in agri-food supply chains	03-2019	06-2021	behind schedule	134 205.54	18.47

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Based on inputs from partners, BED has developed a new section in the Open Challenge Call document i.e. 'Benefits for companies in agri-food supply chains from participation in REAMIT pilot tests'. Whysor and I&R have translated it to French, Dutch and German; and NTU has developed infographics which illustrates these benefits. All partners promoted these new materials through social media channels. All partners have engaged in recruiting companies for REAMIT pilot tests. In total, 5 companies have been recruited so far for 6 REAMIT pilot tests (PT): PT1 with Routhiau in France; PT2 with WD Meats in UK, PT3 with WD Meats in UK, PT4 with Picnic in the NL, PT5 with WEYERS in Germany and PT6 with Manor Farm in IE. REAMIT pilot tests focus mainly on constant monitoring of food quality, especially when food is in transit. PT1 led by UoN with Routhiau in France: the aim is to monitor quality of ready to eat and frozen food (salads, soups, sandwiches, deserts, smoked and cooked meats, pastry, cooked vegetables, marinated, seasoned and stuffed food) while the food is being distributed to supermarkets. The activity of GEPEA laboratory was strongly disrupted by COVID-19 and some experiments were postponed. Nevertheless, preliminary experiments were done on chicken samples from the industrial partner (Routhiau) in order to evaluate the direct optical analysis of food through the protective film. The objective is to ensure the possibility to analyse food without removing the samples from their packaging. In parallel, the discussion concerning the analytical protocol and the complementary analyses has progressed with Routhiau. A first protocol including Raman analysis, microbiological and physico-chemical measurements was established. Also, a new company (Adria, France) was contacted in order to complement the Raman measurements by an interesting application called "Sym'Previus" necessary for the validation of results. Shipments of some optical components of the Raman system were delayed due to the borders closing between European countries and the stop of industrial work. PT2 led by UU with WD Meats in UK: the aim is to detect clostridium bacteria in fresh beef meat before the meat is packaged in foiled packs. PT3 led by UU with WD Meats in UK: the aim is to monitor quality of beef meat in dry aging chamber in order to set the optimal parameters (temperature and humidity) in the chamber to minimize weight and quality loss of meat. PT4 led by Whysor with Picnic in The NL: the aim is to deliver fresh and high quality food from online supermarkets to customers' homes. PT5 led by Picnic with WEYERS in Germany: the aim is to distribute high quality and fresh fruit and vegetables from food producers to customers' homes. PT6 led by UCD with Manor Farm in Ireland: the aim is to imprint cyberbar code directly on food to reduce plastic packaging. At least 6 new companies have been approached by REAMIT partners to explore ideas for new pilot tests: I&R and Valorial approached ADRO Ouest and BbaMV (egg and milk consortia) in France, UoN approached Adria in France to complement the Raman measurements, Whysor approached Meyer/QSL in the NL, NTU approached Tesco in UK, and UU and BED approached Metro in Germany. I&R, based on input from pilot test leads (UU, Whysor, UoN), have developed a first draft of Test Roadmap and Companies Recruited documents. They cover information about companies and focus of each pilot test: aim, role of company, role of technology partners, technologies deployed, protocol for pilot test, implementation calendar. Additionally, I&R as lead of WP T1, have developed a document summarizing the impact of COVID-19 on each pilot test (Pilot Impact Assessment). The document estimates 4-6-month delay in the implementation of the currently running pilot tests.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Implementation of WP T1 has been severely affected by COVID-19. To assess the impact of COVID-19 on pilot tests, WP T1 leader I&R initiated writing a document "REAMIT COVID-19 Pilot Impact assessment". The document has been developed based on inputs from partners and updated systematically during lockdown. Key reasons which delay implementation of REAMIT pilot tests include: put on hold laboratory work at UoN, UCD, ITT, UU; put on hold procurement of equipment (sensors) at UU; no availability of sensors and other equipment provided by suppliers (Levstone, Whysor); no access to pilot tests sites due to lockdown (Whysor could not access pilot sites' at Weyers; UU could not access pilot sites at WD Meats); frozen recruitment processes of staff dedicated to REAMIT (ITT and UCD); explosive growth in online orders for pilot test partner (online supermarket) which forced the company to focus all resources on its core business. Partners confirmed that exit from lockdown for industrial partners has been slow and companies now prioritise their core business, not research. This contributes to further delays in reassuming REAMIT pilot tests. Some pilot test partner companies (Weyers) have not responded to correspondence regarding reassuming pilot tests, the work on developing pilot tests in the pipeline has been frozen and it has been impossible to recruit new companies for pilot tests. Even though industrial partners remain interested in REAMIT pilot tests, for the moment, food industry which suffered from the lockdown will not participate in REAMIT technology demonstrations at the same level as before pandemic. Industrial partners need time to recover, which means it will take some time for REAMIT partners to re-establish relations with industry partners. Based on partners' input, BED estimated a min 12-month delay in the implementation of WP T1 (accumulation of delays caused directly by lockdown with delays caused by very slow reassuming of pre-lockdown relations).

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T1.1 Working prototypes of sensor technologies based on pilot tests with agribusiness users	Five prototypes that use traditional and new sensor technologies to monitor quality of fresh produce and sends the data over WiFi, Cat-M, NB-IOT (or other radio technology) will be produced with agribusiness users recruited through the open call (A1.1)	5.01. Number of efficient natural and material resources solutions implemented and tested	06.2021	5.00			behind schedule	
T1.2 Agribusiness companies supported in food waste reduction pilots	Agribusiness companies will be recruited through an open call to participate in the pilot tests in A1.2. Each company will benefit from the installation of new technologies for the test period, giving reductions in waste and savings in their costs.	CO01. Number of enterprises receiving support	06.2021	5.00			behind schedule	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T1.1	Open call for Agri-business agribusiness user companies for pilot tests	03-2019	03-2020	completed
Deliverable T1.1.1				
Deliverable title		Planned delivery month		Deliverable status
Publication of open call		03-2019		completed and achieved more than planned
Deliverable description	Partners would develop an open call for participation from companies willing to offer their premises & equipment to the testing of technologies. The call would be issued on the project webspace and through partner networks so that Risk 2 is minimised.			

Description of progress achieved	Open Challenge Call has been published on the REAMIT website www.reamit.eu in 4 languages (English, French, Dutch and German) and circulated through partners' networks. Based on partners' input, BED has developed a new section in the Open Challenge Call titled 'Benefits from participation in REAMIT pilot tests for agri-food production and transportation companies'. I&R and Whysor have translated it to French, Dutch and German. Based on inputs from all partners (at RSC meeting in Jan-2020), NTU have developed infographics presenting these benefits. The infographics has been uploaded on the REAMIT website and communicated through REAMIT social media channels. Sub-partners at Valorial created a dedicated webpage on Valorial website and circulated information about Open Challenge Call within their network of businesses. In this way, Valorial have identified 2 consortia interested in the participation in REAMIT pilot tests. These are ADRO Ouest (Egg consortium) and BbaMV (dairy products consortium).
Evidence	

Deliverable T1.1.2

Deliverable title	Planned delivery month	Deliverable status
Companies recruited from across agri-business supply chain. Minimum 4 companies will be recruited across NWE so that there is a total of 5 user companies (including the one UK agribusiness user (PP12) that is already a partner) for minimum 5 pilot tests.	03-2020	behind schedule
Deliverable description	Partners expect to recruit a minimum of 4 companies to participate in the technology tests, with a representative mix of locations, sub-sectors etc. A simple MoU would be issued to them; no funding is involved. One UK user company is already a partner.	
Description of progress achieved	REAMIT partners have so far recruited 5 companies for pilot tests: 1) Routhiau: SME in France which produces ready to eat and frozen food (salads, soups, sandwiches, deserts, smoked and cooked meats, pastry, cooked vegetables, marinated, seasoned and stuffed food) distributed in supermarkets. 2) WD Meats: an enterprise in the UK producing beef meat 3) Picnic: data-driven online supermarket in the NL delivering food to customers' doors 4) WEYERS GmbH: food distributor company in Germany focusing on customer-oriented procurement and sale of vegetables 5) Manor Farm: a company producing chicken meat in Ireland In addition, six new companies/consortia have been approached by REAMIT partners to initiate talks on their participation in new pilot tests. These are: 1) Adria (France): UoN contacted Adria to complement the Raman measurements by an interesting application called "Sym'Previus" necessary for the validation of results. 2) ADRO Ouest (France) have been approach by I&R and Valorial 3) BbaMV (France): I&R and Valorial presented a proposal to BbaMV consortium to design a pilot test focusing on egg powder 4) Meyer/QSL (NL) has been contacted by Whysor 5) Tesco (UK) has been contacted by NTU 6) Metro (Germany) has been contacted by UU and BED Due to COVID-19, talks with these 6 companies have been put on hold and REAMIT partners are still waiting for their responses (expected in or after September 2020).	
Evidence		

Activity	Title	Start month	End month	Status
Activity T1.2	Transnational synthesis of sensor technologies (Raman Spectroscopy from UoN, 3D Fluorescence from Ulster and CyberBar from UCD) and big data integration	03-2019	01-2021	behind schedule

Deliverable T1.2.1

Deliverable title	Planned delivery month	Deliverable status
Partner workshop on sensors and big data	06-2019	completed and achieved as planned
Deliverable description	A workshop between knowledge partners and sensor/big data SME partners will bring forward all available knowledge about technologies, applications and potential combinations for food supply chains. An internal workshop with around 20 attendees.	
Description of progress achieved	Partner workshop on sensors and big data was organised by BED in September 2019 in Luton, UK. Previous REAMIT report contains more information about it.	
Evidence		

Deliverable T1.2.2

Deliverable title	Planned delivery month	Deliverable status
Test roadmap	09-2019	behind schedule
Deliverable description	The output from the workshop will be the production of an internal 'test roadmap' combining the results from the call for test companies (so we know how many tests, what kind of companies, and where) with the optimum technologies combinations.	

Description of progress achieved		I&R, based on input from pilot test leads (UU, Whysor, UoN), have developed a first draft of Test Roadmap. Test Roadmap covers the following headings for each Pilot Test and is updated systematically as pilot tests develop: -Aim of the pilot test -Partner companies involved -REAMIT partners involved -Technologies employed -Role of technology partners -Protocol for the pilot test -Implementation calendar I&R, based on input from pilot test leads (UU, Whysor, UoN), have developed a first draft of Test Roadmap and Companies Recruited documents. They cover information about industrial partners in each pilot test and focus of each pilot test (aim of pilot test, role of industrial partner, role of technology partners, technologies deployed, protocol for pilot test, implementation calendar). I&R have also developed a document summarising the impact of COVID-19 on each pilot test: 'Pilot Impact Assessment'. This is not a REAMIT deliverable though.		
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.3	Adapting and pilot testing of sensor technologies with agribusiness users	10-2019	06-2021	behind schedule
Deliverable T1.3.1				
Deliverable title		Planned delivery month		Deliverable status
Working prototypes using sensor technology		06-2021		behind schedule
Deliverable desription	The sensor and scanning technologies will tested along with other traditional sensors where needed and adaptations carried out wherever needed. Data flow to be checked. At the end of the pilot test, new working prototypes will be developed.			
Description of progress achieved	In order to develop working prototypes using sensor technology, several pilot tests are being developed and implemented jointly by REAMIT partners and partner companies. Partner companies are: Routhiau (FR) working with UoN; WD Meats (UK) working with UU; Picnic (NL) working with Whysor; WEYERS GMBH (DE) working with Whysor; Manor Farm (IE) working with UCD. REAMIT pilot tests focus mainly on contact monitoring food quality, i.e.: PT1 led by UoN with Routhiau in France: the aim is to monitor quality of ready to eat and frozen food (salads, soups, sandwiches, deserts, smoked and cooked meats, pastry, cooked vegetables, marinated, seasoned and stuffed food) while the food is being distributed to supermarkets. PT2 led by UU with WD Meats in UK: the aim is to detect clostridium bacteria in fresh beef meat before the meat is packaged in foiled packs. PT3 led by UU with WD Meats in UK: the aim is to monitor quality of beef meat in dry aging chamber in order to set the optimal parameters (temperature and humidity) in the chamber to minimize weight and quality loss of meat. PT4 led by Whysor with Picnic in The NL: the aim is to deliver fresh and high quality food from online supermarkets to customers' homes. PT5 led by Picnic with WEYERS in Germany: the aim is to distribute high quality and fresh vegetables from food producers to customers' homes. PT6 led by UCD with Manor Farm in Ireland: the aim is to imprint cyberbar code directly on food to reduce plastic packaging. Implementation of these pilot tests is not yet at the stage where they can be considered as working prototypes. Levstone reviewed sensors available in the market to understand common problems with different sensors. Levstone then carried out a number of tests with 3 sensors they procured (attached test documents), including the power test and signal strength test. Levstone have shared findings from this analysis and experimentation with REAMIT partners.			
Evidence				
Deliverable T1.3.2				
Deliverable title		Planned delivery month		Deliverable status
User manual for each pilot test		06-2021		not started
Deliverable desription	A user manual documenting the experience of pilot test and a step-by-step guide of good practice in each pilot test will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				
Deliverable T1.3.3				
Deliverable title		Planned delivery month		Deliverable status
Report on the pilot test and development of the sensor prototypes		06-2021		not started
Deliverable desription	A report on the 5 sensor-based pilot tests will be compiled by participating partners and posted on the project webspace. It will describe in detail the experiences with the pilot test and give recommendations for future pilot tests.			
Description of progress achieved				

Evidence	

Work Package Big Data integration and applications to reduce food wastage. (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T2	Big Data integration and applications to reduce food wastage.	01-2019	07-2022	behind schedule	55 109.64	5.61

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

The overall project progress in the implementation of WP T2 has been slow due to very unfavorable circumstances caused by COVID-19, resulting in lockdown in REAMIT partner countries and freezing implementation of REAMIT pilot tests. Nevertheless, partners have worked jointly on developing interface to collect sensor data and send it to cloud; developing Big Data platform collecting and storing data from all REAMIT pilot tests; and developing smartphone APP for linking food owners, truck drivers and warehouses. BED, Whysor, Levstone, SenX, UoN, UU started work on creation and launch of interface. In March 2018 Whysor made presentation to BED and NTU on operation of REAMIT dashboar. Whysor and BED discussed REAMIT software platform (frequency, type and structure of data being retrieved and stored, format to extract data to be compatible and loaded into big data server in real time). Whysor and SenX discussed solutions to support UoN in sending data to REAMIT cloud. Pilot test with Raman Spectroscopy will generate large amounts of data. Measures taken must be checked against experimental data which will form big dataset. This use can profit from caching mechanism where data used frequently will be stored in memory for very fast access. With Dunbia leaving REAMIT, the pilot has changed and sensor discovery had to restart for 2 new pilots. As LoRaWAN gateway was purchased previously for pilot test with Dunbia, it will be re-purposed for WD Meats dry-aging pilot test. Whysor are preparing list of potential LoRa enabled sensors to track temperature and humidity and will be used in WD Meats dry-aging trial. James Dooley (Prof of Microbiology at UU) will help find sensor for Clostridium trial. As of yet, sensor discovery is on-going. Since COVID-19 delayed implementation of pilots and production of data, SenX focused on preliminary work according to sensors and gateways specifications. Since most sensors will be embarked in vehicles and will rely on potentially slow or per-use networks, Levstone worked on reducing size of messages carrying data from sensors to server. Levstone implemented and added Google Varint encoding (<https://developers.google.com/protocol-buffers/docs/encoding>) to Levstone's platform Warp 10. Work was done to make sure alerting works on time on large sets of data. Levstone added a caching mechanism in Warp 10 (Accelerator) to make sure recent data can be fetched and analysed with minimum delay. Based on input from Whysor, ITT, Levstone and SenX, BED developed specifications of equipment for Big Data hub and software platform at BED. BED has launched the procurement process for Big Data hub equipment and software platform, received and assessed quotations from suppliers and with the support from Whysor, ITT, Levstone and SenX selected two suppliers. BED will finalise purchase and installation of REAMIT Big Data hub equipment in the second semester of 2020. Levstone have started the work on developing smartphone APP for linking food owners, truck drivers and warehouses. However, this deliverable is still work in progress as there are no running pilot tests in REAMIT sending data from sensors to cloud. The APP has been tested inhouse by Levstone and is ready for further testing on multi group users within each pilot test (drivers, warehouses, customers). Once the APP can be tested in real life scenario of REAMIT pilot tests, Levstone will fine tune the APP so that it addresses specific requirements of each group of end users participating in the pilot test.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

WP T2 is strictly linked to and dependent upon the implementation and completion of activities (pilot tests) in WP T1. In particular, the core of WP T2 is the analysis of data obtained from sensors employed in pilot tests in WP T1. Consequently, WP T2 can be implemented only if there is data generated by sensors in several pilot tests implemented in WP T1. COVID-19 has caused 4-6-month delay in the implementation of REAMIT pilot tests, and this delay can still increase as some pilot test partner companies are slow in reassuming work on REAMIT pilot tests (companies now prioritize their core business, not research). Since no data has been generated by pilot tests so far, partners agreed that the best approach for the near future would be to prepare as much as possible for the arrival of real data from pilot tests. To do so, partners test the work of sensors and connections with cloud in their own home environments (where possible) with other data (not from pilot tests). Based on inputs from partners, BED has estimated that due to accumulation of two types of delays – delay in the implementation of running pilot tests and delay in companies reassuming their work with REAMIT consortium on pilot tests, the implementation of WP T2 is delayed by minimum 12 months. Based on it, in June 2020 BED submitted a request to JS for a 12-month project extension. Such extension will make it possible for REAMIT consortium to deliver what has been indicated in the REAMIT AF.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T2.4 Technology solutions developed	3 solutions will be developed: 1) a Big Data platform to detect loss of food quality and understand underlying factors, 2) a Smartphone APP to alert truck drivers, warehouse managers and owners of the produce of the potential quality issues with food in transport and make decisions on rerouting, 3) an integrated IoT sensor and big data solution which will help monitor food quality, make rapid decisions to reroute the food if there is deteriorating quality, and save food waste.	5.01. Number of efficient natural and material resources solutions implemented and tested	07.2022	3.00			behind schedule	
T2.5 Companies supported in technology development	In this WP, potential suppliers and consumers linked to REAMIT corridors can self-enrol to participate in tests and trials. Our network events will be used to run proactive campaign to include users subject to resource availability.	CO01. Number of enterprises receiving support	07.2021	5.00			behind schedule	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T2.4	Develop an interface to collect sensor data and send to cloud	07-2019	07-2021	behind schedule
Deliverable T2.4.1				
Deliverable title		Planned delivery month		Deliverable status
Creation and launch of interface		07-2021		behind schedule
Deliverable desription	An interface will be developed for each of the 5 pilot tests for collecting data from sensors and sending them to the cloud for use in a transnational Big Data infrastructure			

Description of progress achieved	BED, Whysor, Levstone, SenX, UoN, UU started work on creation and launch of interface. In March 2018 Whysor made presentation to BED and NTU on operation of REAMIT dashboard (CABS Annual Research Conference, NTU Business School, UK). Whysor and BED discussed REAMIT software platform (frequency, type and structure of data being retrieved and stored, format to extract data to be compatible and loaded into big data server in real time). Whysor and SenX discussed solutions to support UoN in sending data to REAMIT cloud. Pilot test with Raman Spectroscopy generates large amounts of data. Measures taken must be checked against experimental data which will form big dataset. This use can profit from caching mechanism where data used frequently will be stored in memory for very fast access. With Dunbia leaving REAMIT, trial has changed and sensor discovery had to restart for 2 new pilots. As LoRaWAN gateway was purchased in previous reporting period for pilot test with Dunbia, it will be re-purposed for WD Meats dry-aging trial. Whysor are preparing list of potential LoRa enabled sensors to track temperature and humidity and will be used in WD Meats dry-aging trial. James Dooley (Prof of Microbiology at UU) will help find sensor for Clostridium trial. As of yet, sensor discovery is on-going. Since COVID-19 delayed implementation of pilots and production of data, SenX focused on preliminary work according to sensors and gateways specifications. Since most sensors will be embarked in vehicles and will rely on potentially slow or per-use networks, Levstone worked on reducing size of messages carrying data from sensors to server. Levstone implemented and added Google Varint encoding (https://developers.google.com/protocol-buffers/docs/encoding) to Levstone's platform Warp 10. Work was done to make sure alerting works on time on large sets of data. Levstone added a caching mechanism in Warp 10 (Accelerator) to make sure recent data can be fetched and analysed with minimum delay.			
Evidence				
Deliverable T2.4.2				
Deliverable title		Planned delivery month		Deliverable status
User Manual on launching the interface		07-2021		not started
Deliverable description	A user manual documenting the experience of creating and launching the interface and a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved	Work has not started yet, partly because of Covid-19 issues.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.5	Development of Big Data infrastructure for analytics of sensor data and for rerouting to minimise food waste	01-2020	07-2022	not started
Deliverable T2.5.1				
Deliverable title		Planned delivery month		Deliverable status
A big data platform with capability to collect and store sensors data from all REAMIT corridors		07-2021		behind schedule
Deliverable description	This big data platform will be used as the hub for conducting business analytics, and will create an understanding of complex, transnational supply chains. This will be hosted in BED.			
Description of progress achieved	Based on input from Whysor, ITT, Levstone and SenX, BED has developed specifications of equipment necessary to build Big Data hub and software platform at BED (taking account of frequency, type, structure of data being retrieved and stored, formats for extraction of data so that data sets are compatible and can be loaded into a Big Data server in real time, etc.). BED has launched the procurement process for Big Data hub equipment and software platform, received and assessed quotations from suppliers and with the support from Whysor, ITT, Levstone and SenX selected two suppliers. On 29/06/2020 ICT at BED has approved the purchase of Big Data hub equipment, however they requested some amendments to the original request. The internal approval process at BED for hosting physical equipment for REAMIT Big Data hub was delayed because, apparently, it was not in line with a long term ICT strategy at BED to 'move to cloud' and needed further justification. BED has addressed all requirements from ICT team at University of Bedfordshire and got the permission to purchase all the required equipment, install it and host it in the premises of the University of Bedfordshire (Luton Campus). BED will finalise purchase and installation of the REAMIT Big Data hub equipment in the second semester of 2020.			
Evidence				
Deliverable T2.5.2				
Deliverable title		Planned delivery month		Deliverable status
Reports on Big Data platform performance		07-2022		not started
Deliverable description	Partners leading the activity will provide regular annual reports on the performance of the platform.			

Description of progress achieved		Work has not started yet.		
Evidence				
Deliverable T2.5.3				
Deliverable title		Planned delivery month	Deliverable status	
A web-interface with self-enrol facility for enrolment of potential suppliers and consumers of food produce		07-2022	not started	
Deliverable description	Potential suppliers and consumers can self-enrol after approval from the lead partner. This will be augmented using Google Maps data to identify potential destinations for rerouting food that would otherwise become waste.			
Description of progress achieved		Work has not started yet.		
Evidence				
Deliverable T2.5.4				
Deliverable title		Planned delivery month	Deliverable status	
User manuals for the big data platform and the web-interface highlighted in the two deliverables above		07-2022	not started	
Deliverable description	The user manuals will document the experience of creating the big data platform and the web-interface and include a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved		Work has not started yet.		
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.7	Development of smartphone APP for use by truck drivers and warehouses	01-2020	07-2021	not started
Deliverable T2.7.1				
Deliverable title		Planned delivery month	Deliverable status	
Launch of smartphone APP for linking to food owners, truck drivers and warehouses.		07-2021	not started	
Deliverable description	This APP will be developed and tested to work in Android and Apple smartphones. This APP will also be used to link to all relevant stakeholders for long terms dissemination after getting GDPR consent from all parties.			
Description of progress achieved		Levstone have started the work on developing smartphone APP for linking food owners, truck drivers and warehouses. However, this deliverable is still work in progress as we do not have running pilot tests sending data from sensors to cloud. The App has been tested inhouse by Levstone and it is ready for further testing on multi group users within a pilot test (drivers, warehouse and customers). Once the APP can be tested in real life scenario of REAMIT pilot tests, Levstone will do fine tuning of the APP so that it fully addresses the requirements of each group of end users participating in each pilot test.		
Evidence				
Deliverable T2.7.2				
Deliverable title		Planned delivery month	Deliverable status	
User manual for the use of the APP		07-2021	not started	
Deliverable description	A user manual documenting the experience of creating and launching the APP and a step-by-step guide of good practice will be developed for the benefit of food owners, truck drivers and warehouse managers using the APP.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status

Activity T2.8	Delivering the integrated IoT/Big Data technology with capabilities on analytics and decision support to help reduce food waste in NWE.	01-2019	07-2022	not started
Deliverable T2.8.1				
Deliverable title		Planned delivery month	Deliverable status	
Deployment of the integrated IoT/Big Data/analytics/Decision support technology		07-2022	not started	
Deliverable desription	This integrated technology will have the capability to bring together the outputs of sensor technology and analytics to provide decision support to owners of food at risk, truck drivers and warehouse managers via the Smartphone APP.			
Description of progress achieved				
Evidence				
Deliverable T2.8.2				
Deliverable title		Planned delivery month	Deliverable status	
A user manual for the integrated IoT/Big Data/analytics/Decision support technology		07-2022	not started	
Deliverable desription	A user manual documenting the experience of creating and launching the integrated IoT/Big Data technollogy and a step-by-step guide of good practice will be developed for the benefit of future users willing to test REAMIT technologies.			
Description of progress achieved				
Evidence				

Work Package Business development of REAMIT technologies (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T3	Business development of REAMIT technologies	01-2020	07-2022	behind schedule	16 096.50	5.96

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

There was no progress in the implementation of WP T3 in this reporting period. WP T3 depends on the implementation of WP T1 and WP T2. WP T3 will draw together results from WP T1 and WP T2 into a set of solutions which can be brought closer to the market. Based on detailed assessment of REAMIT technology, WP T3 will develop sound business cases, which can be used to validate and promote REAMIT technologies. Delay in the implementation of WP T1 and WP T2 results in delayed implementation of WP T3. The trials with WD Meats are legitimate business value problems, with the Clostridium Estherthicumbacteria issue potentially resulting in over one hundred thousand pounds worth of wasted food. This problem is of global scale and any trials run at the company will provide a small scale proof of concept for the business development of the technology.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

BED estimated minimum of 12 months delay in the implementation of WP T3 and submitted to JS request for a 12-month project extension.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T3.2 Companies introduced to REAMIT business case	The business cases will be used to encourage businesses to take up the REAMIT approach of combined technologies and turn them into marketable products. The output is the number of companies (not currently partners) benefitting from an in-depth introduction to the REAMIT approach.	CO29. Number of enterprises supported to introduce new to the firm products	07.2022	10.00			not started	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T3.1	Risk, technology and sustainability assessments of REAMIT technologies (led by UCD with support from NTU, UU and BED)	01-2021	07-2022	behind schedule
Deliverable T3.1.1				
Deliverable title		Planned delivery month		Deliverable status
An assessment report of REAMIT technologies including a comprehensive systematic review (mapping) of the technical and business landscape in the fresh produce food chain.		09-2021		behind schedule
Deliverable description	The assessment report will be an internal document for partners, used as the basis for the business models development (AT3.4)			
Description of progress achieved	UCD is currently carrying out a review of state-of-the-art technologies that are being implemented/experimented in the food traceability domain. UU confirmed that pilot tests that are being run at WD Meats are legitimate business value problems, with the Clostridium Estherthicum issue potentially resulting in over one hundred thousand pounds worth of wasted food. This problem is of global scale and any trials run at the company will provide a small scale proof of concept for the business development of the technology.			
Evidence				
Deliverable T3.1.2				
Deliverable title		Planned delivery month		Deliverable status
Life Cycle Assessment (LCA) for REAMIT		07-2022		behind schedule
Deliverable description	The life cycle assessment system will allow environmental impact data to be integration with REAMIT IoT sensor and big data solutions.			
Description of progress achieved	UCD is currently carrying out a review of databases for use in the LCA of REAMIT strategies.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.2	Future-proofing REAMIT Technologies (led by UCD with support from BED)	01-2020	07-2021	not started

Deliverable T3.2.1				
Deliverable title		Planned delivery month		Deliverable status
Current and identified future REAMIT technology assessment report		07-2021		not started
Deliverable description	The Future-proof report will be made available to SME technology developers with a view to identifying both the bottlenecks and potential solutions that can be used to drive future food quality analysis technology developments.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.3	Market assessment (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.3.1				
Deliverable title		Planned delivery month		Deliverable status
Market readiness report.		07-2022		not started
Deliverable description	A market analysis and foresight report identifying forthcoming opportunities for REAMIT technologies to be developed into marketable products			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.4	Development of business case (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.4.1				
Deliverable title		Planned delivery month		Deliverable status
Business prospectus		07-2022		not started
Deliverable description	An outward-facing document will be made available to SME technology developers, to potential buyers of technology approaches (large agri-business and logistics companies) and potential investors who can see the possibilities for product development.			
Description of progress achieved				
Evidence				
Deliverable T3.4.2				
Deliverable title		Planned delivery month		Deliverable status
Business case for achieving 40,000 tonnes of waste reduction		07-2022		not started
Deliverable description	The business case will use REAMIT data from continual monitoring of sensor data for identifying/saving potential food waste and subsequent analytics to understand patterns of food waste in NWE with justification for saving 40,000 tonnes of food waste.			
Description of progress achieved				
Evidence				

Work Package Communication (communication)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
C	Communication	01-2019	07-2022	behind schedule	61 651.78	21.25

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland)

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Overall project progress in implementing WP C has been good in the past semester, in spite of lockdown caused by COVID-19 pandemic. NTU, based on partners' input, have further developed REAMIT Communication Strategy, kept REAMIT website up-to-date and populated with relevant information, coordinated communication about REAMIT through social media as well as development of REAMIT banners, posters and newsletters. BED applied for REAMIT stand at two exhibitions. BED's application was accepted by CABS (Chartered Association of Business Schools) Research Exhibition 2020, organised by NTU on 18/03/2020. BED with support from NTU, Whysor, UU, UoN, have prepared a stand at this exhibition (dashboard showing data collection process from a pilot test with Whysor, posters and quiz). However due to the COVID-19 the exhibition has been postponed. In May 2020, BED developed and submitted application for REAMIT stand at 'IT2020 - Leading the Digital Age' exhibition organised by DG Connect, European Commission, 1-3/12/2020, Cologne, Germany. All ICT related projects funded by ERDF have been invited to submit their application for a stand at this prestigious event for research and innovation actors. Members of the REAMIT project team were invited to present the REAMIT project in multiple conferences and events. However, most of them have been either cancelled or postponed due to the pandemic. In spite of the pandemic, partners presented REAMIT (online) at the following events**: 1) PI, Ram Ramanathan, delivered an invited research seminar on REAMIT at Cass Business School, London, UK, on 05/02/2020; 2) PI, Ram Ramanathan, delivered a plenary lecture at the 3rd International Industrial Engineering and Operation Research (<http://ieconferences.com/>) Conference, Istanbul, Turkey, 25 June 2020 on the topic, "Improving Operations and Sustainability of Agribusiness Supply Chains using Internet of Things sensors and Big Data Analytics." (Presented online); 3) PI, Ram Ramanathan, presented a paper titled "A review of sensors for reducing waste in food logistics and supply chains", at the 27th EurOMA Conference, 26/06/2020 - 01/07/2020, Warwick, UK. (presented online at the publication workshop of the conference). The authorship was: Ramakrishnan Ramanathan, Daniel Kelly, Bryan Gardiner, Gerard Corkery, Tahmina Ajmal, William Duffy and Joan Condell; 4) Usha Ramanathan, NTU presented REAMIT at conference UNIDAVI, Brazil: 'Importance of technology in food supply chains to reduce waste'; 5) PM, Katarzyna Pelc: was invited to Interreg NWE project 'Food Heroes Final Conference', 18/03/2020, Brussels. However she could not attend as the meeting was cancelled due to Covid-19 developments; 6) PM, Katarzyna Pelc, BED delivered presentation: 'Introduction to REAMIT' for BMRI staff and research students, Business and Management Research Institute Day, 13/01/2020, University of Bedfordshire, Luton, UK; 7) PM, Katarzyna Pelc delivered a presentation on 25/01/2020 'Introduction to REAMIT' for BED master students in Logistics, Global Supply Chain and Logistics Management class, University of Bedfordshire, Luton, UK; 8) PI, Ram Ramanathan was invited to 'Total Food Conference', 14-17/04/2020 in Nottingham, UK. However he could not attend as the meeting was cancelled due to Covid-19 developments; 9) PI, Ram Ramanathan was invited to 'Smart Food Matters' conference on 24-25/06/2020, London. However he could not attend as the meeting was postponed due to Covid-19 developments; 10) Partner from SenX participated in a conference 'SMARTAGRI' in France in January-2020: <http://smartagri.bzh> where SenX was present in the demo area. BED, UU, Levstone, WD Meats have jointly worked on 4 journal articles inspired by REAMIT.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

All travels (international and domestic) have been cancelled in all REAMIT partner countries in the past semester due to COVID-19. Hence, attendance of REAMIT partners staff in most of the external events (** for the list of events, please see the box above) to network, promote and communicate about REAMIT, has been postponed or cancelled. BED encouraged active online collaboration among REAMIT partners. For example, regular bi-weekly online meetings have been held with REAMIT Team within UoB to update and discuss progress. Similarly, regular bi-weekly meetings with REAMIT project staff on fixed term contracts (BED, NTU and UU) have been held. Minutes of all the meetings have been developed and circulated. Further, REAMIT partners are regularly communicating for specific project purposes. For example, BED and UU have interviewed technology partners (Whysor and Levstone) on developing the sensor review paper further. More interviews with technology partners outside the REAMIT consortium are being planned with help from Whysor and Levstone. BED has supported NTU partner in identifying alternative ways of communicating about REAMIT and its activities as well as connecting with actors involved in ICT and food supply chains. In particular, BED has supported NTU in developing a new section on the REAMIT website, to collect and systemize information from various media sources and online events, on the impact of COVID-19 on food waste and food supply chain actors. This is still work in progress. Based on inputs from partners, BED estimated minimum of 12 months delay in the implementation of WP C and asked JS for a 12-month project extension.

Communication objectives - what is the progress toward the communication objectives as defined in the application form? The level of achievement should be cumulative; however the explanation should describe achievements in this reporting period

Project specific objectives	Level of achievement	Explanations
To raise awareness on the potential of sensor technology to monitor food quality in food supply chains. While there has been significant improvements in the capabilities of sensors and their connectivity over the internet, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains.	to a minor degree	Despite individual and collective efforts of REAMIT partners, REAMIT consortium did not yet attract five companies for pilot testing of REAMIT technologies, but only three (one in Germany, one in the NL and one in the UK). Unfortunately, the lockdown caused by COVID-19 pandemic has made it impossible to carry out with the implementation of these 3 pilot tests as well as very challenging to engage with new companies (6 companies in the pipeline) to develop new pilot tests. REAMIT consortium hopes that with intensified communication tools (i.e. REAMIT website substantially improved and animated, new REAMIT promotional materials including specification of benefits to agri-food companies from using REAMIT technologies, new REAMIT videos, newsletters, partners efforts to promote REAMIT at more and more external online events) we will be able to raise greater awareness on the potential of sensor technology to monitor food quality and recruit more end users for pilot tests in different REAMIT corridors (at least one per country). We believe this will be possible especially thanks to results we aim to obtain from three pilot tests (Germany, NL and UK reassuming in autumn 2020) which will be promoted across new end-users. Whether REAMIT consortium succeeds in achieving this objective now fully depends on whether EU will be hit by the second wave of COVID-19 in autumn/winter 2020/2021.
To convince agribusiness users using the results of pilot studies that food waste can be significantly reduced by adopting REAMIT's integrated IoT-Big Data-Analytics technology solution. REAMIT will conduct regular networking events with agribusiness users, popularise the benefits of using these new technologies, and showcase demonstrations to influence their attitude.	to a minor degree	Since REAMIT pilot tests have been frozen during COVID-19 lockdown, we do not yet have the results which we could communicate to agribusinesses users to convince them about benefits from using REAMIT technology. We hope to have first results from pilot tests in autumn-2020 (as some pilot tests are reassuming the work with REAMIT now ie in September 2020) and we will then be able to communicate them to agribusiness end-users and attract more end-users to participate in new pilot tests. More and more companies in agri-food supply chains seem interested in participating in REAMIT pilot tests (at least 6 companies / pilot tests are in the REAMIT pipeline). However, the work with this new companies on developing new pilot tests had to be put on hold at the start of COVID-19 pandemic. Many of these companies seem to prioritise their core business now (not research), hence the work with REAMIT does not yet seem to be a priority. Nevertheless we stay in touch with all these companies (we communicate with them at least once a month not to irritate them but to maintain contact) hoping that within the next months we will be able to launch new pilot tests.

To raise awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. As highlighted earlier, while there has been significant improvements in the capabilities of sensors, their connectivity over the internet, and the potential of conducting data analytics, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains, collecting huge volumes of data on food quality across the NWE region to identify patterns of food wastage, most frequent causes of food waste, and, likely actions that would have maximum impact in reducing food waste. Policy briefs will be developed to provide action oriented solutions that can be favourably considered by policy makers in NWE.	not achieved	Not started yet as there is no data yet from pilot tests as all pilot tests have been frozen during pandemic.
Using the analytics algorithms and decision support, REAMIT will identify patterns on food waste in NWE and assess the most frequent causes of food wastage along supply chains. By regularly publishing this information through blogs, social media, project outputs and policy briefs, REAMIT will make efforts to change behaviour of relevant stakeholders. For example, targeted feedback of the results to owners of food, decision support on redistribution of food to avoid food becoming waster, etc. will help change behaviour of owners of food and members of food supply chains at micro levels. Policy briefings to suggest best ways of avoiding food waste and regulatory suggestions will help reduce food waste in the region at a macro level.	not achieved	Not started yet as there is no data yet from pilot tests as all pilot tests have been frozen during pandemic.
Based on the risk and sustainability assessment, the project aims to convince agribusiness users of the value of REAMIT's technologies in reducing food waste and increase profitability of their businesses. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help influence their attitude.	not achieved	Not started yet as there is no data yet from pilot tests as all pilot tests have been frozen during pandemic.
Understand the risks involved in the technologies, to help design future-proof technologies for food waste reduction and also the sustainability issues. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help increase knowledge about sustainability aspects of technologies, knowledge and benefits of saving food waste, and policy oriented activities.	-	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity C.1	Start-up activities including communication strategy	01-2019	01-2022	proceeding according to work plan
Deliverable C.1.1				
Deliverable title		Planned delivery month		Deliverable status

Communication strategy document		01-2022	proceeding according to work plan	
Deliverable description	A communication strategy approved by Steering Committee (RSC) including guidelines on local, regional and inter-regional strategies will be delivered in the first quarter, and reviewed annually. It will outline approach to reach all target groups.			
Description of progress achieved	Based on input from partners, NTU has updated REAMIT Communication Strategy.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.2	Digital activities	03-2019	07-2022	proceeding according to work plan
Deliverable C.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Website launch		03-2019	proceeding according to work plan	
Deliverable description	In line with communication rules specified in Interreg documents, the REAMIT webspace will be developed within the Interreg NWE site. It will include updated information on benefit to target groups, operational & technical specifications of IoT/ Big Data			
Description of progress achieved	NTU with input from BED, I&R, Whysor has updated REAMIT website www.reamit.eu i.e. new sections have been created and populated: 'Documents to share', 'Funding opportunities' and 'Media and publications'. During the pandemic BED has supported NTU partners in identifying alternative ways of communicating about REAMIT and its activities as well as connecting with actors involved in ICT and food supply chains. In particular, BED has supported NTU in developing a new section on the REAMIT website, to collect and systemize information from various media sources and online events, on the impact of COVID-19 on food waste and food supply chain actors. This is still work in progress.			
Evidence				
Deliverable C.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Social media		03-2019	proceeding according to work plan	
Deliverable description	Social media - twitter, Whatsapp, and Facebook will be added to facilitate more active project communication. This will create opportunity for discussion on any technological development in IoT and operational success of food waste management.			
Description of progress achieved	BED and NTU ensure that all partners increase communication about REAMIT through social media (LinkedIn, FB, Twitter). All partners were asked to make minimum 5 communication actions in social media in each semester. All partners will report about it at the next RSC meeting. REAMIT partners have developed 4 videos: NTU with help and input from all PPs have developed three REAMIT videos: 'REAMIT animation', 'REAMIT - meet the partners', and REAMIT video made by a professional company. UoN and I&R have developed one video on REAMIT (in French). REAMIT videos are available at the REAMIT website www.reamit.eu and at Vimeo: https://vimeo.com/reamit4nwe NTU has created a webpage for REAMIT under research and innovation section of NTU. This platform is used to engage with local businesses and encourage ongoing discussion with NTU partners. BED shared with REAMIT partners information about online events on technology and food supply chains and encouraged partners to attend: 'Food Waste innovation showcase' on 27/02/2020, Sheffield, UK; 'EUROPE Let's Cooperate. Interregional cooperation forum' online event on 9/06/2020; 9/09/2020; 'IOT & Industry 4.0 Online Conference and exhibition' on 16/06/2020.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.3	Promotional material	01-2019	07-2022	proceeding according to work plan
Deliverable C.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project banners, posters and flyers		07-2021	proceeding according to work plan	
Deliverable description	Banners and posters about the project will be developed in 4 languages. Banners will be kept in partners' workplaces and also in event venues to create visibility of the project. Posters will be used to promote the project in all major events conducted			

Description of progress achieved		UoN, Whysor and ITT have developed REAMIT banners. NTU with support from BED and Whysor have developed the content of April and June REAMIT newsletters. Whysor have developed two posters on the Dutch and German pilot tests; UU have developed a poster on pilot test with Dunbia for the Charted ABS Impact Event (March 2020).		
Evidence				
Deliverable C.3.2				
Deliverable title		Planned delivery month		Deliverable status
Policy briefs		01-2022		not started
Deliverable description	Based on the analytics of sensor data, policy oriented briefs will be developed for each country on the best ways to reduce food waste.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity C.4	Public Event(s)	01-2019	07-2022	proceeding according to work plan
Deliverable C.4.1				
Deliverable title		Planned delivery month		Deliverable status
Reports on REAMIT Networking events		12-2021		proceeding according to work plan
Deliverable description	Three REAMIT networking events will be conducted (1 annually) to reach all target groups in all five countries. The reports will be widely published to reach more members of target groups using traditional and electronic channels.			
Description of progress achieved	NTU has developed a report from REAMIT first Symposium (9/01/2020, Nottingham, UK), which has been shared with wider audiences through REAMIT partners' networks.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.5	Publication(s)	01-2019	07-2022	ahead of schedule
Deliverable C.5.1				
Deliverable title		Planned delivery month		Deliverable status
Journal article		07-2022		ahead of schedule
Deliverable description	Scientific publication will target high-level academic journal. At least 2 articles will be produced from the project results			
Description of progress achieved	Partners have managed the available time during lockdown more fruitfully by undertaking relevant research studies that do not need sensor data: A conference paper “A review of sensors for reducing waste in food logistics and supply chains” was developed by BED, UU and submitted to EurOMA; A white paper on sensors is being developed jointly by BED, Levstone and UU; A research paper ‘Wastage aware rapid response model for transport of fresh agri-food products’ is being developed by BED. It aims to develop a multi-objective mixed integer linear programming model to simultaneously minimise transportation cost and delivery time goals while adhering to practical constraints such as vehicle capacity, route restrictions and wastage thresholds; UU has began an in-depth review of the literature around the causes of meat waste in the different areas of the supply chain. This work was continued and extended based on conversations that had been held with Dunbia and WD Meats. As a result of this work, a literature review was created and turned into a scoping review and the completed article submitted to Elsevier’s Journal of Cleaner Production. UU’s article ‘Sensing technologies for maximizing quality and minimizing waste of meat’ is currently under review.			
Evidence				

Project report tables

Project report expenditure summary

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)						
Total co-financing	2 955 102.35	637 363.71	30 000.00	393 110.38	393 110.38	275 196.70	270 973.65	4 223.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Partner contribution	1 970 068.26	424 909.30	20 000.00	262 073.66	262 073.66	183 464.53	180 649.16	2 815.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 062 273.01	50 000.00	655 184.04	655 184.04	458 661.23	451 622.81	7 038.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per partner

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)						
BED	1 063 530.07	ERDF	243 325.94	50 000.00	181 932.04	181 932.04	111 393.90	111 393.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I&R	578 032.50	ERDF	94 506.79	0.00	66 844.65	66 844.65	27 291.53	25 419.27	1 872.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UCD	426 788.05	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UoN	544 862.80	ERDF	186 196.85	0.00	113 033.34	113 033.34	72 910.63	72 913.48	-2.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levstone	334 112.50	ERDF	105 537.75	0.00	79 430.53	79 430.53	26 107.22	26 107.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTU	454 041.89	ERDF	115 009.78	0.00	65 216.62	65 216.62	49 793.16	49 071.36	721.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Whysor	296 579.25	ERDF	98 740.95	0.00	38 323.42	38 323.42	60 417.53	60 417.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FD	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ITT	191 430.00	ERDF	14 897.35	0.00	0.00	0.00	14 897.35	15 052.36	-155.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SenX	276 022.10	ERDF	91 842.43	0.00	59 690.73	59 690.73	34 655.12	30 125.25	4 529.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UU	660 146.81	ERDF	112 215.17	0.00	50 712.71	50 712.71	61 194.79	61 122.44	72.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DNI	99 624.64	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61		1 062 273.01	50 000.00	655 184.04	655 184.04	458 661.23	451 622.81	7 038.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per budgetline

Budgetline	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)						
Staff costs	3 404 444.17	867 784.29	0.00	500 292.26	500 292.26	369 412.17	363 889.76	5 522.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office and administration	510 666.23	130 167.47	0.00	75 043.72	75 043.72	55 411.77	54 583.42	828.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel and accommodation	251 386.42	29 580.73	0.00	13 746.44	13 746.44	15 198.39	15 430.23	-231.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External expertise and services	426 942.13	26 071.09	50 000.00	61 883.69	61 883.69	14 187.40	13 267.90	919.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment	331 731.66	8 669.43	0.00	4 217.93	4 217.93	4 451.50	4 451.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Infrastructure and works	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4 925 170.61	1 062 273.01	50 000.00	655 184.04	655 184.04	458 661.23	451 622.81	7 038.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 062 273.01	50 000.00	655 184.04	655 184.04	458 661.23	451 622.81	7 038.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage

Workpackage	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)						
Wp P	50 000.00	0.00	50 000.00	50 000.00	50 000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	390 743.04	48 749.76	0.00	29 294.56	29 294.56	19 380.62	19 380.89	-0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp M	749 083.57	239 406.02	0.00	72 755.15	72 755.15	166 182.20	165 178.46	1 003.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T1	1 668 704.18	444 627.78	0.00	308 155.04	308 155.04	137 157.49	134 205.54	2 951.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T2	1 108 726.53	115 507.21	0.00	62 196.46	62 196.46	55 526.91	55 109.64	417.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T3	462 892.07	43 754.13	0.00	27 571.52	27 571.52	16 096.10	16 096.50	-0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp C	495 021.22	170 228.11	0.00	105 211.31	105 211.31	64 317.91	61 651.78	2 666.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4 925 170.61	1 062 273.01	50 000.00	655 184.04	655 184.04	458 661.23	451 622.81	7 038.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 062 273.01	50 000.00	655 184.04	655 184.04	458 661.23	451 622.81	7 038.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage per budgetline (total values)

Wp number / budgetline	Staff costs	Office and administration	Travel and accommodation	External expertise and services	Equipment	Infrastructure and works	Total	Net Revenue	Total eligible expenditure
Wp P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	15 657.18	2 348.56	1 375.15	0.00	0.00	0.00	19 380.89	0.00	19 380.89
Wp M	128 046.35	19 206.96	10 877.70	4 876.07	2 171.38	0.00	165 178.46	0.00	165 178.46
Wp T1	107 676.96	16 151.54	1 387.39	6 773.53	2 216.12	0.00	134 205.54	0.00	134 205.54
Wp T2	47 865.78	7 179.86	0.00	0.00	64.00	0.00	55 109.64	0.00	55 109.64
Wp T3	13 996.96	2 099.54	0.00	0.00	0.00	0.00	16 096.50	0.00	16 096.50
Wp C	50 646.53	7 596.96	1 789.99	1 618.30	0.00	0.00	61 651.78	0.00	61 651.78
Total	363 889.76	54 583.42	15 430.23	13 267.90	4 451.50	0.00	451 622.81	0.00	451 622.81

Project report expenditure - invoices outside of the eu part of the programme area

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)			Total amount declared to flc	Total amount certified by flc	Total amount included in project report - declared to js
		Declared to flc	Reported to js	Confirmed by ca			
Total co-financing	2 955 102.35	905.40	352.62	352.62	540.17	540.17	0.00
Partner contribution	1 970 068.26	603.61	235.08	235.08	360.12	360.12	0.00
Total eligible expenditure	4 925 170.61	1 509.01	587.70	587.70	900.29	900.29	0.00

Project expenditure spending profile

Period	Period start date	Period end date	Reporting date	Total eligible budget per period	Actual spending	Forecast from the previous project report (1.2)
Period 0	10.01.2019	10.01.2019	09.07.2022	50 000.00	50 000.00	673 085.08
Period 1	10.01.2019	31.12.2019	31.12.2019	1 312 420.01	605 184.04	
Period 2	01.01.2020	31.12.2020	31.12.2020	1 675 938.23	451 622.81	
Period 3	01.01.2021	31.12.2021	31.12.2021	1 382 442.10	0.00	
Period 4	01.01.2022	09.07.2022	09.07.2022	504 370.27	0.00	
Total	N/a	N/a	N/a	4 925 170.61	1 106 806.85	

Project report expenditure per partner (fund amounts)

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)						
BED	638 118.04	ERDF	145 995.55	30 000.00	109 159.21	109 159.21	66 836.34	66 836.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I&R	346 819.50	ERDF	56 704.06	0.00	40 106.79	40 106.79	16 374.91	15 251.56	1 123.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UCD	256 072.83	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UoN	326 917.68	ERDF	111 718.09	0.00	67 820.00	67 820.00	43 746.37	43 748.08	-1.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levstone	200 467.50	ERDF	63 322.64	0.00	47 658.31	47 658.31	15 664.33	15 664.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTU	272 425.13	ERDF	69 005.86	0.00	39 129.97	39 129.97	29 875.89	29 442.81	433.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Whysor	177 947.55	ERDF	59 244.56	0.00	22 994.05	22 994.05	36 250.51	36 250.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FD	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ITT	114 858.00	ERDF	8 938.41	0.00	0.00	0.00	8 938.41	9 031.41	-93.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SenX	165 613.26	ERDF	55 105.45	0.00	35 814.43	35 814.43	20 793.07	18 075.15	2 717.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UU	396 088.08	ERDF	67 329.09	0.00	30 427.62	30 427.62	36 716.87	36 673.46	43.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DNI	59 774.78	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	2 955 102.35		637 363.71	30 000.00	393 110.38	393 110.38	275 196.70	270 973.65	4 223.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project progress report NWE831 REAMIT

Project progress report identification

Title	Improving Resource Efficiency of Agribusiness supply chains by Minimising waste using Big Data and Internet of Things sensors
Acronym	REAMIT
Number	NWE831
Start date	01-01-2020
End date	01-07-2020
Priority	Priority Axis 3 Resource and materials efficiency
Specific objective	SO5: To optimise (re)use of material and natural resources in NWE
Lead partner	University of Bedfordshire
Contact person	University of Bedfordshire
Reporting period	Period 2 : 01-01-2020 - 31-12-2020

Highlights of main achievements

WP T1: PPs advanced implementation of 7 pilots with 4 companies: Clostridium Bacteria, Dry chamber, Picnic, Weyers, Raman, Cyberbar, 3D Fluorescence. BED & Whysor recruited one company each for additional pilot tests. Partners met over 30 times online to advance pilots.

WP T2: BED with support from Levstone set up Big data server at BED which can be accessed by PPs. Whysor provided temporary solution for storing data from pilots in Whysor cloud.

WP T3: UCD developed REAMIT LCA framework for assessing REAMIT technologies for each pilot test.

WP M: Research Assistant joined REAMIT team at ITT; two visiting staff members have been recruited by BED to support REAMIT activities. Based on input from partners, BED developed 3rd REAMIT progress report, submitted to JS in Sept-2020; transferred to partners 3rd tranche of funds; coordinated work on 4th REAMIT progress report and payment claim; updated Project Handbook; BED, with support from Whysor, NTU and UU organised online meetings of RAC/WP/RSC (8-9/07/2020) and circulated minutes to PPs. BED's request for 12-month REAMIT project (and financial) extension was approved by funder. New end date for the REAMIT project is 9/07/2023. BED coordinated work on REAMIT project 12-month extension. BED revised risk log and included 5 new risks in REAMIT.

WP C: Based on input from partners, NTU updated REAMIT website, developed 2 new REAMIT videos and 2 REAMIT newsletters (Sept & Dec 2020). NTU delivered online training on social media platforms for REAMIT partners; developed Sharepoint - online storage space for REAMIT internal documents; initiated work on developing food waste case studies. BED presented and promoted REAMIT at 12 online internal and external events on ICT, food supply chains and agri-food production. UU submitted a journal article on sensors.

WP LT: Valorial delivered 2nd Symposium; BED is developing Capitalisation proposal; PPs approached over 30 new actors in agri-food supply chains.

Project specific objectives

Project specific objectives	Level of achievement	Explanations
1 - To pilot test sensor technologies in agri-food supply chains in the five partner countries	to a minor degree	REAMIT partners are continuously making efforts to raise awareness on the potential of sensor technology to monitor food quality in food supply chains. However, most businesses that work with REAMIT partners have been hit by the pandemic and they substantially reduced (or froze) communication with REAMIT partners. Often, implementation of pilot tests have been put on hold by private companies, and often it was not possible for REAMIT partners to access companies' premises to install sensors. Many companies in the pilot test pipeline, prioritize now their core activities, and not research. Often, companies choose not to engage in REAMIT technology demonstrations, as they struggle with much reduced resources due to the pandemic, and focus on their core business.
2 - To develop Big Data infrastructure for analytics and decision support to reduce food waste	to a minor degree	REAMIT Big Data server has been procured and installed in BED. Final checks are being carried out in order to make it accessible to REAMIT partners from outside BED. REAMIT partners have communicated and made efforts to raise awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. However, many businesses despite confirming interest in the proposed REAMIT approach and technology, nowadays prioritize their core activities rather than research. Often, companies choose not to engage in REAMIT technology demonstrations as they struggle with much reduced resources due to pandemic and lockdown. Also, since implementation of pilot tests (WP T1) has been delayed due to COVID-19, no data has been generated by these pilot tests, hence it was not possible to do data analytics to demonstrate the potential of the proposed approach in the REAMIT project.
3 - To bring the REAMIT combination of technologies closer to market	not achieved	Not started yet, yet but internal WP T3 meetings will start in the next reporting period.

Project main outputs achievement

Programme output indicators	Sum of output indicator targets	Sum of achieved output indicators so far	Project main output indicator number	Project main output title	Project main output quantification target	Planned delivery	Achieved so far	Level of achievement
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	8.00	T1.1.1	Working prototypes of sensor technologies based on pilot tests with agribusiness users	5.00	10-06-2021	7.00	behind schedule
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	8.00	T2.4.1	Technology solutions developed	3.00	10-07-2022	1.00	behind schedule
CO01. Number of enterprises receiving support	10.00	8.00	T1.2.2	Agribusiness companies supported in food waste reduction pilots	5.00	10-06-2021	4.00	behind schedule
CO01. Number of enterprises receiving support	10.00	8.00	T2.5.2	Companies supported in technology development	5.00	10-07-2021	4.00	behind schedule
CO29. Number of enterprises supported to introduce new to the firm products	10.00	0.00	T3.2.1	Companies introduced to REAMIT business case	10.00	10-07-2022	0.00	not started

Target groups reached

Target groups	Target value	Target groups reached (prev. periods)	Target groups reached current period	Source of verification	Description of target group involvement	Target groups reached so far (%)
local public authority	10.00	1.00	0.00			10.00
regional public authority	5.00	0.00	0.00			0.00
national public authority	5.00	0.00	2.00	Thank you letter sent to RR; Email exchanges.	BED attended 'Awareness Raising and Networking Events on Horizon 2020, European Green Deal and co-funding opportunities', Department of Biotechnology, India (3/11/2020) and made presentation promoting REAMIT. Whysor contacted Dutch Ministry of Foreign Affairs to involve Belgian dairy companies to REAMIT pilot tests.	40.00
interest groups including NGOs	5.00	23.00	0.00			460.00

higher education and research	20.00	25.00	3.00	REAMIT Capitalisation proposal; developments within REAMIT Clostridium Bacteria pilot test.	BED connected with 2 HEIs to discuss cooperation under REAMIT: Maastricht University (NL) and Hof University (DE). This resulted in MU engaging with REAMIT pilot test with WD Meats (Clostridium Bacteria) and becoming a partner in the REAMIT Capitalisation proposal. Whysor contacted Maastricht University (NL) and initiated contact between BED and MU. This resulted in MU engaging with REAMIT pilot test and becoming a partner in REAMIT Capitalisation proposal. At the 2nd REAMIT Symposium Whysor connected with Fontys Venlo University of Applied Science, attended an online meeting and spoke about REAMIT project. UU connected with staff at Maastricht University who became involved in clostridium trial.	140.00
enterprise, excluding SME	10.00	17.00	12.00	Email exchanges, notes from meetings.	BED (indirectly through Bradford University and a former colleague from University of Bedfordshire Business School) connected with Morrisons, a chain of large food supermarkets in the UK, and promoted REAMIT through BED students who have internships at Morrisons. UU connected with 8 enterprises: held meeting held with SealedAir as part of clostridium trial, meeting held with Finnebrogue to introduce project and find additional trials, introductory emails sent to Willowbrook Lettuce, Moy park, Lynas, meetings held with Sensipdx as part of clostridium trial, meeting held with Galvia digital and Riverwest Management to find interested companies. NTU contacted Pepsi, Starkey's fruits, Morrisons and Tesco.	290.00
SME	10.00	7.00	2.00	Exchange of emails, notes from meetings, involvement of companies as new REAMIT pilot test partners.	BED have found another SME in the UK and will start engaging with them as pilot test partner ASAP. Whysor contacted SME Connecting Agri and Food in the Netherlands, which resulted in a possible new Dutch pilot partner (meat).	90.00

business support organisation	5.00	0.00	4.00	Exchange of emails, meetings on line, REAMIT project Capitalisation proposal.	At World Agri Tech Innovation Summit, BED connected with CEO from Agri-Tech-e in UK, discussed involvement of UK agri-food companies in REAMIT pilots, exchanged emails. At REAMIT Symposium, BED connected with Biotech Sante Bretagne, discussed involvement of French companies in REAMIT pilots, attended online meeting, exchanged emails. At Food Waste Feast 2.020 BED connected with Flanders Food, discussed involvement of Belgian companies in REAMIT pilot tests, met online and exchanged emails. Whysor contacted LIOF (regional development company for Limburg, NL), discussed involvement of Dutch/Belgian agri-food companies in REAMIT pilots, exchanged emails, which resulted in a contact with the Dutch Ministry of Foreign Affairs.	80.00
sectoral agency	5.00	2.00	2.00	Exchange of emails, follo-up talks/meetings and REAMIT Capitalisation proposal.	Whysor contacted DLV Advies and GoodyFoods for involving dairy companies in pilot tests. At Food Waste Fest 2.020 Whysor connected with Innovatiesteunpunt (innovation support center Belgium) and Boerenbond (farmers union), discussed involvement of Belgian companies in pilot test, which resulted in contact with BCZ-CBL (Belgian Confederation of Dairy Industry).	80.00

Problems and solutions found

WP T1: Work on 7 pilot tests have advanced but slower than planned. It has been affected by COVID-19 and national (second) lockdown in NWE countries in autumn/winter 2020 will create further delay. Partners could not access company's sites to install sensors, or companies have put on hold working on REAMIT pilot tests due to shortage of resources caused by the pandemic. In consequence, no data has been generated by pilot tests, and no data has been sent to Big data server for analysis.

WP T2: Big data server has been set up at BED. However, no data is available from pilot tests for big data analysis by the server.

WP M: Communication within BED team and with REAMIT partners has been slow. This delayed payment approval process and transfer of funds (3rd tranche) to partners. PM and PI discussed this with finance team at BED, who confirmed that due to amounts involved, payment process had to go through many levels of approval, which was timely as staff worked remotely. BED communicated with partners via email but responses were slower than normal. RAC/WP/RSC meetings on 8-9/07/2020 took place online, and not at Whysor's office in NL. Planned visits to sites of pilot tests in NL and DE were cancelled. Delays have been encountered in recruitment of a suitably qualified researchers to work on the project at UCD. The delay has been exacerbated by the Covid-19 crisis as UCD staff are now working from home which has lead to lengthy delays in re-advertising the positions. The positions will be advertised in early 2021.

Delays in the implementation of WP T1 cause delays in the implementation of WP T2, WP T3, WP LT and WP C. Based on inputs from partners, BED estimated up to 12 months delay in the implementation of all WPs. In November 2020 BED received confirmation from the funder, that REAMIT project has been granted 12-month project and budget extension. The new end date of the REAMIT project is 9th of July 2023.

Horizontal Principles

Horizontal principles	Contribution in this reporting period	Description of the contribution
Sustainable development (environment)	as planned	This depends on the success of pilot tests, 6 of which are under way currently. However they are delayed due to COVID-19. We will document the food waste saved and the corresponding impact on savings in carbon emissions, which will then be linked to sustainable development.
Equal opportunity and non-discrimination	as planned	Every effort has been made in REAMIT project to promote equality opportunities and non-discrimination. The REAMIT consortium consists of a mix of men and women from different countries and cultures, and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (PM at BED, CM at NTU, PM at Whysor) and men (Research Fellow at UU, Research Fellow at BED, RA at ITT). The new RA recruited by ITT is from India.
Equality between men and women	as planned	Every effort has been made in REAMIT project to promote equality between men and women. The REAMIT consortium consists of a mix of men and women and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (PM at BED, CM at NTU, PM at Whysor) and men (Research Fellow at UU, Research Fellow at BED, RA at ITT). The two new visiting staff members recruited by BED are both women.

Fully implemented

Implemented (to be ticked at the last reporting period, only when the project has fully been achieved):	No
Implemented on:	

Reporting per WP overview

Start	End	Type	Title
Jan.2019	Jan.2019	preparation	Preparation
Jan.2019	Jul.2022	implementation	Long term
Jan.2019	Jul.2022	management	Project management
Mär.2019	Jun.2021	implementation	Adapting and pilot testing sensor technologies in agri-food supply chains
Jan.2019	Jul.2022	implementation	Big Data integration and applications to reduce food wastage.
Jan.2020	Jul.2022	implementation	Business development of REAMIT technologies
Jan.2019	Jul.2022	communication	Communication

Work Package Preparation (preparation)

WP no	Title	Start month	End month	WP Status
P	Preparation	01-2019	01-2019	not started

Partner's involvement

Abbreviation	Name
UCD	National University of Ireland, Dublin, University College Dublin
ITT	Institute of Technology in Tralee
Levstone	Levstone Ltd.
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
SenX	SenX
NTU	Nottingham Trent University
Whysor	Whysor
UoN	Université de Nantes

Summary description of activities carried out and contribution of each partner

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Work Package Long term (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
LT	Long term	01-2019	07-2022	behind schedule	28 790.95	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Valorial, with support from I&R, and some assistance from BED and NTU, organised the second REAMIT networking Symposium (online) on 5/11/2020. BED, UU, UoN, Whysor and UCD have made presentations during the symposium focusing on REAMIT's approach and technologies, pilot tests and expected results and impacts. BED developed and submitted the REAMIT application to 'Real impact interdisciplinary research Fund Award' organised by Emerald Publishing (27/11/2020). BED, with support from Whysor and UU, has developed the REAMIT project Capitalisation proposal. This involved organisation and facilitation of one online meeting with REAMIT partners interested in participation in the REAMIT Capitalisation project (30/10/2020); 6 online meetings with potential new partners from Maastricht University, NL (19/10/2020), Sensip-dx, NL (30/10/2020), Yumchop (5/10/2020, 19/11/2020, 16/12/2020), FlandersFood (21/12/2020); attending online info meeting with the funder at Interreg NWE Programme JS (5/11/2020). BED collected partners' inputs for the Capitalisation project proposal, drafted the Capitalisation project proposal, and actively searched for new end user companies (in Belgium, NL, Germany, France and UK) producing liquid food. While developing the Capitalisation proposal, partners worked extensively to formulate a solution that will greatly enhance the benefits of REAMIT most notably by making IoT easier to deploy, almost like an off-the-shelf plug'n'play solution that doesn't require agribusiness or transport companies to have technology skills. The easier and faster it is for companies to deploy a REAMIT solution then the more companies will adopt and thereby increase the project ability to reduce food wastage. REAMIT partners have reached out to new target groups (frozen and liquid food producers, pork meat producers), actors (e.g. Dutch Ministry of Foreign Affairs, FEVIA - umbrella trade association of the Belgian food industry representing all companies producing foodstuffs and/or beverages in BE, HEIs), and geographical areas (Belgium, Germany as well as new regions in NL, UK and IE), who expressed interest in the REAMIT approach and technologies.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

WP LT links with all technical WPs (WP T1, WP T2 and WP T3). Delay in the implementation of technical WPs, has an impact on the implementation of WP LT. Consequently, producing policy briefs about REAMIT approach and technology, formulating ideas for rolling out REAMIT approach and technology to other sectors or updating framework for measuring the impact of REAMIT technologies on food waste has not been possible yet. Based on input from partners, BED estimated a 12-month delay in the implementation of WP LT.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity LT.1	Creating a self-sustaining REAMIT Network	01-2019	07-2022	behind schedule
Deliverable LT.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Network prospectus		09-2020	behind schedule	
Deliverable desription	BED as coordinator will engage partners to develop a network prospectus, setting out the principles by which the network will operate, and ensure financial sustainability based on a low-cost model of voluntary contributions from partners and members.			
Description of progress achieved	REAMIT partners have connected with new actors in agrifood supply chains to grow REAMIT network. BED connected with 2 HEIs to discuss cooperation under REAMIT - Maastricht University, NL and Hof University, DE. This resulted in MU engaging with REAMIT pilot test with WD Meats (Clostridium Bacteria) and becoming a partner in the REAMIT Capitalisation proposal; 1 large enterprise - Morrisons, a chain of large food supermarkets in the UK, and promoted REAMIT through BED students who have internships at Morrisons; Flandersfood – platform in BE that contributes through innovation to a more competitive, innovative and sustainable agri-food industry; FEVIA - federation of food industry in BE; Biotech Sante Bretagne - agrifood innovation cluster in FR; Agri-Tech-e, UK's leading membership organisation for agri-tech, bringing together farmers, researchers, tech developers to accelerate innovation. This resulted in BED's intensified communication with some of these organisations, especially in the context of REAMIT Capitalisation proposal. BED have found another SME in the UK and will start engaging with them as a pilot test partner ASAP. NTU contacted at least 6 businesses (Pepsi, Starkey's fruits, Morrisons, Tesco, and some charities). Whysor contacted Dutch ministry of foreign affairs to involve Belgian dairy companies in REAMIT pilot tests; Maastricht University (NL) and introduced BED to MU, which resuted in MU engaging as partner in REAMIT Capitalisation proposal; Fontys Venlo University of Applied Science; SME Connecting Agri and Food in NL, which resulted in a possible new Dutch pilot partner (meat); DLV Advies and GoodyFoods for involving dairy companies in pilot tests; LIOF (regional development company for Limburg, NL), Innovatiesteunpunt (innovation support center Belgium) and Boerenbond (farmers union), BCZ-CBL (Belgian Confederation of Dairy Industry).			
Evidence				
Deliverable LT.1.2				
Deliverable title		Planned delivery month	Deliverable status	
REAMIT networking events: 2019, 20 and 21 including invited lectures from experts		07-2021	proceeding according to work plan	

Deliverable description	Partners will bring together agribusiness & technology SMEs from REAMIT countries for a 1-day annual conference: (i) to ensure that REAMIT technologies keep pace with technology developments; and (ii) to maximize achievement of REAMIT's objectives.			
Description of progress achieved	Valorial, with support from I&R, was responsible for the organization of the Second REAMIT Symposium (5/11/2020) and promotion of this event. BED and NTU also supported Valorial and I&R with the organisation of the Symposium. The Symposium should have taken place at the Regional Hotel in Nantes, on 5/11/2020. Valorial planned to welcome about 200 attendees. However, due to COVID-19 and national lockdowns in NWE economies, the event was organised in an online format. It was one half day conference and 2 half days of BtoB meetings. Presenters represented the European Commission, ADEME (French Environment and Energy Management Agency), partners in the REAMIT project (BED, I&R, UoN, Whysor, UU and UCD). Presentations of REAMIT partners focused on REAMIT's approach and technologies, pilot tests and expected impacts. Guests who participated in a panel discussion, represented institutional agriculture actors in France (upstream agriculture, processing, distribution and consumption) including Prince de Bretagne, IDmer, Agromousquetaires, ADONIAL, Zéro-gâchis, COMERSO, Les Banques Alimentaires de l'Ouest, Ook. The panel discussion focused on how these organisations engage to limit food losses in the food supply chain. The content of the presentations and discussions was simultaneously translated from FR to EN, and EN to FR. 167 persons registered for the Symposium and 121 attended the event; 45 attendees were from outside France (Belgium, Ireland, NL, Romania, Spain, Turkey, UK). Out of 77 B2B meetings, 20 meetings were transnational while 52 meetings were national (between French participants). Presentations from the Symposium are available on the REAMIT website at www.reamit.eu (under 'Events')			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.2	Regularly updating framework for measuring the impact of REAMIT technologies on food waste	01-2019	07-2022	behind schedule
Deliverable LT.2.1				
Deliverable title		Planned delivery month		Deliverable status
The agreed framework for measuring the impact of REAMIT technologies on food waste		12-2019		behind schedule
Deliverable description	The framework for measuring the impact of REAMIT technologies on food waste will be agreed at the first networking event in December 2019.			
Description of progress achieved	There has been no progress in the past semester on updating framework for measuring the impact of REAMIT technologies on food waste as there is no data yet generated by the pilot tests.			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.3	Ensuring policy impact	01-2019	07-2022	not started
Deliverable LT.3.1				
Deliverable title		Planned delivery month		Deliverable status
Policy briefings		03-2022		not started
Deliverable description	Meetings or briefing papers issued jointly from the partnership to national or EU-level policy formers to engage in a dialogue over the fit of REAMIT technologies to national and EU food waste reduction targets and policies.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.4	Roll-out to other sectors	01-2019	07-2022	behind schedule
Deliverable LT.4.1				
Deliverable title		Planned delivery month		Deliverable status
Cross-sector briefings		06-2022		behind schedule

Deliverable description	REAMIT partners will identify and engage with industry bodies or policy organisations from other sectors where REAMIT technologies may have an application (e.g. EU Medicines Agency, EU Federation of Pharma industries, national health regulators)
Description of progress achieved	On 27/11/2020 BED submitted the REAMIT application to 'Real impact interdisciplinary research Fund Award' organised by Emerald Publishing.
Evidence	

Work Package Project management (management)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
M	Project management	01-2019	07-2022	behind schedule	53 019.65	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Based on input from partners, BED developed 3rd REAMIT progress report and payment claim, submitted to JS in Sept-2020. On 27/11/2020 BED transferred to partners 3rd tranche of funds. BED started to coordinate the work on 4th REAMIT progress report and payment claim. BED asked partners for more detailed information in eMS when developing partner progress reports. BED updated REAMIT Project Handbook with calendar for 4th report and minutes from meetings of REAMIT partnership (RAC/RWP/RSC on 8-9/07/2020, 13 online meetings of REAMIT team at BED, 14 online meetings of REAMIT sub-group, 3 online meetings of WP T1, 1 online meeting with UCD for WP T3, 2 online meetings with Whysor for WP T1, 1 online meeting with UU and Maastricht University for WP T1 and WP LT). On 8-9/07/2020, BED with support from Whysor and NTU, organised online meetings of RAC/WP/RSC; with support from NTU and UU, drafted minutes which were circulated to partners. Whysor developed the etiquette for REAMIT online meetings (RAC/WP/RSC). BED's request for REAMIT project 12-month extension (including financial extension) has been approved by the funder at Interreg NWE Programme JS. In Nov-2020 BED received confirmation from the funder that the REAMIT project new end date is 9/07/2023. In Dec-2020 BED started the work on the REAMIT project extension and asked partners for their input. Three new staff members joined REAMIT - Research Assistant at ITT and two visiting staff members at BED. BED revised risk log and included 5 new risks in REAMIT (COVID related and other risks). COVID related risks: 1. WD Meats severely hit by COVID-19 (many cases of COVID among staff) leading to shortage of staff (illness, quarantine) in factory, freezing communication with REAMIT partners and postponing pilot test work until 2021. This caused delay in implementation of both pilot tests with WD Meats. 2. UCD have not recruited new staff to join the REAMIT team, hence the progress with the cyberbar pilot test has been limited (no sensors added to the cyberbar pilot test). 3. New wave of COVID-19 in autumn 2020, leading to lockdown in Europe, will further delay implementation of pilot tests/developing new pilot tests. Often, companies with whom REAMIT partners work and communicate, do not have resources for extra work (ie participation in technology demonstrations). They struggle to survive through pandemic which hit their organisations, families, neighbourhoods. Recovering from pandemic may be slow and lengthy, and it can manifest itself through actors' slow/no response to REAMIT initiatives in early 2021. Other risks: 4. Lorry drivers in Weyers do not agree to have gateway installed in driver's cabin (too many technology devises). Whysor explored alternatives for transferring data from sensors to cloud. This caused delays in the implementation of the pilot test with Weyers. 5. UU may not find a lab that sells a sample of clostridium bacteria; will need to grow their own CB (min 12 weeks) leading to further delays in both pilot tests with WD Meats.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Due to lockdown, BED experienced slowdown in internal communication within BED and with REAMIT partners. This delayed payment approval process and transfer of funds (3rd tranche) to partners. PM and PI discussed this with finance at BED, who confirmed that due to amounts involved, payment process needed to go through many levels of approval, which was timely, especially if staff worked remotely. BED communicated with partners via email but responses were slower than normal due to lockdown. Slow communication has affected completion of exit of Dunbia and Cottagequinn Farms from REAMIT. Paperwork related to Dunbia and Cottagequinn Farms exit and WD Meats joining REAMIT (and taking over together with UU budget and responsibilities of Dunbia) was completed in Sept-2020. Due to COVID-19, RAC/WP/RSC meetings on 8-9/07/2020 took place online, not at Whysor's office in NL. Planned visits to sites of pilot tests in NL and DE were cancelled. Nevertheless, companies participating in REAMIT pilots were invited to attend REAMIT WP T1 online meeting in July-2020. Delays have been encountered in recruitment of a suitably qualified researchers to work on the project at UCD. The delay has been exacerbated by the Covid-19 crisis as UCD staff are now working from home which has lead to lengthy delays in re-advertising the positions. The positions will be advertised in early 2021. Based on inputs from partners, BED estimated up to 12 months delay in the implementation of all WPs. In November 2020 BED received confirmation from the funder, that REAMIT project has been granted 12-month project and budget extension. The new end date of the REAMIT project is 9th of July 2023.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity M.1	General project management	01-2019	01-2022	proceeding according to work plan
Deliverable M.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Project handbook		02-2019	proceeding according to work plan	
Deliverable description	A document which will collate all necessary information for project management purposes, including terms of reference of groups, project procedures, reporting requirements, partnership agreements, GDPR requirements etc			
Description of progress achieved	BED updated REAMIT Project Handbook with calendar for 4th REAMIT report and minutes from online meetings of REAMIT partnership in the past semester (RAC/RWP/RSC on 8-9/07/2020, 13 online meetings of REAMIT team at BED, 14 online meetings of REAMIT sub-group, 3 online meetings of WP T1, 1 online meeting with UCD for WP T3, 2 online meetings with Whysor for WP T1, 1 online meeting with UU and Maastricht University for WP T1 and WP LT).			
Evidence				
Deliverable M.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Minutes of meetings of RSC, and RAC and WP meetings - minimum six meetings each. The meetings of RSC and RAC will provide overall strategic direction of the project.		01-2022	proceeding according to work plan	
Deliverable description	RSC and RAC will meet every six months -two in the UK and one each in the remaining four partner countries. WP meetings will be organized one day before RSC meetings. Minutes of all these meetings will be circulated & agreed within 1 month.			
Description of progress achieved	On 8-9/07/2020 BED, with support from Whysor, organised online meeting of RAC/WP/RSC and with support from NTU and UU, drafted minutes which were circulated to partners.			
Evidence				
Deliverable M.1.3				
Deliverable title		Planned delivery month	Deliverable status	
Intermediate Work Package coordination		01-2022	behind schedule	
Deliverable description	The leaders of WP will be in regular touch with partners via emails, website and social media sites. Whenever needed, conference facilities via phone, Skype or similar technology will be organised out by leaders of each WP or partners on demand.			
Description of progress achieved	BED has been in regular contact (email and online meetings) with all WP leads and REAMIT partners. However, due to COVID-19 responses from partners have been slow in the past semester. BED facilitated 13 online meetings of REAMIT team at BED, 14 online meetings of REAMIT sub-group (BED, NTU, UU and ITT), 3 online meetings of WP T1, 1 online meeting with UCD for WP T3, 2 online meetings with Whysor for WP T1, 1 online meeting with UU and Maastricht University for WP T1 and WP LT. Minutes of these meetings are included in the REAMIT Project Handbook.			
Evidence				
Deliverable M.1.4				

Deliverable title		Planned delivery month	Deliverable status	
Key control register for Project Management		09-2019	proceeding according to work plan	
Deliverable description	A register of key control milestones will be prepared by LP and made available to all partners. This register will include useful information (e.g., timetable, risks, meetings, etc.). This will be available online and updated regularly.			
Description of progress achieved	Key control register is part of the REAMIT Project Handbook and it has been updated regularly.			
Evidence				
Activity	Title	Start month	End month	Status
Activity M.2	Risk register and risk review	01-2019	07-2022	proceeding according to work plan
Deliverable M.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Risk register		03-2019	proceeding according to work plan	
Deliverable description	Development & partner sign-off of a written risk register, forming an appendix to the project handbook.			
Description of progress achieved	BED revised the risk log, identified 6 new risks in REAMIT and included them in the REAMIT risk log. The new risks are classified as COVID related and other risks. COVID related risks: 1. WD Meats severely hit by COVID-19 (many cases of COVID among staff) leading to shortage of staff (illness, quarantine) in the factory, freezing communication with REAMIT partners and postponing pilot test work until 2021. This caused delay in the implementation of both pilot tests with WD Meats. 2. UCD have not recruited new staff to join the REAMIT team, hence the progress with the cyberbar pilot test has been limited (no sensors added to the cyberbar pilot test). Moreover, communication from UCD has been very limited and their role in REAMIT as project partners has become a concern. 3. New wave of COVID-19 in autumn 2020, leading to lockdown in Europe, will further delay the implementation of pilot tests/developing new pilot tests. Often, companies with whom REAMIT partners work and communicate, do not have resources for extra work (ie participation in technology demonstrations). They struggle to survive through the pandemic which hit their organisations, families, neighbourhoods. Recovering from the pandemic may be slow and lengthy, and it can manifest itself through actors' slow/no response to REAMIT initiatives in 2021. Other risks: 4. Lorry drivers in Weyers do not agree to have gateway installed in driver's cabin (too many technology devises/radiation). Whysor explored alternatives for transferring data from sensors to cloud. This caused delays in the implementation of the pilot test with Weyers. 5. UU may not find a lab that sells a sample of clostridium bacteria; will need to grow their own CB (min 12 weeks) leading to further delays in CB pilot test. 6. If pilot at UoN with Raman spectroscopy does not leave the lab, it may not qualify as REAMIT pilot test.			
Evidence				
Deliverable M.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Annual risk reviews		01-2022	proceeding according to work plan	
Deliverable description	Written notes of annual risk register reviews for 2020 & 2021.			
Description of progress achieved	Annual risk review is part of REAMIT risk log. Risks to REAMIT are reviewed regulary every semester and discussed at REAMIT Steering Committee meeting.			
Evidence				
Activity	Title	Start month	End month	Status
Activity M.3	Record keeping and reporting	01-2019	07-2022	proceeding according to work plan
Deliverable M.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project reports		07-2022	proceeding according to work plan	
Deliverable description	Submission of complete, accurate & timely, activity & financial reports every six months by the LP partners.			
Description of progress achieved	Based on input from partners, BED developed 3rd REAMIT progress report and payment claim and submitted it to JS in Sept-2020. On 27/11/2020 BED transferred to partners 3rd tranche of funds.			

Evidence	
Deliverable M.3.2	
Deliverable title	Planned delivery month
Finance training for partners	04-2019
Deliverable description	completed and achieved as planned
Deliverable description	An event for all finance managers of all partners, to clearly set out the processes & procedures for claims & payments, & the partners' financial obligations in the project.
Description of progress achieved	
Evidence	

Work Package Adapting and pilot testing sensor technologies in agri-food supply chains (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T1	Adapting and pilot testing sensor technologies in agri-food supply chains	03-2019	06-2021	behind schedule	134 262.59	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Pilot leads progressed implementation of pilots as best as possible considering delays due to COVID-19. BED and pilot leads (Whysor, UU, UoN, I&R, UCD) worked jointly to implement 7 pilots (2 with WD Meats, Picnic, Weyers, Routhiau, Cyberbar, 3D Fluorescence (3DF)). Partners met online more than 25 times. 3 monthly meetings of all pilot leads were facilitated by I&R. WD Meats Clostridium Bacteria (CB): UU got placement student to swab target areas in WD Meats and perform DNA extraction experiments in UU labs; identified and initiated procurement of qPCR kits. This will only provide information that bacterium exists in WD Meats and where it is more likely to cause infection. Thanks to Whysor, UU engaged with Maastricht University (MU) and Sensipdx, whose sensor technology allowing for rapid detection of bacteria may help progress CB pilot. Meetings were held with WD Meats, UU, MU, Sensipdx. Research into this technology is ongoing with limiting factor being securing confirmed samples of CB. Since WD Meats were hit by COVID-19, UU could not access factory to take samples. At a meeting (UU, MU, WD Meats) in Dec-2020, WD Meats confirmed strong interest in solution proposed by UU and MU as it may help detect CB. UU commenced talks with 3rd parties on rapid detection of CB. WD Meats (Dry-ageing): aim is to reduce loss of weight and quality of beef meat during dry-aging process. UU, Whysor & Levstone worked on identifying correct sensors. Whysor sent UU a test sensor to get UU LoRaWAN gateway online. Once completed, this sensor was returned to Whysor and 5 URSALINK temperature/humidity sensors were procured. Sensors will be installed in WD Meats in 2021. Implementation of pilot is delayed as UU could not access factory to examine dry aging chambers. Due to pandemic, WD Meats could not work on this trial before Jan-2021. Picnic (groceries): aim is to personalise cooling profile per cooling box and manage customers' complaints linked to how food box has been treated. Whysor purchased 20 sensors for Picnic truck to measure temperature, shock detection, humidity. Based on input from Picnic, Whysor configured 1 sensor to detect shock. Parameters of sensor are set for detecting shock when food box falls down by 50 cm. Sensor sends alerts about detected shock. In Dec-2020 sensors were placed inside coolboxes and are being tested. Whysor will calibrate remaining 18 sensors in Jan-2021. Weyers (vegetables & fruits): Lorry drivers did not agree to have gateway installed inside driver's cabin claiming there was too much hi-tech devices/radiation inside cabin. Whysor looked for alternative solutions how to connect sensors in Weyers trucks to gateway and proposed installing gateway inside truck's trailer. Raman: aim is to demonstrate that Raman sensor can evaluate quality of food samples and composition, and that it has not changed during food transportation. 1st test in Raman lab at UoN was carried out in Sept-Oct 2020 on chicken meat samples from Routhiau; 2nd test in Raman lab at UoN was carried out in Nov-Dec 2020, on chicken samples from Routhiau. UoN needed to do statistical exploration and Raman measurements in lab first, before tests could move to truck. Once 2nd lab test is completed, UoN will carry out tests inside STEF truck transporting food. With support from I&R, IQRF sensor (from iQ Home) was added to monitor temperature to determine relationship between temperature, Raman data and quality of chicken samples. Complete run was done on received samples, 150 Raman spectra were generated daily for over 1 month. Total of generated Raman spectra (4800) were sent to Whysor and SenX for statistical analysis to create models for prediction of quality of sample. Cyberbar technology was tested at UCD. Results show that water activity plays important role in determining readability potential on food products. UU received 3DF sensors from Fresh Detect and configured them. Whysor and BED recruited 2 new companies for pilot tests.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Private sector companies suffer from COVID-19 and lockdown. Currently, they do not have resources to engage in research and technology demonstrations, and they focus on their core business. Consequently, companies have communicated little with REAMIT partners in the past semester. Visiting the sites of WD Meats and Weyers to assess company's sites and where to install sensors has not been possible in the past semester. Consequently, sensors have not been installed in WD Meats and Weyers, and no data has been generated yet. Lockdown and national restrictions in IE have delayed recruitment of new staff in UCD resulting in further delays in the Irish cyberbar pilot. Cyberbar pilot test still does not involve any sensors, hence if it continues this way, it may not qualify as REAMIT pilot test. For a pilot with Picnic, values/data that are expected in Q1 of 2021 may not be relevant/interesting because they will be collected outside of the period of critical weather conditions (temperature). Cool temperatures outside do not affect food spoilage inside Picnic's truck. Communication and contact with Weyers has been very poor. Whysor has invested much time and energy into sustaining communication with Weyers in the past semester. Talks with new companies in France (IGRECA egg products; BbaMv dairy products) approached for new pilot tests, have been put on hold due to pandemic and lockdown. Matthias Brunner of Tsenso got in contact with UU to say that he was unable to fulfil the sensors from the previous reporting period due to the impact of COVID-19 on his company. ITT confirmed that the original Freshbox project partners would need to be in agreement with any developments and as of yet ITT have not got that permission to progress on this. ITT do not have access to physical "Freshboxes" at present. Based on inputs from partners, BED estimated a 12-month delay in the implementation of WP T1.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T1.1 Working prototypes of sensor technologies based on pilot tests with agribusiness users	Five prototypes that use traditional and new sensor technologies to monitor quality of fresh produce and sends the data over WiFi, Cat-M, NB-IOT (or other radio technology) will be produced with agribusiness users recruited through the open call (A1.1)	5.01. Number of efficient natural and material resources solutions implemented and tested	06.2021	5.00			behind schedule	
T1.2 Agribusiness companies supported in food waste reduction pilots	Agribusiness companies will be recruited through an open call to participate in the pilot tests in A1.2. Each company will benefit from the installation of new technologies for the test period, giving reductions in waste and savings in their costs.	CO01. Number of enterprises receiving support	06.2021	5.00			behind schedule	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T1.1	Open call for Agri-business agribusiness user companies for pilot tests	03-2019	03-2020	completed
Deliverable T1.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Publication of open call		03-2019	completed and achieved as planned	
Deliverable description	Partners would develop an open call for participation from companies willing to offer their premises & equipment to the testing of technologies. The call would be issued on the project webspace and through partner networks so that Risk 2 is minimised.			
Description of progress achieved				
Evidence				
Deliverable T1.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Companies recruited from across agri-business supply chain. Minimum 4 companies will be recruited across NWE so that there is a total of 5 user companies (including the one UK agribusiness user (PP12) that is already a partner) for minimum 5 pilot tests.		03-2020	behind schedule	
Deliverable description	Partners expect to recruit a minimum of 4 companies to participate in the technology tests, with a representative mix of locations, sub-sectors etc. A simple MoU would be issued to them; no funding is involved. One UK user company is already a partner.			

Description of progress achieved		REAMIT partners are working with 4 companies (Picnic, Weyers, Routhiau, WD Meats) on the implementation of pilot tests. However, REAMIT partners have approached several new companies across NWE region to explore possibilities for developing new pilot tests. Via SME Connecting Agri and Food, Whysor got in contact with a meat processing and transporting company in the NL that is interested in measuring bacterial load. Whysor will start engaging with them ASAP to develop a second pilot test in the NL. BED approached frozen food producing SME in the UK, which confirmed its interest in developing REAMIT pilot test. UoN, I&R and Valorial have approached companies in France: IGRECA (egg products) and BbaMv (dairy products) to explore possibilities for developing a second pilot test in France. NTU contacted at least six agri-food businesses in the UK, including Pepsi, Starkey's fruits, Morrisons and Tesco. NTU also contacted some food charities within their business community. UU met with Finnebrogue, Galvia Digital and Riverwest Management to discuss developing new pilot tests. ITT continued exploration in the feasibility of advancement and piloting in Ireland of the Fresh Box initiative.		
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.2	Transnational synthesis of sensor technologies (Raman Spectroscopy from UoN, 3D Fluorescence from Ulster and CyberBar from UCD) and big data integration	03-2019	01-2021	completed
Deliverable T1.2.1				
Deliverable title		Planned delivery month		Deliverable status
Partner workshop on sensors and big data		06-2019		completed and achieved as planned
Deliverable desription	A workshop between knowledge partners and sensor/big data SME partners will bring forward all available knowledge about technologies, applications and potential combinations for food supply chains. An internal workshop with around 20 attendees.			
Description of progress achieved	Re Cyberbar Technology, UCD: Results show that water activity plays important role in determining readability potential of food product. In all samples (except potato) different size dimensions of QR code were imprinted on either side of food product to retain consistency. There were size limitations in laser-etched machine as it was designed for multipurpose works and was not only specialised for laser imprinting over food products. Large scale commercialisation of the same would require the laser etching machine to be specially modified and appropriate plate cut should be designed where food products would be directly and firmly held. There is also a possibility to include a conveyor belt to have a better rate of output per minute. Mass production of QR etched food products would mean minimum extra initial investment which in turn would be of minimum impact on customers. It was observed that watermelon was the best performer due to its hard-outer shell. Product was consistent and could provide readability straight for 5 days. Waxy coating over the outer watermelon surface also contributed towards retentivity of QR code. Although it had higher water activity, waxy outer layer presented a completely different scenario. Efficient food traceability options would be one of the most beneficial aspects of this system. Data can be stored in a server/cloud and can be accessed by farmers to customers alike. Just like fright shipments around the world, imparting QR code can provide real-time tracking with min investment. Reverse traceability would be much easier, and product can be recalled as soon as possible. Reduced packaging requirements can be another important benefit of this technology. QR coded food products would eliminate requirement of individual packaging of food product which in turn contributes to reducing the overall carbon footprint. Lesser packaging means more products can be transported at one go and reduction in the cost of transportation can be observed.			
Evidence				
Deliverable T1.2.2				
Deliverable title		Planned delivery month		Deliverable status
Test roadmap		09-2019		not started
Deliverable desription	The output from the workshop will be the production of an internal 'test roadmap' combining the results from the call for test companies (so we know how many tests, what kind of companies, and where) with the optimum technologies combinations.			

Description of progress achieved		Regarding DT1 31: LEVstone worked with ITT and Whysor for the purpose of selecting appropriate sensors for REAMIT pilot tests, to be able to impartially advise supply chain and agribusinesses on how to adopt IoT for perishable food monitoring. This activity originally seemed straightforward and consisting of comparison and evaluation of sensor manufacturers' stated product details and specifications. However, once we progressed to testing we encountered problems and as our tests became more detailed and reality continued to identify further issues that will significantly impact on REAMIT project. LEVstone and Whysor conducted tests on 5 different IoT sensors, and the activity is complete (it may be necessary to re-visit dependent on results and feedback from subsequent Pilot Tests). Major factor in IoT deployment for REAMIT food monitoring is the IoT sensor devices on-going power requirements, of which a major part is power needed to communicate and transmit data wirelessly. WiFi sensors we evaluated had power needs that couldn't be fulfilled by a small internal battery and required hard-wired connection to either a large external battery or to a permanent vehicle power supply (i.e. solution is restricted to specially adapted trucks with power sockets and not suitable for non-vehicle scenarios such as monitoring pallets of food in warehouses and temporary stored outside). These WIFI sensors communicate with a router device that transfers data to cloud (via a range of communication networks). Router device needs a power supply and is a significant cost component with unit prices of €100-200. Levstone built a portable prototype with a weatherproof box housing a WIFI IoT sensor, router device and an external battery to power both devices. The prototype works but isn't ideal. Levstone evaluated bluetooth sensors. LEVstone will develop Bluetooth IoT solution for REAMIT to replace traditional need for external router device with mobile phone.		
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.3	Adapting and pilot testing of sensor technologies with agribusiness users	10-2019	06-2021	behind schedule
Deliverable T1.3.1				
Deliverable title		Planned delivery month		Deliverable status
Working prototypes using sensor technology		06-2021		behind schedule
Deliverable description	The sensor and scanning technologies will tested along with other traditional sensors where needed and adaptations carried out wherever needed. Data flow to be checked. At the end of the pilot test, new working prototypes will be developed.			
Description of progress achieved	6 prototypes are being developed using sensor technology: traditional temperature, humidity and shock detection sensors in 3 prototypes with end users Picnic, Weyers and WD Meats (dry aging chamber); Raman spectroscopy in prototype with Routhiau; Sensipd-dx sensor in prototype with WD Meats (CB); 3D Fluorescence in prototype with WD Meats. Cyberbar pilot test is being developed at UCD, but currently it does not use sensor technology. Weyers: sensor and gateway were delivered in Dec-2019. Whysor tested it inside Weyers office and warehouse and installed it (Feb-2020) in Weyers office. Soon, Whysor lost connection to sensor and because of COVID-19 were not able to visit Weyers' sites. Whysor lost connection to contact person at Weyers until Sept-2020. Whysor tried to get in contact with Weyers but failed to re-establish contact for several months. In Sep-2020 Whysor visited Weyers' site and the pilot started again. Sensor and gateway were functioning. Whysor discovered that the building was built with metal, so the connectivity was poor. In Nov-2020 Whysor was ready to built in the sensor into a truck. Truck drivers did not want an extra device (gateway) inside truck cabin because of extra radiation. Gateway needs power and therefore it needs to be installed inside a cabin as power supply is there. Sensor itself is battery powered and it is placed inside truck trailer. Whysor explained to Weyers that radiation is everywhere: from truck drivers' cell phone, GPS tracking system, and that this device would not cause much extra radiation. Weyers admitted the cabin was already full of technical devices, and truckdrivers did not want another one. Whysor advised that gateway could be also installed inside truck's trailer. Since then there has been no contact with Weyers from their side. Measured values of VOC in sensor are sometimes over max values. By contacting manufacturer, Whysor found out how to fix it, but in order to do so, they need to visit the Weyers' site.			
Evidence				
Deliverable T1.3.2				
Deliverable title		Planned delivery month		Deliverable status
User manual for each pilot test		06-2021		not started
Deliverable description	A user manual documenting the experience of pilot test and a step-by-step guide of good practice in each pilot test will be developed for the benefit of users willing to test REAMIT technologies in the future.			

Description of progress achieved	Re Deliverable D. T1 3.3: Levstone & Whysor evaluated Bluetooth sensors using low-power communication transmission that was sufficiently low that the sensors had an internal battery with a lifetime claim for 2 years. The wireless transmission ranges were not as long as the technical specifications claim! Further investigation revealed many variables, such as the sensors housing, the size and location of the internal battery (we suspect that more battery metal saps the signal, or detunes the antenna circuit), and also the receiving device – we used several different mobile phones to measure the range and signal strength with the IoT sensors. LEVstone will undertake to develop a Bluetooth IoT solution for REAMIT with the goal to replace the traditional need for an external router device with that of a regular mobile phone. A major unknown is determining the effective range and the variability of signal strength for Bluetooth. This will be tested in realistic field conditions during Pilot Tests. Levstone was engaged in design and development of software communication interface to connect IoT devices via Bluetooth. The selected Bluetooth devices all had published open protocol that allowed Levstone to proceed with developing a software interface. Unfortunately the documentation was somewhat variable and aspects were incomplete. We were able to share and discuss our problems with partners at Whysor, ITT and UCD whose skills and expertise was most helpful. As a result of support we have been able to proceed and have now completed our interface with 4 IoT sensors. With regards to integration of the developed Bluetooth interface software on to a mobile phone, LEVstone have integrated the Bluetooth software in to the mobile app LEVstone GPS Vehicle Tracker. We have tested, in conjunction with our partner at BED, and have successfully routed data from Bluetooth IoT sensors via a mobile phone up to the cloud.		
Evidence			
Deliverable T1.3.3			
Deliverable title		Planned delivery month	Deliverable status
Report on the pilot test and development of the sensor prototypes		06-2021	behind schedule
Deliverable desription	A report on the 5 sensor-based pilot tests will be compiled by participating partners and posted on the project webspace. It will describe in detail the experiences with the pilot test and give recommendations for future pilot tests.		
Description of progress achieved	Levstone & Whysor support all pilot test leads with identification of the right sensor for each pilot test, to best address the needs of the pilot test company. Review of potential sensor technology is an ongoing process. LEVstone, ITT & Whysor worked jointly to select appropriate sensors for pilot tests and for REAMIT to be able to impartially advise supply chain and agribusiness on how to adopt IoT for perishable food monitoring. This activity was originally planned to be straightforward and primarily to consist of a literary comparison and evaluation of sensor manufacturers’ stated product details & specifications. However once we progressed to testing we encountered problems and as our tests became more detailed and reality continued to identify further issues that will significantly impact on the REAMIT project. LEVstone & BED conducted tests on 5 different IoT sensors, and activity is complete (it may be necessary to re-visit dependent on results and feedback from subsequent Pilot Tests). One major factor in IoT deployment for REAMIT food monitoring is the IoT sensor devices on-going power requirements; of which a major part is power needed to communicate and transmit data wirelessly. WiFi sensors evaluated by Levston had power needs that couldn’t be fulfilled by a small internal battery and therefore required a hard-wired connection to either a large external battery or to a permanent vehicle power supply (meaning the solution is restricted to specially adapted trucks with power sockets and so it is not suitable for non-vehicle scenarios such as monitoring pallets of food in warehouses and temporary stored outside). These WIFI sensors communicate with router device that then transfers data up to cloud (via a range of communication networks). Router device needs a power supply and is also a significant cost with unit prices of €100-200. Levstone built portable prototype with weatherproof box housing a WIFI IoT sensor, router device and an external battery.		
Evidence			

Work Package Big Data integration and applications to reduce food wastage. (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T2	Big Data integration and applications to reduce food wastage.	01-2019	07-2022	behind schedule	135 657.36	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED purchased Big data hub equipment and installed it in temporary location, until permanent facility for external access was provided at BED. An engineer installed and configured server for different IP addresses as assigned by BED. Softwares (Windows server 2019 standard operating Systems and SQL server 2019) were purchased along with possibility of connecting by 1 internal user with option to upgrade to more number of users as and when required. Engineer installed the server, Windows OS, configured the IP addresses and trained the Research Fellow at BED to do the same. A Windows remote access client based remote connection protocol was estimated for internal as well external users. The server was tested for remote access at the temporary facility using the established protocol. In order to enable external access, the server was moved to another location at BED with facilities to enable secure working, power backup and connection to external people. The remote connection to internal user was tested again at the new permanent location. Additional correspondence is made with BED's Microsoft service provider on software licensing needs to enable external people to connect to server. External access is now possible, but will need to be configured with respect to licensing needs based on number (how many users) and type of access needed by specific partners (specific application access or full remote access of the physical server). Levstone supported BED with testing external connectivity to server (specification of requirements for establishing external connection and tentative needs for accessing the server); suggested using VPN to facilitate testing and security; organising server and installation of programmes. BED liaised with Whysor and ITT to facilitate data available from DE & NL pilots to conduct data analytics. Sample dataset was sent to data analytics partners. Since building Big data hub at BED was a long process, Whysor provided temporary solution for storing data in Whysor-cloud at reamit.whysor.com. Whysor had several contacts with SenX in order to build an integration with their open source data preparation application and the reamit.whysor.com cloud application. UoN met with I&R, Whysor and SenX to present different formats of Raman spectra and find the best one to be used by partners responsible for data analytics. Aim is to avoid using big files which can saturate the server and slow down sending of Raman data (TXT format is the selected format). Time stamping is added in names of Raman spectra, which is helpful for the statistical models. SenX focused on getting the data from Raman spectrograph on chicken samples. However, as it is not allowed to visit UoN to install hardware and software on-site, this has proven to be more challenging than planned. With help of I&R, a solution was devised to retrieve data: the laptop used to run the Raman spectrometer and which stores the data file has been fitted with a Google cloud storage solution. Cloud is then pooled regularly by a Warp 10 instance to retrieve the data, parse it and store it as time series in the Warp 10 platform. Gateway originally intended for trial with Dunbia was configured & re-purposed for dry-ageing trial with WD Meats. With assistance from Whysor, UU successfully got gateway online and started to send sensor data to REAMIT dashboard. However, as the trial has not yet actually started, data is just test data. SenX worked with Whysor on better integration of data analytics language, WarpScript, into Whysor existing solution (reamit.whysor.com cloud application). The idea is to simplify the cleaning, filling and analysis of time series in the solution. This will help with the analysis of data coming from sensors deployed in facilities or trucks. ITT helped BED develop presentation for potential uses of AI in REAMIT project for International Conference on Applications of A.I. & Computational Mathematics (7/12/2020)

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

WP T2 suffers from the lack of data which should be coming from pilot tests implemented under WP T1. All the technical partners, including SenX, are working to be as ready as possible when the data starts arriving. Owing to lengthy processes for providing access to external users by BED and COVID related issues, developing the REAMIT Big data server was delayed. A temporary solution (Google cloud) was developed with support from Whysor, to transfer data from pilots to data analytics partners. Delays in the execution of WP T1 pilots due to unavailability of companies because of COVID have also affected the quality and quantity of data collection. More meetings will be conducted to understand specific needs of REAMIT partners out of the Big data server at BED. This will be communicated to the ICT team at BED for allowing appropriate access. A delay of 6-12 months is estimated for WPT2 deliverables based on current progress of activities and WP T1. Procurement restrictions on UU which were active in the previous reporting period have been lifted, however, there are still delays with progressing pilot tests and generating data which are the consequence of the second wave of the pandemic. UoN reported that time stamping of spectra was complicated to be implemented in the software which drives the spectrometer. The manufacturer has been contacted to find a solution. Now the time stamping is functional.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T2.4 Technology solutions developed	3 solutions will be developed: 1) a Big Data platform to detect loss of food quality and understand underlying factors, 2) a Smartphone APP to alert truck drivers, warehouse managers and owners of the produce of the potential quality issues with food in transport and make decisions on rerouting, 3) an integrated IoT sensor and big data solution which will help monitor food quality, make rapid decisions to reroute the food if there is deteriorating quality, and save food waste.	5.01. Number of efficient natural and material resources solutions implemented and tested	07.2022	3.00			behind schedule	
T2.5 Companies supported in technology development	In this WP, potential suppliers and consumers linked to REAMIT corridors can self-enrol to participate in tests and trials. Our network events will be used to run proactive campaign to include users subject to resource availability.	CO01. Number of enterprises receiving support	07.2021	5.00			behind schedule	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T2.4	Develop an interface to collect sensor data and send to cloud	07-2019	07-2021	behind schedule
Deliverable T2.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Creation and launch of interface		07-2021	behind schedule	
Deliverable description	An interface will be developed for each of the 5 pilot tests for collecting data from sensors and sending them to the cloud for use in a transnational Big Data infrastructure			
Description of progress achieved	Whysor worked with UU, UoN, I&R, SenX to support development of 5 interfaces for pilot tests with WD Meats, Raman Spectroscopy, Picnic and Weyers.			
Evidence				
Deliverable T2.4.2				
Deliverable title		Planned delivery month	Deliverable status	
User Manual on launching the interface		07-2021	not started	
Deliverable description	A user manual documenting the experience of creating and launching the interface and a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				

Activity	Title	Start month	End month	Status
Activity T2.5	Development of Big Data infrastructure for analytics of sensor data and for rerouting to minimise food waste	01-2020	07-2022	behind schedule
Deliverable T2.5.1				
Deliverable title		Planned delivery month	Deliverable status	
A big data platform with capability to collect and store sensors data from all REAMIT corridors		07-2021	behind schedule	
Deliverable description	This big data platform will be used as the hub for conducting business analytics, and will create an understanding of complex, transnational supply chains. This will be hosted in BED.			
Description of progress achieved	Since developing Big data hub at BED was lengthy and complex, Whysor provided temporary solution for storing data in Whysor cloud: reamit.whysor.com. BED purchased Big data hub equipment and installed it in temporary location until permanent facility for external access was provided by ITC. Engineer installed and configured server for different IP addresses assigned by BED. Software (Windows server-2019 standard operating Systems, SQL server 2019) were purchased along with possibility of connecting by 1 internal user with option to upgrade to more users as and when required. Engineer installed server, Windows OS, configured the IP addresses and trained Research Fellow at BED to do the same. Windows remote access client based remote connection protocol was estimated for internal and external users. Server was tested for remote access at the temporary facility using the established protocol. To enable external access, server was moved to another location at BED to enable secure working, power backup and connection to external people. Remote connection to internal user was tested again at new, permanent location. Additional correspondence is made with BED's Microsoft service provider on software licensing needs to enable external people to connect to server. External access is now possible, but will need to be configured with respect to licensing needs based on number (how many users) and type of access needed by specific partners (specific application access or full remote access of the physical server). Levstone supported BED with testing external connectivity to server (specification of requirements for establishing external connection and tentative needs for accessing the server); suggested using VPN to facilitate testing and security; organising server and installation of programmes. BED liaised with Whysor and ITT to facilitate data available from DE and NL pilots to conduct data analytics. Sample dataset was sent to data analytics partners.			
Evidence				
Deliverable T2.5.2				
Deliverable title		Planned delivery month	Deliverable status	
Reports on Big Data platform performance		07-2022	not started	
Deliverable description	Partners leading the activity will provide regular annual reports on the performance of the platform.			
Description of progress achieved				
Evidence				
Deliverable T2.5.3				
Deliverable title		Planned delivery month	Deliverable status	
A web-interface with self-enrol facility for enrolment of potential suppliers and consumers of food produce		07-2022	behind schedule	
Deliverable description	Potential suppliers and consumers can self-enrol after approval from the lead partner. This will be augmented using Google Maps data to identify potential destinations for rerouting food that would otherwise become waste.			

Description of progress achieved		Levstone had a series of meetings with BED to understand the requirements of this activity. Levstone have commenced the development of a web-based app that will allow IoT data to be displayed by users across multi-platforms. Levstone's engineers undertook an evaluation of technologies to ensure the resulting app is future proofed. Levstone have recently commenced work on defining the design and the entity relationship. This activity and the underlying technology will be built upon the Visualisation Web App. This is work in progress and Levstone intend to focus on in the first half of 2021 http://reamit.levstone.com/enroll/ Levstone's advanced method of security for mobile apps is for no direct connection or communication from a client (mobile app) to the data repository located in the cloud, for extra security all client communications are sent to a port and our LEVgateway app services read and write messages back to the client. It means the client has no knowledge of where the database is and it isn't attempting to logon to a server (which would require it to transmit a logon and password which is a vulnerability. Levstone decided to utilise the same high-security architecture for the Visualisation Web App. This required Levstone to create a new gateway app, called LEViotGateway, written in java and so uses a Java webserver. Levstone setup security certificates (Levstone received support and advice from partners BED and Whysor) so browsers trust our visualisation IoT sensor trends. The security took longer than originally anticipated but is now complete. Levstone have created some trends and tested with static data. The next step is to test with live IoT data the plan is to make the web url available to partners to access via a standard web browser and to integrate this into the Levstone GPS Vehicle Tracker app.		
Evidence				
Deliverable T2.5.4				
Deliverable title		Planned delivery month		Deliverable status
User manuals for the big data platform and the web-interface highlighted in the two deliverables above		07-2022		not started
Deliverable description		The user manuals will document the experience of creating the big data platform and the web-interface and include a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.		
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.7	Development of smartphone APP for use by truck drivers and warehouses	01-2020	07-2021	not started
Deliverable T2.7.1				
Deliverable title		Planned delivery month		Deliverable status
Launch of smartphone APP for linking to food owners, truck drivers and warehouses.		07-2021		behind schedule
Deliverable description		This APP will be developed and tested to work in Android and Apple smartphones. This APP will also be used to link to all relevant stakeholders for long terms dissemination after getting GDPR consent from all parties.		
Description of progress achieved		Levstone have commenced the development of a web-based app that will allow IoT data to be displayed by users across multi-platforms. Our engineers undertook an evaluation of technologies to ensure the resulting app is future proofed. Levstone's advanced method of security for mobile apps is for no direct connection or communication from a client (mobile app) to the data repository located in the cloud, for extra security all client communications are sent to a port and our LEVgateway app services read and write messages back to the client. It means the client has no knowledge of where the database is and it isn't attempting to logon to a server (which would require it to transmit a logon and password which is a vulnerability. Levstone decided to utilise the same high-security architecture for the Visualisation Web App. This required us to create a new gateway app, called LEViotGateway, written in java and so uses a Java webserver. And then we setup security certificates (Levstone received support and advice from partners BED and Whysor) so browsers trust our visualisation IoT sensor trends. The security took longer than originally anticipated but is now complete. Levstone have created some trends and tested with static data. The next step is to test with live IoT data the plan is to make the web url available to partners to access via a standard web browser and also to integrate this into the Levstone GPS Vehicle Tracker app.		
Evidence				
Deliverable T2.7.2				
Deliverable title		Planned delivery month		Deliverable status
User manual for the use of the APP		07-2021		not started

Deliverable description	A user manual documenting the experience of creating and launching the APP and a step-by-step guide of good practice will be developed for the benefit of food owners, truck drivers and warehouse managers using the APP.
Description of progress achieved	
Evidence	

Activity	Title	Start month	End month	Status
Activity T2.8	Delivering the integrated IoT/Big Data technology with capabilities on analytics and decision support to help reduce food waste in NWE.	01-2019	07-2022	not started

Deliverable T2.8.1

Deliverable title	Planned delivery month	Deliverable status
Deployment of the integrated IoT/Big Data/analytics/Decision support technology	07-2022	not started
Deliverable description	This integrated technology will have the capability to bring together the outputs of sensor technology and analytics to provide decision support to owners of food at risk, truck drivers and warehouse managers via the Smartphone APP.	
Description of progress achieved		
Evidence		

Deliverable T2.8.2

Deliverable title	Planned delivery month	Deliverable status
A user manual for the integrated IoT/Big Data/analytics/Decision support technology	07-2022	not started
Deliverable description	A user manual documenting the experience of creating and launching the integrated IoT/Big Data technology and a step-by-step guide of good practice will be developed for the benefit of future users willing to test REAMIT technologies.	
Description of progress achieved		
Evidence		

Work Package Business development of REAMIT technologies (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T3	Business development of REAMIT technologies	01-2020	07-2022	behind schedule	43 874.10	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED and UCD met online (12/11/2020) to agree on the approach to LCA system of REAMIT technologies. Following the meeting, UCD developed an outline of the LCA approach for the REAMIT pilots with the data requirements for each stage of the project indicated on the system diagrams. This is considered as the general approach and will be refined to reflect the specific aspects of each of REAMIT pilot tests. The proposed approach will be discussed in detail at WP T1 meeting with all pilot test leads on 20/01/2021. BED and UU started to collect information and materials about Technology Readiness Levels (TRLs) and Market Readiness Levels (MRLs) in the context of REAMIT technologies. Key concepts and first ideas will be presented at the online meeting of REAMIT partners (21/01/2021). BED approached Interreg NWE Food Heroes Project to understand how they considered technologies developed by the Food Heroes Project.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

WP T3 relies on the results obtained from WP T2 and WP T1. As the trials (WP T1) have been delayed by COVID-19 the business development (WP T3) has also been inevitably delayed. Based on input from partners, BED has estimated a 12-month delay in the implementation of WP T3.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T3.2 Companies introduced to REAMIT business case	The business cases will be used to encourage businesses to take up the REAMIT approach of combined technologies and turn them into marketable products. The output is the number of companies (not currently partners) benefitting from an in-depth introduction to the REAMIT approach.	CO29. Number of enterprises supported to introduce new to the firm products	07.2022	10.00			not started	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T3.1	Risk, technology and sustainability assessments of REAMIT technologies (led by UCD with support from NTU, UU and BED)	01-2021	07-2022	not started
Deliverable T3.1.1				
Deliverable title		Planned delivery month	Deliverable status	
An assessment report of REAMIT technologies including a comprehensive systematic review (mapping) of the technical and business landscape in the fresh produce food chain.		09-2021	not started	
Deliverable description		The assessment report will be an internal document for partners, used as the basis for the business models development (AT3.4)		
Description of progress achieved				
Evidence				
Deliverable T3.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Life Cycle Assessment (LCA) for REAMIT		07-2022	behind schedule	
Deliverable description		The life cycle assessment system will allow environmental impact data to be integration with REAMIT IoT sensor and big data solutions.		
Description of progress achieved		The REAMIT methodology for assessment of GHG emission reduction strategies for each of the pilots has been further developed. However, since there is no data yet from pilot tests, it has not been possible to carry out LCA of the individual approach and technology involved in each pilot test.		

Evidence				
Activity	Title	Start month	End month	Status
Activity T3.2	Future-proofing REAMIT Technologies (led by UCD with support from BED)	01-2020	07-2021	not started
Deliverable T3.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Current and identified future REAMIT technology assessment report		07-2021	not started	
Deliverable description	The Future-proof report will be made available to SME technology developers with a view to identifying both the bottlenecks and potential solutions that can be used to drive future food quality analysis technology developments.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.3	Market assessment (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	behind schedule
Deliverable T3.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Market readiness report.		07-2022	behind schedule	
Deliverable description	A market analysis and foresight report identifying forthcoming opportunities for REAMIT technologies to be developed into marketable products			
Description of progress achieved	BED and UU started to collect information and materials about Technology Readiness Levels (TRLs) and Market Readiness Levels (MRLs) in the context of REAMIT technologies. BED approached Interreg NWE Food Heroes Project to understand at which TRL they considered technologies developed by the Food Heroes Project. On 30/10/2020 BED organised an online meeting with an entrepreneur from Sensip-dx (an SME in the NL), who is experienced with developing innovative technology in collaboration with a HEI and bringing it to the market. The meeting was attended by partners from BED, UU and Whysor. The entrepreneur from Sensip-dx was invited to attend a meeting during REAMIT Steering Committee meeting tedicated to TRL and MRL of REAMIT technologies. Key concepts and first ideas for TRL and MRL of REAMIT technologies were presented by UU at the online meeting of REAMIT partners during REAMIT Steering Committee meeting on 21/01/2021.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.4	Development of business case (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Business prospectus		07-2022	proceeding according to work plan	
Deliverable description	An outward-facing document will be made available to SME technology developers, to potential buyers of technology approaches (large agri-business and logistics companies) and potential investors who can see the possibilities for product development.			
Description of progress achieved	After presenting details of the Clostridium trial at the second REAMIT symposium, UU were contacted by an American company called SealedAir. They provided information that they had significant numbers of customers affected by this bacterium and they were interested in assisting and potentially investing in a potential solution. This proves the trial to be a legitimate business value problem which has a genuine market for business development of any related research activities.			
Evidence				
Deliverable T3.4.2				

Deliverable title		Planned delivery month	Deliverable status
Business case for achieving 40,000 tonnes of waste reduction		07-2022	not started
Deliverable description	The business case will use REAMIT data from continual monitoring of sensor data for identifying/saving potential food waste and subsequent analytics to understand patterns of food waste in NWE with justification for saving 40,000 tonnes of food waste.		
Description of progress achieved			
Evidence			

Work Package Communication (communication)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
C	Communication	01-2019	07-2022	behind schedule	64 035.34	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Based on input from LP and PPs, NTU updated REAMIT website to reflect progress in project implementation. NTU with input from BED, UU, Whysor, UoN, developed 2 new REAMIT videos. NTU with input from BED, Whysor, UU, UoN, ITT developed 2 REAMIT newsletters (Sept & Dec 2020). NTU delivered online training on social media platform to enhance skills of REAMIT partners for using social platforms to communicate about REAMIT. In consequence, partners' presence in social media intensified (partners have communicated more often about REAMIT through LinkedIn, Twitter, FB). In Nov-2020 NTU developed Sharepoint site providing access to all REAMIT partners as a central online storage space to store internal REAMIT documents. Sharepoint is hosted through NTU's online server. NTU distributed log in permissions to REAMIT partners and explained how Sharepoint should be used. This facilitated creating a shared folder in cloud where all partners can store and find REAMIT related materials. NTU initiated work on developing food waste case studies which will be presented on REAMIT website and published in REAMIT Newsletters. Case studies are developed based on input (stories, images, videos, etc.) from REAMIT partners, food companies or information in media. BED promoted REAMIT at 12 online internal and external events focusing on ICT, food supply chains and agri-food production. RR made presentation: 'Climate Change Implications of Reducing Food Waste Using New Digital Technologies' at Freshcrist online conference for Dr. Kirit S. Parikh on 19/09/2020; RR & LM attended networking event 'Awareness Raising and Networking Events on Horizon 2020 – European Green Deal and co-funding opportunities', Department of Biotechnology, India and made a presentation promoting REAMIT (3/11/2020); RR attended 'Internet of food things' of Internet of Food Things Network Plus, 20/09/2020; RR made keynote presentations on REAMIT at online conferences: International Conference on Applications of A.I. & Computational Mathematics in Bangalore (07-11/12/2020), 53rd Annual convention of the Operational Research Society of India (17-20/12/2020); TA chaired panel discussion at 'Smart Food Factory' online event, Premier Publishing & Events (10/09/2020); KP attended 'Transforming Food Production. Investor Partnership Programme' workshop, KTN-UK, 6/08/2020; KP attended 'World Agri-Tech Innovation Summit', Rethink Events, 15-16/09/2020; KP attended 4 workshops at EU Regions week 2020: 'Circular economy for a green Europe – Regiostars finalists talk' (13/10/2020); 'Partnerships for Renewable Energy Regions' (15/10/2020); 'How can regions enable the Green Deal?' (20/10/2020), and 'Adapting agriculture to climate change' (20/10/2020); KP attended 'Food Waste Fest 2.020', Food Heroes project, (8-9/12/2020); LM promoted REAMIT internally at BED and made presentation introducing REAMIT to BED master students in Logistics (Global Supply Chain & Logistics Management), 26/10/2020; TA attended H2020 networking event where she promoted REAMIT (23/10/2020). BED, UU, NTU, Whysor, I&R, UoN, UCD, Levstone attended REAMIT Symposium (5/11/2020). BED, UU, Whysor, UoN, UCD made presentations on REAMIT approach, pilot tests and expected impacts during REAMIT Symposium. UCD promoted REAMIT at 3 events: UCD School of Biosystems & Food Engineering research day seminar, 11/03/2020 in UCD, IE; Department of Agricultural and Biological Engineering seminar at Penn State University, USA, 24/03/2020; UCD Institute of Food and Health Research Day

2020, 15/10/2020, IE. UoN was invited to present REAMIT at ISBC conference, Gijon, Spain (June 2020). UoN contributed to drafting article: "Review of Potential Sensor Technology for Continuous Monitoring of Food Quality in Transport" with the section on Raman spectroscopy. UU have submitted an article to Sensors MDPI Special Issue "State-of-the-Art Sensors Technologies in Ireland 2020" (December 2020). BED advanced work on 4 journal articles

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Partners have been communicating frequently about REAMIT, and they communicated as much as possible given no concrete results have been obtained yet from the pilot tests. All possible communication channels have been used regularly by REAMIT partners (e.g. REAMIT website, social media, videos, newsletters, communicating via email, attendance to external events) to reach out to different REAMIT audiences and target groups. However, delays in the implementation of WP T1 and WP T2, lockdown and companies prioritizing their core business over research, have had an impact on the implementation of WP C, in particular with regards to raising awareness on the potential of sensor technology to monitor food quality in food supply chains; convincing agribusiness users using the results of pilot studies that food waste can be significantly reduced by adopting REAMIT's integrated IoT-Big Data-Analytics technology solution; raising awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. Communicating about the REAMIT approach and proposed REAMIT technologies will be more effective if REAMIT partners can show concrete positive results obtained from pilot tests. All travels (international and domestic) have been cancelled in the past 5 months due to COVID-19 and lockdown. Hence, attendance of partners in events to network, promote and communicate about REAMIT, has been postponed, cancelled or took place online. Nevertheless, partners used alternative ways of communicating about REAMIT and connecting with actors involved in ICT and food supply chains. BED supported NTU in developing a new section in REAMIT newsletters and on the REAMIT website dedicated to case studies on food waste; BED attended 6 B2B meetings following online events (REAMIT Symposium, Food Heroes Fest) to approach new actors in France and Belgium to promote REAMIT and look for new pilot test end users.

Communication objectives - what is the progress toward the communication objectives as defined in the application form? The level of achievement should be cumulative; however the explanation should describe achievements in this reporting period

Project specific objectives	Level of achievement	Explanations
To raise awareness on the potential of sensor technology to monitor food quality in food supply chains. While there has been significant improvements in the capabilities of sensors and their connectivity over the internet, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains.	to a minor degree	REAMIT partners have communicated and made efforts to raise awareness on the potential of sensor technology to monitor food quality in food supply chains. However, many businesses despite confirming interest in the proposed REAMIT approach and technology, nowadays prioritize their core activities rather than research. Often, companies choose not to engage in REAMIT technology demonstrations as they struggle with much reduced resources due to pandemic and lockdown.
To convince agribusiness users using the results of pilot studies that food waste can be significantly reduced by adopting REAMIT's integrated IoT-Big Data-Analytics technology solution. REAMIT will conduct regular networking events with agribusiness users, popularise the benefits of using these new technologies, and showcase demonstrations to influence their attitude.	to a minor degree	REAMIT partners keep looking for new agrifood businesses whom they invite to participate in REAMIT pilot tests. However, since implementation of pilot tests have been severely affected by COVID-19, no concrete results have been obtained yet from the pilot tests. Hence, it has not been possible to use concrete results from pilot tests to showcase how much food waste can be avoided due to REAMIT approach and technologies.
To raise awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. As highlighted earlier, while there has been significant improvements in the capabilities of sensors, their connectivity over the internet, and the potential of conducting data analytics, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains, collecting huge volumes of data on food quality across the NWE region to identify patterns of food wastage, most frequent causes of food waste, and, likely actions that would have maximum impact in reducing food waste. Policy briefs will be developed to provide action oriented solutions that can be favourably considered by policy makers in NWE.	to a minor degree	REAMIT partners keep promoting REAMIT approach and technologies to raise awareness on the potential of combining sensor technology with Big data analytics to reduce food waste. However, since the implementation of pilot tests have been severely affected by COVID-19, no pilot test data has been generated yet and consequently no pilot test data has been sent to Big Data server for analytics. Hence, it has not been possible to show to agribusinesses concrete results from Big data server analytics, on how the proposed REAMIT approach can assist agribusiness companies to monitor and control food quality along food supply chain. Although the Big data hub has been built at BED, there is no data yet from pilot tests which can be analysed by the server. Due to Covid-19 and lock down, end user companies participating in REAMIT pilot tests have put on hold REAMIT pilot tests. Consequently, REAMIT partners could not access the sites of these companies, companies have suffered from reduced resources (COVID-19 cases among staff) and were forced to prioritize their core business over the work on pilot tests.
Using the analytics algorithms and decision support, REAMIT will identify patterns on food waste in NWE and assess the most frequent causes of food wastage along supply chains. By regularly publishing this information through blogs, social media, project outputs and policy briefs, REAMIT will make efforts to change behaviour of relevant stakeholders. For example, targeted feedback of the results to owners of food, decision support on redistribution of food to avoid food becoming waster, etc. will help change behaviour of owners of food and members of food supply chains at micro levels. Policy briefings to suggest best ways of avoiding food waste and regulatory suggestions will help reduce food waste in the region at a macro level.	-	Not started yet as there is no data yet from pilot tests as all pilot tests have been frozen during pandemic.
Based on the risk and sustainability assessment, the project aims to convince agribusiness users of the value of REAMIT's technologies in reducing food waste and increase profitability of their businesses. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted	-	Not started yet.

at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help influence their attitude.		
Understand the risks involved in the technologies, to help design future-proof technologies for food waste reduction and also the sustainability issues. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help increase knowledge about sustainability aspects of technologies, knowledge and benefits of saving food waste, and policy oriented activities.	-	Not started yet.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity C.1	Start-up activities including communication strategy	01-2019	01-2022	proceeding according to work plan

Deliverable C.1.1

Deliverable title	Planned delivery month	Deliverable status
Communication strategy document	01-2022	proceeding according to work plan
Deliverable description	A communication strategy approved by Steering Committee (RSC) including guidelines on local, regional and inter-regional strategies will be delivered in the first quarter, and reviewed annually. It will outline approach to reach all target groups.	
Description of progress achieved	REAMIT Communication Strategy is systematically being updated by NTU with input from REAMIT partners. The latest version of the Communication Strategy has been attached.	
Evidence		

Activity	Title	Start month	End month	Status
Activity C.2	Digital activities	03-2019	07-2022	proceeding according to work plan

Deliverable C.2.1

Deliverable title	Planned delivery month	Deliverable status
Website launch	03-2019	proceeding according to work plan
Deliverable description	In line with communication rules specified in Interreg documents, the REAMIT webspace will be developed within the Interreg NWE site. It will include updated information on benefit to target groups, operational & technical specifications of IoT/ Big Data	
Description of progress achieved	REAMIT website is being continuously updated by NTU (with the support from BED and materials from REAMIT partners) to reflect activities and progress in the implementation of the REAMIT project. I&R supported NTU by providing French translation of the "REAMIT Infographics - Benefits for companies in agri-food supply chains" which has been uploaded on the REAMIT website. I&R has supported NTU by proposing updates to the English version of the infographics.	
Evidence		

Deliverable C.2.2

Deliverable title	Planned delivery month	Deliverable status
Social media	03-2019	proceeding according to work plan
Deliverable description	Social media - twitter, Whatsapp, and Facebook will be added to facilitate more active project communication. This will create opportunity for discussion on any technological development in IoT and operational success of food waste management.	
Description of progress achieved	NTU continues to update REAMIT social media channels with information on REAMIT progress and activities. NTU tweets have been recognised by the funder at Interreg NWE Programme who continue to retweet and interact with REAMIT LinkedIn profile. Online interaction has grown around 2nd REAMIT Symposium (5/11/2020), where over 100 visitors were directed to REAMIT YouTube channel tweets, web-updates and website. Across REAMIT social media platforms, we saw 46 posts using the hashtag #REAMITSymposium2020 with a total 64 retweets on Twitter. With input from BED, UU, Whysor, UoN,	

NTU developed 2 new REAMIT videos: 'The Benefit of Participating in REAMIT technology demonstrations' and 'REAMIT technology demonstrations across NWE'. REAMIT videos received much attention, were recognised by funder's Communication team, uploaded to Interreg's official YouTube channel, shared on various social media platforms (e.g. <https://www.youtube.com/watch?v=-Sl2yL5rzU4&t=20s>) and highlighted in Interreg NWE Programme Newsletter. NTU paid annual subscription for 2021 to Powtoon (online video creation software), which will enable NTU developing 5 new REAMIT videos in 2021. To help REAMIT partners be more active on social media (posting up to date information about REAMIT), NTU delivered online training on social media tailored to REAMIT partners (3/12/2020). Thanks to the training, UU created a Twitter handle; and Whysor, UoN and UU intensified their presence in social media to promote REAMIT using company and private LinkedIn, Twitter and FB accounts. Second social media training will be delivered by NTU during REAMIT online meeting (20/01/2021). NTU, based on input from BED, UU, UoN, Whysor and ITT, have developed 2 REAMIT Newsletters: September and December. REAMIT has been featured in other external publications i.e. newsletter for Growing Nottingham – Nottingham City Council's monthly digest on Food and Drink related topics; NTU's Commercial E-zines for December 2020.

Evidence

Activity	Title	Start month	End month	Status
Activity C.3	Promotional material	01-2019	07-2022	proceeding according to work plan

Deliverable C.3.1

Deliverable title	Planned delivery month	Deliverable status
Project banners, posters and flyers	07-2021	proceeding according to work plan
Deliverable description	Banners and posters about the project will be developed in 4 languages. Banners will be kept in partners' workplaces and also in event venues to create visibility of the project. Posters will be used to promote the project in all major events conducted	
Description of progress achieved	NTU has updated REAMIT promotional materials with a logo of WD Meats and shared the updated logo with all partners. UoN and SenX have developed and printed a REAMIT roll up. Whysor has used the REAMIT roll up in online meetings and events as background. Whysor updated it's own website with REAMIT film about technology demonstration, the logo of the new REAMIT partner WD Meats and a better logo (in solution) of Interreg. Whysor updated the REAMIT poster with the new logo of WD Meats and printed a new one. UU has developed a new REAMIT poster. UU and UoN took images of sensors and shared them with NTU. These images were used in REAMIT newsletters and other communication materials.	
Evidence		

Deliverable C.3.2

Deliverable title	Planned delivery month	Deliverable status
Policy briefs	01-2022	not started
Deliverable description	Based on the analytics of sensor data, policy oriented briefs will be developed for each country on the best ways to reduce food waste.	
Description of progress achieved		
Evidence		

Activity	Title	Start month	End month	Status
Activity C.4	Public Event(s)	01-2019	07-2022	proceeding according to work plan

Deliverable C.4.1

Deliverable title	Planned delivery month	Deliverable status
Reports on REAMIT Networking events	12-2021	proceeding according to work plan
Deliverable description	Three REAMIT networking events will be conducted (1 annually) to reach all target groups in all five countries. The reports will be widely published to reach more more members of target groups using traditional and electronic channels.	
Description of progress achieved	Valorial has developed report from the second (online) REAMIT Networking Symposium (5/11/2020)	
Evidence		

Activity	Title	Start month	End month	Status
Activity C.5	Publication(s)	01-2019	07-2022	proceeding according to work plan
Deliverable C.5.1				
Deliverable title		Planned delivery month	Deliverable status	
Journal article		07-2022	proceeding according to work plan	
Deliverable desription	Scientific publication will target high-level academic journal. At least 2 articles will be produced from the project results			
Description of progress achieved	3 journal articles inspired by REAMIT are being prepared by BED (targeted for submission in 2021): (1) article on sensor review: "Sensor choices for heterogenous stationary and moving conditions - A descriptive analysis from North West European markets". 4 interviews were conducted so far. Some interviews were converted to transcripts. More interviews will be conducted to complete the analysis in future. (2) article "Multi-objective modelling for wastage aware Agri-business supply chains": formulation of the wastage awareness was completed and is at the solution finding stage. (3) A paper is conceptualised to capture the real impact of REAMIT pilots, titled "Impact of reducing fresh food wastage on risk components in multi-echelon supply chain designs". BED is preparing an abstract for submission to EUROMA 2021 conference on "Integration of quality control with supply chain network design to reduce food wastage - Modes and methods". UoN contributed to drafting of "Review of Potential Sensor Technology for Continuous Monitoring of Food Quality in Transport" with the Raman spectroscopy section. UU have submitted an article to Sensors MDPI Special Issue "State-of-the-Art Sensors Technologies in Ireland 2020" (December 2020).			
Evidence				

Project report tables

Project report expenditure summary

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Total co-financing	2 955 102.36	1 056 804.39	30 000.00	664 084.03	664 084.03	284 545.30	275 783.97	2 657.32	6 104.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Partner contribution	1 970 068.25	704 536.48	20 000.00	442 722.82	442 722.82	189 696.92	183 856.02	1 771.55	4 069.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 761 340.87	50 000.00	1 106 806.85	1 106 806.85	474 242.22	459 639.99	4 428.87	10 173.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per partner

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
BED	1 063 530.07	ERDF	378 227.01	50 000.00	293 325.94	293 325.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I&R	578 032.50	ERDF	135 603.37	0.00	92 263.92	92 263.92	41 096.58	36 317.44	4 779.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

UCD	426 788.05	ERDF	89 924.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UoN	544 862.80	ERDF	303 228.76	0.00	185 946.82	185 946.82	117 031.91	117 029.15	2.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levstone	334 112.50	ERDF	216 471.89	0.00	105 537.75	105 537.75	110 934.14	110 934.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTU	454 041.89	ERDF	165 339.73	0.00	114 287.98	114 287.98	50 329.95	50 329.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Whysor	296 579.25	ERDF	154 741.99	0.00	98 740.95	98 740.95	56 001.04	56 001.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ITT	191 430.00	ERDF	14 897.35	0.00	15 052.36	15 052.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SenX	276 022.10	ERDF	120 984.64	0.00	89 815.98	89 815.98	29 142.21	29 495.24	-353.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UU	759 771.45	ERDF	181 921.56	0.00	111 835.15	111 835.15	69 706.39	59 533.03	0.00	10 173.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DNI	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61		1 761 340.87	50 000.00	1 106 806.85	1 106 806.85	474 242.22	459 639.99	4 428.87	10 173.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per budgetline

Budgetline	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Staff costs	3 397 294.45	1 410 945.75	0.00	864 182.02	864 182.02	363 452.71	350 808.85	3 797.44	8 846.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office and administration	509 593.80	211 641.58	0.00	129 627.14	129 627.14	54 517.80	52 621.23	569.63	1 326.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel and accommodation	238 386.42	34 125.95	0.00	29 176.67	29 176.67	1 192.12	1 130.32	61.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External expertise and services	420 942.13	47 545.14	50 000.00	75 151.59	75 151.59	18 349.34	18 349.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	358 953.81	57 082.45	0.00	8 669.43	8 669.43	36 730.25	36 730.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Infrastructure and works	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4 925 170.61	1 761 340.87	50 000.00	1 106 806.85	1 106 806.85	474 242.22	459 639.99	4 428.87	10 173.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 761 340.87	50 000.00	1 106 806.85	1 106 806.85	474 242.22	459 639.99	4 428.87	10 173.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage

Workpackage	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Wp P	50 000.00	0.00	50 000.00	50 000.00	50 000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	382 332.76	92 676.46	0.00	48 675.45	48 675.45	28 962.04	28 790.95	0.00	171.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp M	735 506.69	428 226.76	0.00	237 933.61	237 933.61	52 997.45	53 019.65	-22.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T1	1 682 887.56	653 049.99	0.00	442 360.58	442 360.58	143 926.10	134 262.59	4 623.03	5 040.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T2	1 101 982.93	252 650.35	0.00	117 306.10	117 306.10	137 143.14	135 657.36	-225.19	1 710.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T3	487 100.03	97 497.68	0.00	43 668.02	43 668.02	46 953.82	43 874.10	-0.01	3 079.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp C	485 360.64	237 239.63	0.00	166 863.09	166 863.09	64 259.67	64 035.34	53.24	171.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4 925 170.61	1 761 340.87	50 000.00	1 106 806.85	1 106 806.85	474 242.22	459 639.99	4 428.87	10 173.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 761 340.87	50 000.00	1 106 806.85	1 106 806.85	474 242.22	459 639.99	4 428.87	10 173.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage per budgetline (total values)

Wp number /		Office and	Travel and	External expertise		Infrastructure and			Total eligible
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budgetline	Staff costs	administration	accommodation	and services	Equipment	works	Total	Net Revenue	expenditure
Wp P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	21 312.15	3 196.81	0.00	3 878.00	403.99	0.00	28 790.95	0.00	28 790.95
Wp M	38 550.38	5 782.53	1 202.10	7 484.64	0.00	0.00	53 019.65	0.00	53 019.65
Wp T1	91 328.18	13 699.21	-71.78	5 415.40	23 891.58	0.00	134 262.59	0.00	134 262.59
Wp T2	107 150.17	16 072.51	0.00	0.00	12 434.68	0.00	135 657.36	0.00	135 657.36
Wp T3	38 151.40	5 722.70	0.00	0.00	0.00	0.00	43 874.10	0.00	43 874.10
Wp C	54 316.57	8 147.47	0.00	1 571.30	0.00	0.00	64 035.34	0.00	64 035.34
Total	350 808.85	52 621.23	1 130.32	18 349.34	36 730.25	0.00	459 639.99	0.00	459 639.99

Project report expenditure - invoices outside of the eu part of the programme area

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)			Total amount declared to flc	Total amount certified by flc	Total amount included in project report - declared to js
		Declared to flc	Reported to js	Confirmed by ca			
Total co-financing	2 955 102.36	905.40	892.79	892.79	0.00	0.00	0.00
Partner contribution	1 970 068.25	603.61	595.20	595.20	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 509.01	1 487.99	1 487.99	0.00	0.00	0.00

Project expenditure spending profile

Period	Period start date	Period end date	Reporting date	Total eligible budget per period	Actual spending	Forecast from the previous project report (2.1)
Period 0	10.01.2019	10.01.2019	09.07.2022	50 000.00	50 000.00	665 585.57
Period 1	10.01.2019	31.12.2019	31.12.2019	1 284 257.14	605 184.04	
Period 2	01.01.2020	31.12.2020	31.12.2020	1 645 380.17	911 262.80	
Period 3	01.01.2021	31.12.2021	31.12.2021	1 388 335.23	0.00	
Period 4	01.01.2022	09.07.2022	09.07.2022	557 198.07	0.00	
Total	N/a	N/a	N/a	4 925 170.61	1 566 446.84	

Project report expenditure per partner (fund amounts)

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)						
	638		226		175	175											

BED	118.04	ERDF	936.19	30 000.00	995.55	995.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I&R	346 819.50	ERDF	81 362.00	0.00	55 358.35	55 358.35	24 657.94	21 790.46	2 867.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UCD	256 072.83	ERDF	53 954.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UoN	326 917.68	ERDF	181 937.23	0.00	111 568.08	111 568.08	70 219.14	70 217.49	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levstone	200 467.50	ERDF	129 883.12	0.00	63 322.64	63 322.64	66 560.48	66 560.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTU	272 425.13	ERDF	99 203.83	0.00	68 572.78	68 572.78	30 197.97	30 197.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Whysor	177 947.55	ERDF	92 845.18	0.00	59 244.56	59 244.56	33 600.62	33 600.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ITT	114 858.00	ERDF	8 938.41	0.00	9 031.41	9 031.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SenX	165 613.26	ERDF	72 590.77	0.00	53 889.58	53 889.58	17 485.32	17 697.14	-211.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UU	455 862.87	ERDF	109 152.92	0.00	67 101.08	67 101.08	41 823.83	35 719.81	0.00	6 104.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DNI	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	2 955 102.36		1 056 804.39	30 000.00	664 084.03	664 084.03	284 545.30	275 783.97	2 657.32	6 104.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project progress report NWE831 REAMIT

Project progress report identification

Title	Improving Resource Efficiency of Agribusiness supply chains by Minimising waste using Big Data and Internet of Things sensors
Acronym	REAMIT
Number	NWE831
Start date	01-01-2021
End date	01-07-2021
Priority	Priority Axis 3 Resource and materials efficiency
Specific objective	SO5: To optimise (re)use of material and natural resources in NWE
Lead partner	University of Bedfordshire
Contact person	University of Bedfordshire
Reporting period	Period 3 : 01-01-2021 - 31-12-2021

Highlights of main achievements

WP T1: 7 pilot tests advanced: Clostridium Bacteria, Dry Aging Chamber, Picnic, Raman Spectroscopy, Yumchop, Human Milk Foundation, Musgrave. 5 pilots in pipeline: Glen Affric, Cyberbar, 3D Fluorescence, Biogros, VHG. Companies approached and PPs awaiting response: Carton Group, IGRECA, Weather Logistics, Prince de Bretagne. Nondisclosure Agreement template developed.

WP T2: Big Data server set up; access to Big Data server for all PPs established; client enrolment interface advanced; linking Mobile App and Big Data server advanced; REAMIT dashboard at Whysor improved; manual on launching interface advanced; integrating WARP-10 into REAMIT dashboard advanced; data requirements document developed; data analytics initiated.

WP T3: questionnaire with data required for LCA developed; initiated collecting information on amount of waste generated in different supply chains and location in supply chain where food becomes waste; initiated developing shared approach to TRL and MRL in the context of REAMIT.

WP M: 6 staff members joined REAMIT (UCD, BED, UU, Whysor); Project Handbook and Risk log updated; 12-months project extension budget developed; 4th REAMIT progress report submitted to JS; over 30 online meetings of PPs organised and documented; minutes from RAC/WP/RSC meeting (Jan-2021) circulated to PPs; SharePoint regularly updated with REAMIT related materials and accessible to all PPs.

WP C: REAMIT website updated; developed justification for stand-alone REAMIT website, 2 newsletters, 2 videos, 2 posters, 2 case studies, 2 journal articles, 1 book chapter, 3 presentations; delivered 3 online trainings for PPs on social media; increased PPs' communication through local communication channels and REAMIT social media platforms; presented and promoted REAMIT at 10 external events;

WP LT: Planning 3rd REAMIT Symposium initiated; new target groups reached; rolling out to new sectors initiated: Human Milk Foundation, Weather Logistics.

Project specific objectives

Project specific objectives	Level of achievement	Explanations
1 - To pilot test sensor technologies in agri-food supply chains in the five partner countries	to a minor degree	REAMIT partners are continuously promoting the REAMIT approach and technology among agri-food companies. However, due to COVID-19 and lockdowns in NWE economies, all REAMIT promotion and communication activities are happening only online. Agri-food companies are still suffering from the pandemic, and many of them have confirmed that they needed to prioritise core business, not research, in order to bounce back and recover from the pandemic and the lock down. Nevertheless, REAMIT partners continue to engage in promotional activities and they present the REAMIT project and approach to companies and actors in agri-food supply chains, in their respective regions and countries. This has resulted in recruiting 3 new companies and 1 foundation which have committed to developing REAMIT pilot tests.
2 - To develop Big Data infrastructure for analytics and decision support to reduce food waste	not achieved	Because of COVID-19, getting data from pilot tests has proven to be difficult, and in consequence the analytics partners do not have real data to do data analytics. Thus, they have not been able yet to demonstrate capabilities of IoT sensors and Big Data technology in monitoring and controlling conditions in which food is transported along food supply chains.
3 - To bring the REAMIT combination of technologies closer to market	not achieved	Very little progress has been made so far in the implementation of WP T3, hence project and communication objectives related to this WP have not been achieved yet.

Project main outputs achievement

Programme output indicators	Sum of output indicator targets	Sum of achieved output indicators so far	Project main output indicator number	Project main output title	Project main output quantification target	Planned delivery	Achieved so far	Level of achievement
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	20.00	T1.1.1	Working prototypes of sensor technologies based on pilot tests with agribusiness users	5.00	10-06-2021	16.00	behind schedule
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	20.00	T2.4.1	Technology solutions developed	3.00	10-07-2022	4.00	behind schedule
CO01. Number of enterprises receiving support	10.00	18.00	T1.2.2	Agribusiness companies supported in food waste reduction pilots	5.00	10-06-2021	14.00	behind schedule
CO01. Number of enterprises receiving support	10.00	18.00	T2.5.2	Companies supported in technology development	5.00	10-07-2021	4.00	behind schedule
CO29. Number of enterprises supported to introduce new to the firm products	10.00	0.00	T3.2.1	Companies introduced to REAMIT business case	10.00	10-07-2022	0.00	not started

Target groups reached

Target groups	Target value	Target groups reached (prev. periods)	Target groups reached current period	Source of verification	Description of target group involvement	Target groups reached so far (%)
local public authority	10.00	1.00	0.00		.	10.00
regional public authority	5.00	0.00	3.00	Email exchange and online meeting attended by PI and PM to present REAMIT project and discuss which companies in SEMLEP region can be approached for pilot tests; REAMIT poster; online meetings attended.	BED connected with SEMLEP (South East Midlands Local Enterprise Partnership), responsible for supporting local businesses. I&R and Valorial promoted REAMIT at Pays de La Loire council by preparing a poster of the REAMIT project to be exposed at the council's lobby. UU met online with HSCNI.	60.00
national public authority	5.00	2.00	0.00			40.00

interest groups including NGOs	5.00	23.00	1.00	Email exchange, minutes from 3 online meetings, presentation by HMF at RSC meeting on 7/07/2021.	BED approached Human Milk Foundation (HMF), supporting families with feeding their prematurely born babies with human milk, and invited them to participate in REAMIT pilot tests. HMF confirmed REAMIT approach and technologies seemed very relevant to help them save human milk from becoming waste. HMF has actively engaged in developing a new REAMIT pilot test in the UK.	480.00
higher education and research	20.00	28.00	0.00			140.00
enterprise, excluding SME	10.00	29.00	7.00	Email exchange, minutes from online meetings.	BED approached Unilever, UK at Innovate UK online event 'Food Industry Innovation' on 2-3/03/2021 and invited them to participate in REAMIT pilot tests. BED approached Ocado via email, inviting them to participate in REAMIT pilot test (June 2021). BED & NTU approached Glen Affric (April 2021) and VEC. Glen Affric engaged in REAMIT pilot test. UU met online with Musgrave, Henderson group, and Kepak.	360.00
SME	10.00	9.00	8.00	Email exchange; presentation by Weather Logistics at RSC meeting on 7/07/2021; online meetings; new pilot tests materialising in REAMIT.	In May 2021, BED and NTU connected with a UK SME called Weather Logistics, which specialises in developing solutions that can help agri-food supply chains become more resilient to short-term climate disruptions. Valorial, UoN and I&R approached vegetables cooperative SME in France for a new pilot test in France. Whysor contacted DLV Advies and this contact led to another possible pilot partner: Van de Huijgevoort Groep. Whysor contacted Sensip-dx which led to a possible new technology to be used in pilot testing in liquid foods. Whysor contacted Tsenso which led to a possible pilot partner in Germany. UU approached Aurivo and Dale Farm.	170.00
business support organisation	5.00	4.00	5.00	Email exchanges; article in organisation's Newsletter.	BED approached German Contact Point Person for help with finding more German companies for pilot tests. BED worked with NIFDA in Northern Ireland in January/February 2021 to recruit companies for pilot tests. BED reached out to JS of Interreg BSR Programme for help in finding companies in Germany for pilot tests. BED reached out to more business support organisations through LinkedIn. Whysor contacted Kimpunt Limburg, an agrifood network in Limburg and wrote an article about REAMIT for their newsletter.	180.00

sectoral agency	5.00	4.00	4.00	Presentations made, follow up online meetings attended, REAMIT pitch being prepared.	RR presented REAMIT at 'Internet of Food Things Network, UK, 22/01/2021. KP promoted REAMIT at Innovate UK 'Food Industry Innovation 2021', 3-4/03/2021. RR and LM presented REAMIT (12/06/2021) at Operations Research Society of India (ORSI). MTU Initiated contacts with Meat Technology Ireland (http://www.mti.ie/) to pitch the REAMIT idea and explore pilot test possibilities.	160.00
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Problems and solutions found

COVID-19 pandemic and lockdown have caused a delay in the implementation of all WPs of at least 12 months.

WP T1: Partners countries were in severe 2nd lockdown from December 2020 until May 2021. Agri-food companies needed all of their means for their primary process, rather than research. Many businesses were not responsive and confirmed that they needed to prioritize core business activities. In consequence, it has been difficult to maintain productive relationship with pilot test partner companies. Implementation of all pilot tests has been delayed by at least 12 months. REAMIT lost pilot test company in Germany, as Weyers decided not to proceed with REAMIT pilot test.

WP T2: Very few data has been generated for analytics so far.

WP T3: Limited progress in WP T3.

WP M: All meetings of REAMIT partnership took place online. Although we have by now adjusted to online mode of working and communicating, responses from partners and colleagues have been slow, causing delays (e.g. payment from LP to PPs; purchase of equipment at BED for pilot tests, etc). It was not possible to travel to the sites of pilot tests in the NL, Germany and UK. Staff turnover at BED and UU may cause risks of lost continuity and expertise in the implementation of WP T1 and WP T2.

WP C: NTU were not able to travel to visit the sites of REAMIT pilot tests to take high quality video footage. Instead, videos had to be made based on materials sent to NTU by PPs via email. NTU resorted to remote working, and created animated REAMIT videos, recorded video and voiceovers remotely, based on files sent by PPs online.

WP LT: Due to delay in WP T1, WP T2 and WP T3, it was not possible to develop briefings for policy actors about REAMIT approach, or effectively promote REAMIT, its achievements and impact among local, regional and national businesses and policy actors.

Horizontal Principles

Horizontal principles	Contribution in this reporting period	Description of the contribution
Equal opportunity and non-discrimination	as planned	Equal opportunities and non-discrimination: Every effort has been made in REAMIT project to promote equal opportunities and non-discrimination. The REAMIT consortium consists of a mix of men and women from different countries and cultures, and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (RF at UCD and BED; VL at BED) and men (Research Fellow at UCD and UU; trainee at Whysor). They are from the EU and outside of the EU (India and Iran).
Equality between men and women	as planned	Equality between men and women: Every effort has been made in the REAMIT project to promote equality between men and women. The REAMIT consortium consists of a mix of men and women and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (RF at UCD and BED; VL at BED) and men (Research Fellow at UCD and UU; trainee at Whysor).
Sustainable development (environment)	as planned	This depends on the success of pilot tests, 7 of which are under way currently. However, they are delayed due to COVID-19. We will document the food waste saved and the corresponding impact on savings in carbon emissions, which will then be linked to sustainable development.

Fully implemented

Implemented (to be ticked at the last reporting period, only when the project has fully been achieved):	No
Implemented on:	

Reporting per WP overview

Start	End	Type	Title
Jan.2019	Jan.2019	preparation	Preparation
Jan.2019	Jul.2022	implementation	Long term
Jan.2019	Jul.2022	management	Project management
Mär.2019	Jun.2021	implementation	Adapting and pilot testing sensor technologies in agri-food supply chains
Jan.2019	Jul.2022	implementation	Big Data integration and applications to reduce food wastage.
Jan.2020	Jul.2022	implementation	Business development of REAMIT technologies
Jan.2019	Jul.2022	communication	Communication

Work Package Preparation (preparation)

WP no	Title	Start month	End month	WP Status
P	Preparation	01-2019	01-2019	not started

Partner's involvement

Abbreviation	Name
Whysor	Whysor
I&R	Images & Réseaux
Levstone	Levstone Ltd.
BED	University of Bedfordshire (Lead Partner)
UoN	Université de Nantes
SenX	SenX
NTU	Nottingham Trent University
ITT	Institute of Technology in Tralee
UCD	National University of Ireland, Dublin, University College Dublin

Summary description of activities carried out and contribution of each partner

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Work Package Long term (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
LT	Long term	01-2019	07-2022	behind schedule	43 447.17	7.53

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED supported UCD with organisation of the 3rd REAMIT Symposium (online) in November / December 2021 in Ireland. BED advised UCD about the content of the Symposium and how the Symposium could be used as a means to reach out to new companies and target groups of REAMIT in Ireland. Format, date and programme of the 3rd REAMIT symposium will be further discussed by REAMIT partners at RSC meeting on 8/07/2021. New target groups reached: BED has reached out to a new target group and actors who expressed interest in the REAMIT approach and technologies, particularly Human Milk Foundation (HMF). HMF is a charity working to help more families feed their babies with human milk. By associating with them, REAMIT will not only save wasted human milk, but will also help save several pre-mature babies. HMF expressed interest in testing the REAMIT approach during transportation of human milk between donors, the milk bank and hospitals. Recruitment of HMF (<https://humanmilkfoundation.org>) as REAMIT pilot test partner organisation in the UK, may be an opportunity to roll out the REAMIT approach outside mainstream food sector. Human milk is also food category, and in some cases i.e. of pre-maturely born babies, it is the only food, which can be offered to such babies (as their underdeveloped stomachs and organs do not tolerate formula milk). Thus, donor milk is often the only nutrient for these babies and the only chance for them to survive and grow. REAMIT network: more than 20 companies and actors have been approached and invited to join the REAMIT network.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Since all REAMIT pilot tests have been frozen during the pandemic, no data was generated by the pilot tests. Hence it was not possible to analyse the data and based on it develop briefings for policy, governance and sector actors, about the approach and technology proposed by REAMIT.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity LT.1	Creating a self-sustaining REAMIT Network	01-2019	07-2022	behind schedule
Deliverable LT.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Network prospectus		09-2020	behind schedule	
Deliverable description	BED as coordinator will engage partners to develop a network prospectus, setting out the principles by which the network will operate, and ensure financial sustainability based on a low-cost model of voluntary contributions from partners and members.			
Description of progress achieved	Despite the lockdown caused by the pandemic, REAMIT partners continue to make efforts to connect with new actors in agrifood supply chains to grow the REAMIT network. The following actors have been contacted about the REAMIT project, its approach and technology: BED connected with the Human Milk Foundation, Unilever, Ocado, Weather Logistics, SEMLEP. NTU connected with TTK Confectionery, Glen Affric Brewery, Weather Logistics. NTU have also contacted local agri-business companies, IoT companies & organisations working with wider public such as The D2N2, Growing Notts and some large supermarket chains & food suppliers. Ulster connected with Musgrave, Knockbracken (the catering branch of HSCNI / NHS), Aurivo, Dale Farm, Henderson group, NIFDA and Kepak, HSCNI. Whysor connected with Biogros and Van de Huijgevoort Groep (VHG) in the NL. I&R and Valorial connected with Prince de Bretagne Vegetables Cooperative in France. UoN connected with IGRECA. MTU connected with Meat Technology Ireland, Enterprise Ireland.			
Evidence				
Deliverable LT.1.2				
Deliverable title		Planned delivery month	Deliverable status	
REAMIT networking events: 2019, 20 and 21 including invited lectures from experts		07-2021	proceeding according to work plan	
Deliverable description	Partners will bring together agribusiness & technology SMEs from REAMIT countries for a 1-day annual conference: (i) to ensure that REAMIT technologies keep pace with technology developments; and (ii) to maximize achievement of REAMIT's objectives.			
Description of progress achieved	Partners at UCD are responsible for the organisation of 3rd REAMIT Symposium, which will take place in November or December 2021 in Dublin. Most probably it will be an online event. Date and format of the Symposium will be discussed by REAMIT partners at REAMIT Steering Committee meeting on 8/07/2021.			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.2	Regularly updating framework for measuring the impact of REAMIT technologies on food waste	01-2019	07-2022	behind schedule
Deliverable LT.2.1				
Deliverable title		Planned delivery month	Deliverable status	
The agreed framework for measuring the impact of REAMIT technologies on food waste		12-2019	behind schedule	
Deliverable description	The framework for measuring the impact of REAMIT technologies on food waste will be agreed at the first networking event in December 2019.			
Description of progress achieved	No progress in the past semester.			
Evidence				
Activity	Title	Start month	End month	Status

Activity LT.3	Ensuring policy impact	01-2019	07-2022	not started
Deliverable LT.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Policy briefings		03-2022	not started	
Deliverable description	Meetings or briefing papers issued jointly from the partnership to national or EU-level policy formers to engage in a dialogue over the fit of REAMIT technologies to national and EU food waste reduction targets and policies.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.4	Roll-out to other sectors	01-2019	07-2022	behind schedule
Deliverable LT.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Cross-sector briefings		06-2022	behind schedule	
Deliverable description	REAMIT partners will identify and engage with industry bodies or policy organisations from other sectors where REAMIT technologies may have an application (e.g. EU Medicines Agency, EU Federation of Pharma industries, national health regulators)			
Description of progress achieved	Recruitment of Human Milk Foundation (https://humanmilkfoundation.org) as REAMIT pilot test partner organisation in the UK, may be an opportunity to roll out the REAMIT approach outside the mainstream food sector. Human milk is also categorised as food (although for a very narrow customer group), and in some cases of pre-maturely born babies, it is the only food which can be offered to these babies (as their underdeveloped stomachs and other organs do not tolerate formula milk). The Human Milk Foundation is a charity working to help more families feed their babies with human milk. By associating with them, REAMIT will not only save wasted human milk, but will also help save several pre-mature babies.			
Evidence				

Work Package Project management (management)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
M	Project management	01-2019	07-2022	behind schedule	197 327.56	23.56

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

New staff in REAMIT: Dr Tamiris da Costa and Dr Xavier Cama joined REAMIT team at UCD as post-doctoral researchers. Tamiris

will work on life cycle assessment of REAMIT technologies; Xavier on REAMIT pilot tests. BED employed two staff (part-time visiting lectures) to support BED with setting up Big Data server and developing research publications. Whysor employed a graduation student from Fontys University of Applied Sciences, Education ICT & Software Engineering, in the NL. He specialises in Applied Data sciences and he will be working at Whysor (from March till July 2021) on integrating WARP-10 (software developed by SenX) in the Whysor platform. Dr Trevor Cadden joined the Ulster University team to assist in finding additional pilot tests by utilising his industrial contacts. Project Handbook: Based on input from PPs, BED updated PH with information on calendar for 5th progress report and minutes from meetings (RAC/WP/RSC on 20-21/01/2021, monthly meetings of WPT1 and WPT2, bi-monthly meetings of WPT3, bi-weekly meetings of REAMIT sub-group composed of full time staff in REAMIT at BED, NTU, UU, UCD, MTU; and monthly meetings of REAMIT team at BED). With support from UCD, on 20-21/01/2021, BED organised online meetings of RAC/WP/RSC hosted by UCD. With support from UCD, MTU and NTU, BED developed minutes of RAC/WP/RSC and circulated it to PPs. Based on input from PPs, BED developed 4th REAMIT progress report and submitted it to JS in March 2021. In June 2021, BED actioned transferring due amounts from the funder to PPs. BED's coordination of WPs has been limited as due to lockdown there has been some progress in WP implementation, but slower than expected. BED was in regular contact with leads of all WPs (I&R, UU, NTU); supported I&R in organising WPT1 monthly meetings; coordinated input from technology partners in setting up Big Data server; supported NTU with developing communication materials (newsletters, videos, website updates, justification for REAMIT's stand-alone website sent to JS); attended online meetings with Whysor, MTU, UCD, NTU and Levstone to improve internal communication between PPs. BED held 5 monthly meetings of REAMIT team at BED; 10 meetings of REAMIT sub-group (fixed term staff in REAMIT at BED, NTU, UU, ITT, UCD). Based on input from PPs, BED developed a budget for REAMIT project 12-month extension and in May 2021 sent it to JS for feedback. In June 2021, BED worked on justifying the proposed expenditure for 12-months extension project. With support from NTU, BED started preparations of RAC/RWP/RSC meeting hosted online by NTU on 7-8/07/2021; developed agenda and circulated it to PPs, APs and pilot test partner companies and organisations. BED updated REAMIT risk log by adding 4 new risks in REAMIT: Risk of not having a pilot test in Germany due to losing Weyers and no success in recruiting a new company in Germany; Absence of a proper French pilot test and an Irish pilot test; The sensors cannot be fitted at Yumchop and HMF by Whysor physically due to travel restrictions; delays at BED with making payments from the funder to PPs. BED started work on 5th REAMIT progress report and claim and requested more detailed information from PPs in eMS on deliverables.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Due to the lockdown, BED have experienced considerable slowdown in the internal communication within BED and with the PPs. This delayed the payment approval process and resulted in delaying transfer of funds (4th tranche) from BED to PPs. PM and PI discussed this situation with finance team at BED, who confirmed that due to the amounts involved, the payment process needs to go through new levels of approval, which is timely, especially that many staff work remotely. As the project lead, BED has been communicating with PPs via email but responses from partners were slower than normal due to lockdown. Slow communication has affected completion of REAMIT 12-months extension budget. Due to COVID-19 lockdown, RAC/WP/RSC meetings on 20-21/01/2021 took place online, and not at UCD's office in IE; visits to the sites of pilot test in the NL and UK could not be organised physically, and were postponed. BED has launched the recruitment process to replace the research fellow at BED. Although interviews took place on 18/06/2021, it may take some months before the new person joins the REAMIT team at BED, which may cause delays in the implementation of the project, especially WP T2. Two professors in BED (Jun Peng and Feng Dong) have left BED and LP need to look for new staff members to get continued expert support. Procurement process at BED is very slow, which may cause equipment suppliers to cancel BED's order, leading to a delay in the implementation of pilot tests. Based on inputs from partners, BED estimated up to 12 months delay in the implementation of all WPs. In November 2020 BED received confirmation from the funder, that REAMIT project has been granted 12-month project and budget extension. The new end date of the REAMIT project is 9th of July 2023.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity M.1	General project management	01-2019	01-2022	behind schedule
Deliverable M.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Project handbook		02-2019	proceeding according to work plan	
Deliverable description	A document which will collate all necessary information for project management purposes, including terms of reference of groups, project procedures, reporting requirements, partnership agreements, GDPR requirements etc			
Description of progress achieved	Based on input from PPs, BED updated PH with information on calendar for 5th progress report and minutes from meetings within the REAMIT partnership (RAC/WP/RSC on 20-21/01/2021, monthly meetings of WPT1 and WPT2, bi-monthly meetings of WPT3, bi-weekly meetings of REAMIT sub-group composed of full time staff in REAMIT at BED, NTU, UU, UCD , MTU; and monthly meetings of REAMIT team at BED). All minutes included in the Project Handbook have been drafted by WP leads, I&R (lead of WP T1), BED (lead of WP T2), Ulster (Lead of WP T3). Project Handbook is uploaded in SharePoint, administered by NTU, and accessible by all PPs.			
Evidence				
Deliverable M.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Minutes of meetings of RSC, and RAC and WP		01-2022	proceeding according to work plan	

meetings - minimum six meetings each. The meetings of RSC and RAC will provide overall strategic direction of the project.		
Deliverable description	RSC and RAC will meet every six months -two in the UK and one each in the remaining four partner countries. WP meetings will be organized one day before RSC meetings. Minutes of all these meetings will be circulated & agreed within 1 month.	
Description of progress achieved	With support from UCD, on 20-21/01/2021, BED organised online meetings of RAC/WP/RSC hosted by UCD. With support from UCD, MTU and NTU, BED developed draft minutes of RAC/WP/RSC and circulated it to PPs. Draft minutes, including action log for all partners, were discussed and approved at RSC online meeting on 8/07/2021.	
Evidence		

Deliverable M.1.3

Deliverable title	Planned delivery month	Deliverable status
Intermediate Work Package coordination	01-2022	behind schedule
Deliverable description	The leaders of WP will be in regular touch with partners via emails, website and social media sites. Whenever needed, conference facilities via phone, Skype or similar technology will be organised out by leaders of each WP or partners on demand.	
Description of progress achieved	BED's coordination of WPs has been limited as due to lockdown there has been some progress in WP implementation, but slower than expected. BED was in regular contact with leads of all WPs (I&R, UU, NTU); supported I&R in organising WPT1 monthly meetings; coordinated input from technology partners in setting up Big Data server; supported NTU with developing communication materials (newsletters, videos, website updates, justification for REAMIT's stand-alone website); attended online meetings with Whysor, MTU, UCD, NTU and Levstone to improve internal communication between PPs. BED held 5 monthly meetings of REAMIT team at BED; 10 meetings of REAMIT sub-group (fixed term staff in REAMIT at BED, NTU, UU, ITT, UCD). Minutes of these meetings are included in the REAMIT Project Handbook.	
Evidence		

Deliverable M.1.4

Deliverable title	Planned delivery month	Deliverable status
Key control register for Project Management	09-2019	proceeding according to work plan
Deliverable description	A register of key control milestones will be prepared by LP and made available to all partners. This register will include useful information (e.g., timetable, risks, meetings, etc.). This will be available online and updated regularly.	
Description of progress achieved	Key control register is part of the REAMIT Project Handbook and it has been updated regularly.	
Evidence		

Activity	Title	Start month	End month	Status
Activity M.2	Risk register and risk review	01-2019	07-2022	proceeding according to work plan

Deliverable M.2.1

Deliverable title	Planned delivery month	Deliverable status
Risk register	03-2019	proceeding according to work plan
Deliverable description	Development & partner sign-off of a written risk register, forming an appendix to the project handbook.	
Description of progress achieved	BED updated REAMIT risk log by adding 4 new risks in REAMIT: Risk of not having a pilot test in Germany due to losing Weyers and no success in recruiting a new company in Germany; Absence of a proper French pilot test and an Irish pilot test; The sensors cannot be fitted at Yumchop and HMF by Whysor physically due to travel restrictions; delays at BED with making payments to PPs.	
Evidence		

Deliverable M.2.2

Deliverable title	Planned delivery month	Deliverable status
Annual risk reviews	01-2022	proceeding according to work plan
Deliverable description	Written notes of annual risk register reviews for 2020 & 2021.	
Description of progress achieved	Risks in REAMIT are reviewed bi-annually at RSC meetings.	
Evidence		

Activity	Title	Start month	End month	Status
Activity M.3	Record keeping and reporting	01-2019	07-2022	proceeding according to work plan
Deliverable M.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project reports		07-2022	proceeding according to work plan	
Deliverable description	Submission of complete, accurate & timely, activity & financial reports every six months by the LP partners.			
Description of progress achieved	Based on input from PPs, BED developed 4th REAMIT progress report and submitted it to JS in March 2021. In June 2021, BED actioned transferring due amounts from the funder to PPs.			
Evidence				
Deliverable M.3.2				
Deliverable title		Planned delivery month	Deliverable status	
Finance training for partners		04-2019	completed and achieved as planned	
Deliverable description	An event for all finance managers of all partners, to clearly set out the processes & procedures for claims & payments, & the partners' financial obligations in the project.			
Description of progress achieved				
Evidence				

Work Package Adapting and pilot testing sensor technologies in agri-food supply chains (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T1	Adapting and pilot testing sensor technologies in agri-food supply chains	03-2019	06-2021	behind schedule	227 080.18	8.85

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED supported pilot leads (Whysor, UU, UoN, UCD, I&R, NTU, MTU) with implementation of pilots and recruitment of new pilot companies. Over 20 online meetings took place, including WP T1 monthly meetings facilitated by I&R. Materials from meetings are stored online in SharePoint administered by NTU. 1. Clostridium bacteria (CB): To progress towards a rapid detection method of CB, WD Meats, UU, Sensipdx and Maastricht University (MU) met to discuss progress of this pilot test. Due to its reduced sensitivity, MU and Sensipdx technology required that bacteria conform to a minimum limit of detection. WD Meats froze swabs from their own routine testing to be used by UU for obtaining the limit of detection. UCD confirmed some of their CB could be used by UU for lab testing. UU trained placement student in DNA extraction. UU and WD Meats agreed to start testing at WD Meats factory in July 2021. 2. Dry aging chamber: With assistance of Whysor, Ursalink UC-11 TC sensors and Multitech Conduit LoRaWAN gateway have been configured and display data to REAMIT dashboard. Installation of 5 sensors and

a gateway within WD Meats had been delayed due to COVID-19. Installation of equipment at WD Meat factory in July-2021. 3. Picnic: 2 sensors were installed in Picnic's e-truck and started to send data on temperature and shock. Sensors registered information about most recent shock detected, not all instances of shock. Sensors needed to have firmware updated by producer. Not to delay this pilot, Picnic and Whysor decided to start test in July 2021 with sensors as they are, measuring temperature and humidity only. Remaining 18 sensors will be installed in cool boxes in e-vehicle of Picnic in July 2021. 4. Raman Spectroscopy (RS), FR: UoN arranged transmission of data from RS pilot on chicken and shrimp (Routhiau), to BED server. UoN used RS to test eggs from IGRECA (French company producing eggs). 4 kinds of samples of egg powder we received for tests. Aim is to evaluate ability of RS to determine chemical composition of sample e.g. detecting presence of salt. UoN carried tests with RS on orange and apple but no company has been involved yet. UoN needs to obtain concrete results before they approach companies for this pilot test to detect freshness of fruits. 5. Yumchop, UK: Based on input from Whysor, BED purchased equipment for pilot with Yumchop (temperature sensors, gateway, batteries). Equipment has been configured by Whysor and is ready to be installed inside Yumchop's factory. At online meeting (21/06/30), Yumchop, Whysor and BED agreed to install equipment at Yumchop's food factory in July 2021. 6. Human Milk Foundation (HMF), UK: BED recruited HMF for a pilot test focusing on controlling temperature and humidity during storage and transportation of human milk. Whysor assessed what equipment was needed and offered to lend two of its own sensors and ship them to HMF. The aim of the pilot is to keep track of temperature in which human milk is transported between donor, milkbank and hospital/home where a prematurely born baby is located. Sensors will be installed in bags transporting human milk and will track conditions of milk during transportation from 30-50 donors per day. 7. Musgrave (Cash&Carry), UK: new trial in reducing food waste within last mile delivery vans with Musgrave is currently being set up by UU. A test temperature and humidity sensor has been purchased and an APP is being developed at UU. Once the APP has been completed, sensor will be installed inside Musgrave vans in Sept-2021. 6 pilots in pipeline: Glen Affric brewery in UK recruited by NTU; Cyberbar, UCD; 3D Fluorescence, UU; Biogros, wholesaler of organic food in Luxembourg, recruited by Whysor; Van de Huijgevoort Groep (VHG) - a Dutch meat processing company owning several supermarkets in the NL, recruited by Whysor; I&R, Valorial, UoN discussed new pilot test in FR with vegetables cooperative Prince de Bretagne.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

WP T1 is key in REAMIT and its implementation continues to be severely affected by COVID-19. Delay in implementation of running pilot tests is estimated as 12 months. Private companies still suffer from pandemic, and focus on core business, not research. Although situation with COVID-19 is improving and businesses gradually return to 'normal', REAMIT pilots are resuming slowly. Problems with pilot tests: WD Meats closed down premises to external visitors; UU had no access to WD Meats' factory and were not able to take samples and assess chambers where sensors would be installed. WD Meats did not respond to emails. In June 2021, WD Meats reassumed communication with UU and confirmed installation of sensors in July 2021. UCD were not able to access labs to find out if clostridium bacteria were usable and could be shipped to UU. This delayed CB pilot. Picnic did not communicate with Whysor between March-May 2021; reassumed communication with Whysor in June 2021 and agreed to start installing remaining 18 sensors inside Picnic's vans in July 2021. Weyers lorry drivers protested against extra device (gateway) installed in driver's cabin. Although Whysor looked for an alternative solution, in Feb-2021 Weyers decided to stop the work on REAMIT pilot. REAMIT has lost an important pilot test partner company in Germany. BED made efforts to recruit another company in Germany (also through Interreg NWE Programme Contact Point person for Germany). No luck so far. If pilot test at UoN with RS does not leave lab environment, it may not qualify as REAMIT pilot. No progress with cyberbar pilot at UCD; Carton Group did not confirm involvement in pilot test. Due to cancellation of all local and international travels, PI from BED and PPs from Whysor were not able to visit sites of pilots in UK and NL, including to install sensors. Lengthy procurement process at BED delayed purchase of equipment for pilot with Yumchop. Continued delays in engaging with pilot companies.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T1.1 Working prototypes of sensor technologies based on pilot tests with agribusiness users	Five prototypes that use traditional and new sensor technologies to monitor quality of fresh produce and sends the data over WiFi, Cat-M, NB-IOT (or other radio technology) will be produced with agribusiness users recruited through the open call (A1.1)	5.01. Number of efficient natural and material resources solutions implemented and tested	06.2021	5.00			behind schedule	
T1.2 Agribusiness companies supported in food waste reduction pilots	Agribusiness companies will be recruited through an open call to participate in the pilot tests in A1.2. Each company will benefit from the installation	CO01. Number of enterprises receiving support	06.2021	5.00			behind schedule	

	of new technologies for the test period, giving reductions in waste and savings in their costs.							
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Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T1.1	Open call for Agri-business agribusiness user companies for pilot tests	03-2019	03-2020	completed

Deliverable T1.1.1

Deliverable title	Planned delivery month	Deliverable status
Publication of open call	03-2019	completed and achieved as planned
Deliverable description	Partners would develop an open call for participation from companies willing to offer their premises & equipment to the testing of technologies. The call would be issued on the project webspace and through partner networks so that Risk 2 is minimised.	
Description of progress achieved	We are continuing to recruit new pilot test companies and hence we have changed the closing dates in the Open Challenge Call (published at www.reamit.eu). The new end date for recruiting companies for REAMIT pilot tests is 30/06/2022.	
Evidence		

Deliverable T1.1.2

Deliverable title	Planned delivery month	Deliverable status
Companies recruited from across agri-business supply chain. Minimum 4 companies will be recruited across NWE so that there is a total of 5 user companies (including the one UK agribusiness user (PP12) that is already a partner) for minimum 5 pilot tests.	03-2020	behind schedule
Deliverable description	Partners expect to recruit a minimum of 4 companies to participate in the technology tests, with a representative mix of locations, sub-sectors etc. A simple MoU would be issued to them; no funding is involved. One UK user company is already a partner.	
Description of progress achieved	9 companies/organisations have been recruited and engaged in developing REAMIT pilot tests: 1) WD Meats - beef producer (UK); 2) Picnic - online food supermarket (NL); 3) Routhiau - fresh and frozen food catering company (FR); 4) Yumchop - food producer selling frozen, ready to eat meals through vending machines (UK); 5) Human Milk Foundation (HMF) - charity which collects human milk from milk donors, stores human milk in the milk bank run by the HMF and delivers human milk to prematurely born babies at homes and hospitals (UK); 6) Musgrave - Cash & Cery supermarket (UK). 7) Biogros - wholesaler of organic food (LU); 8) Van de Huijgevoort Groep (VHG) which owns several food supermarkets and a meat processing company in the NL; 9) Glen Affric brewery (UK); Partners are waiting to hear back from 3 companies: 1) Following UCD's connection with Carton Group, UCD contacted this company to find if they are interested in developing a pilot test. Carton Group is an Irish chicken meat processor with an interest in optimizing their processes and operations for minimizing food waste. The idea is to implement a combination of traditional sensors and CyberBar, a novel IoT based traceability system to contribute to food waste reduction. 2) UoN is waiting to hear back from IRECA, egg producer in France, whether they will get involved in REAMIT pilot test. 3) I&R, Valorial and UoN are waiting to hear back from Prince de Bretagne, Fruits and vegetables cooperative in France. NTU connected with the Weather Logistics company (UK). BED has developed Non-Disclosure Agreement.	
Evidence		

Activity	Title	Start month	End month	Status
Activity T1.2	Transnational synthesis of sensor technologies (Raman Spectroscopy from UoN, 3D Fluorescence from Ulster and CyberBar from UCD) and big data integration	03-2019	01-2021	completed

Deliverable T1.2.1

Deliverable title	Planned delivery month	Deliverable status
Partner workshop on sensors and big data	06-2019	completed and achieved as planned
Deliverable description	A workshop between knowledge partners and sensor/big data SME partners will bring forward all available knowledge about technologies, applications and potential combinations for food supply	

		chains. An internal workshop with around 20 attendees.		
Description of progress achieved				
Evidence				
Deliverable T1.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Test roadmap		09-2019	not started	
Deliverable description	The output from the workshop will be the production of an internal 'test roadmap' combining the results from the call for test companies (so we know how many tests, what kind of companies, and where) with the optimum technologies combinations.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.3	Adapting and pilot testing of sensor technologies with agribusiness users	10-2019	06-2021	behind schedule
Deliverable T1.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Working prototypes using sensor technology		06-2021	behind schedule	
Deliverable description	The sensor and scanning technologies will tested along with other traditional sensors where needed and adaptations carried out wherever needed. Data flow to be checked. At the end of the pilot test, new working prototypes will be developed.			
Description of progress achieved	Prototype No 10: In the past 6 months, Levstone have carried out work to understand the IoT sensors and IoT sensors impact on Mobile Technology. Levstone evaluated 5 different sensors and analysed challenges for each of them. As a result, Levstone can now offer to REAMIT partners and clients a reliable Blue Tooth IoT sensor which can be used with Levstone's Mobile App to capture data from pilot tests. MTU explored further the feasibility of advancing the Freshbox initiative. UCD have further explored developing a box (inspired by Freshbox) equipped with sensors. Based on input from PPs, I&R have updated the document 'COVID-19 pilot impact assessment'.			
Evidence				
Deliverable T1.3.2				
Deliverable title		Planned delivery month	Deliverable status	
User manual for each pilot test		06-2021	not started	
Deliverable description	A user manual documenting the experience of pilot test and a step-by-step guide of good practice in each pilot test will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				
Deliverable T1.3.3				
Deliverable title		Planned delivery month	Deliverable status	
Report on the pilot test and development of the sensor prototypes		06-2021	not started	
Deliverable description	A report on the 5 sensor-based pilot tests will be compiled by participating partners and posted on the project webspace. It will describe in detail the experiences with the pilot test and give recommendations for future pilot tests.			
Description of progress achieved				
Evidence				

Work Package Big Data integration and applications to reduce food wastage. (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current	% of WP reported so far
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					report)	
T2	Big Data integration and applications to reduce food wastage.	01-2019	07-2022	behind schedule	96 133.93	12.31

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED, with support from Levstone, MTU and Whysor, set up Big Data server at BED campus in Luton; planned and established Big Data architecture framework and design; set up working connections between Big Data server and REAMIT partners; provided access to Big Data server for all REAMIT partners; started preparatory work to handle data coming from pilot tests; defined detailed entities and processes needed for Big Data server repository; started the purchase process of unlimited licence (software) for the Big Data server. Levstone have advanced work on linking Mobile App, Sensors, Customer Client and Journey to develop a web-interface for client enrolment; developed a web page access, which is now available for initial client enrolment. The complete system for the REAMIT pilot tests will be developed by end of December 2021. Levstone deployed a working Mobile App on Playstore, which PPs can download and test:

<https://play.google.com/store/apps/details?id=com.levstone.mobility.trustedtransport> Levstone are in the process of preparing demonstrations of the Mobile App to get initial feedback from REAMIT partners and potential clients. Levstone has advanced work on developing the data link between the Big Data server and the Mobile App; and a self enrolment webpage the initial version of which is available for testing by partners. REAMIT dashboard: Whysor made various changes and added new functionalities to improve the dashboard for the REAMIT project. These include: updates of database on device and sensor databases to improve the stability of the platform; dashboard engine was updated to use the newest version; new widgets have been added to the dashboard, such as a static text widget for user input and a widget, which can filter data ranges for the entire dashboard; new modules for the dashboard have been developed, including using template dashboards which is particularly important for creating standardized dashboards (as in the case of Picnic where 20 sensors have been installed); reporting module of the dashboard has been improved to facilitate periodical report of sensors (automatic weekly update on e.g. the heaviest shocks in the Picnic pilot). Manual on launching the interface: Whysor delivered two parts for the manual on launching the interface and a document describing different elements of the REAMIT dashboard to be included in the manual. Whysor and SenX worked jointly on integrating WARP-10 (SenX) into the REAMIT dashboard (Whysor); developing a module to easily plug FLoWS, a time series analysis language, on SQL databases. This module is a Docker image including all the necessary dependencies to connect to SQL servers and run FLoWS scripts. This module still needs further improvements to be easily deployable on most SQL databases. MTU drafted the base framework, data requirements and data collection strategy for all pilot tests. This document would be a reference for analysis of data coming from all pilot tests. The document is based on input from all pilot test leads (Whysor, UoN, UU). It proposes a common understanding of data requirements and formulates data collection strategies. Based on input from partners, MTU proposed to capture the following data from pilot tests: food score index, wastage of ice, fuel consumption, and carbon emissions. Following the copy of the Raman spectra to a Warp 10 instance, SenX with support from UoN and I&R, started to explore the data from RS with the aim of creating an algorithm to assess the quality of chicken samples. Data has been cleaned of erroneous values and transformed to ease the visualisation and analysis. Some visualizations have been done to better understand the spectra and choose the best algorithms for the task. For the analysis, SenX now focuses on simple XAI (explainable artificial intelligence) models. This will allow SenX to give an explanation on why a sample is deemed of lower quality based only on its Raman spectrum.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Challenge 1. Due to delay in the pilot tests testing IoT sensor technologies, not much data has been generated and shared and thus only limited analysis have been possible. Since lack of data hinders progress in the implementation of WP T2, and in order to address this situation and to carry on with some work under WP T2, Levstone have captured data from a private home environment. This 'home data' (not real data from REAMIT IoT sensors and pilot tests) enabled Levstone to test the sensors and integrate them with the Mobile APP. In this way, Levstone managed to capture data over the past 4-6 months. This data will be used for the next stage of Levstone's work in the implementation of WP T2. Challenge 2. Data coming from different pilot tests will be different. That is why data needs to be examined and specified by all pilot test leads. This challenge needs to be addressed in order to build uniform environment for the Big Data database and repository. This needs to be discussed within REAMIT partnership at RSC meeting in July 2021. Challenge 3. Different formats of data coming from different REAMIT pilot tests

represent a challenge for Big Data Sever management. In this scenario, security and various processes running/installed by partners will need to be safely controlled. To be discussed at RSC meeting in July 2021. Challenge 4. Because of COVID-19, getting data from pilots has proven to be difficult, and analytics partners do not have real data to analyse. In this scenario, analytics partners (MTU, SenX) have focused on data coming from UoN only, in order to prepare for the transfer, sharing and analysis of future datasets. However, Raman dataset is very time consuming to produce, and it is small for machine learning algorithms. It will be therefore difficult to avoid common problems with small 'training-type' of datasets.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T2.4 Technology solutions developed	3 solutions will be developed: 1) a Big Data platform to detect loss of food quality and understand underlying factors, 2) a Smartphone APP to alert truck drivers, warehouse managers and owners of the produce of the potential quality issues with food in transport and make decisions on rerouting, 3) an integrated IoT sensor and big data solution which will help monitor food quality, make rapid decisions to reroute the food if there is deteriorating quality, and save food waste.	5.01. Number of efficient natural and material resources solutions implemented and tested	07.2022	3.00			behind schedule	
T2.5 Companies supported in technology development	In this WP, potential suppliers and consumers linked to REAMIT corridors can self-enrol to participate in tests and trials. Our network events will be used to run proactive campaign to include users subject to resource availability.	CO01. Number of enterprises receiving support	07.2021	5.00			behind schedule	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T2.4	Develop an interface to collect sensor data and send to cloud	07-2019	07-2021	behind schedule
Deliverable T2.4.1				
Deliverable title		Planned delivery month		Deliverable status
Creation and launch of interface		07-2021		behind schedule
Deliverable desription	An interface will be developed for each of the 5 pilot tests for collecting data from sensors and sending them to the cloud for use in a transnational Big Data infrastructure			
Description of progress achieved	REAMIT dashboard: Whysor made various changes to improve the dashboard for REAMIT, and added new functionalities. Database upgrades were performed on device, and sensor databases to improve the stability of the platform. These updates also contribute to a smoother user experience by improving load times. Dashboard engine was also updated to use the newest version. Various new widgets have been added to dashboard, such as a static text widget for user input and a widget, which can filter data ranges for the entire dashboard. There have been various developments on new modules for the dashboard, e.g. the ability to use template dashboards, which facilitates creating standardized dashboards. This is very useful for the Picnic pilot, so we do not have to build 20 dashboards by hand (1 for each sensor). Whysor has worked on reporting module of the dashboard.			

	Using this module, users can get periodical report of the sensors. This is useful to get an automatic weekly update on e.g. the biggest shocks in Picnic pilot. Whysor have created various scripts to incorporate the generated sensor data into Big Data server at BED. These include scripts to convert data into the right format, and to insert it into the Big Data server database. For Dutch pilot test with Picnic, Whysor have added support for shock data to dashboard, and developed decoder to process this data. For German pilot test with Weyers, Whysor modified firmware of VOC logger, and integrated these changes into platform.
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Evidence	
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Deliverable T2.4.2

Deliverable title	Planned delivery month	Deliverable status
User Manual on launching the interface	07-2021	behind schedule

Deliverable description	A user manual documenting the experience of creating and launching the interface and a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.
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Description of progress achieved	Whysor delivered two parts for the manual on launching the interface and a document describing different elements of the REAMIT dashboard to be included in the manual. Regarding deliverable 'Creation and launch of interface': Whysor and SenX worked jointly on integrating WARP-10 (SenX) into the REAMIT dashboard (Whysor). WARP-10 features were reviewed and assessed for REAMIT dashboard benefits. Integration of WARP-10 into the REAMIT dashboard is beneficiary for data-analytics, speed of the dashboard because we can collect data more efficiently (e.g. when filtering anomalies in shock detection). When we knew the functions of WARP-10 were beneficiary for REAMIT, SenX made a specific implementation of WARP-10 that fits Whysor's database architecture. The functionalities were tested to see whether they work as expected. After this, an intern at Whysor was assigned a task to integrate WARP-10 within Whysor's existing cloud architecture. It is a complex task because there are many different elements in Whysor's cloud architecture that need to be taken into account. Next step is to build a proof of concept within Whysor architecture.
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Evidence	
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Activity	Title	Start month	End month	Status
Activity T2.5	Development of Big Data infrastructure for analytics of sensor data and for rerouting to minimise food waste	01-2020	07-2022	behind schedule

Deliverable T2.5.1

Deliverable title	Planned delivery month	Deliverable status
A big data platform with capability to collect and store sensors data from all REAMIT corridors	07-2021	behind schedule

Deliverable description	This big data platform will be used as the hub for conducting business analytics, and will create an understanding of complex, transnational supply chains. This will be hosted in BED.
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Description of progress achieved	Setting up the Big Data server: BED, with support from Levstone and MTU, finalised work on setting up Big Data server at BED campus in Luton. The server was moved from temporary to permanent location at BED campus in Luton. An engineer installed and configured the server for different IP addresses assigned to BED. Development of Big Data infrastructure for analytics of sensor data and for rerouting to minimise food waste: BED, with support from MTU and, Levstone planned and established Big Data architecture framework and design; and set up working connections between Big Data server and REAMIT partners. Access to Big Data server: BED with support from Levstone and MTU planned and established Big Data architecture framework and design, and set up working connections between Big Data server and REAMIT partners (setting up compatible database client and VPN software, allowing to access data in Big Data server). This involved granting each REAMIT partner an individual instance on the server (working area & processing). Data analytics partners (BED, Levstone, MTU, Whysor) are currently evaluating what data is needed, who needs data, in what format data is needed, how partners can access processes (Create, Read, Update, Delete). Based on input from pilot test leads (Whysor, UoN, UU), MTU developed a document on data requirements for REAMIT. Whysor supported BED and UoN in sending pilot test data to the Big Data server. Building Big Data server repository: BED with support from Levstone, started preparatory work to handle data coming from pilot tests. This involved defining detailed entities and processes needed for Big Data server repository. Licence for Big Data server: BED started the purchase process of a licence for Big Data server. it seems that licence with unlimited access will be more appropriate for REAMIT. In the next months, BED will collect quotes from suppliers, select the best offer and purchase the licence.
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Evidence	
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Deliverable T2.5.2

Deliverable title	Planned delivery month	Deliverable status
Reports on Big Data platform performance	07-2022	not started

Deliverable description	Partners leading the activity will provide regular annual reports on the performance of the platform.
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Description of progress achieved				
Evidence				
Deliverable T2.5.3				
Deliverable title		Planned delivery month	Deliverable status	
A web-interface with self-enrol facility for enrolment of potential suppliers and consumers of food produce		07-2022	behind schedule	
Deliverable description	Potential suppliers and consumers can self-enrol after approval from the lead partner. This will be augmented using Google Maps data to identify potential destinations for rerouting food that would otherwise become waste.			
Description of progress achieved	A web-interface (also known as client enrolment) means marrying the Mobile App + Sensors + Customer Client + Journey. Client enrolment process needs to be standardised, which will require manual approval for compliance and business rules. Levstone have developed a web page access, which is now available for initial client enrolment. Levstone are now working with the above 4 key components (Mobile App + Sensors + Customer Client + Journey) to develop a complete system for the REAMIT pilot tests by end of December 2021.			
Evidence				
Deliverable T2.5.4				
Deliverable title		Planned delivery month	Deliverable status	
User manuals for the big data platform and the web-interface highlighted in the two deliverables above		07-2022	not started	
Deliverable description	The user manuals will document the experience of creating the big data platform and the web-interface and include a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.7	Development of smartphone APP for use by truck drivers and warehouses	01-2020	07-2021	not started
Deliverable T2.7.1				
Deliverable title		Planned delivery month	Deliverable status	
Launch of smartphone APP for linking to food owners, truck drivers and warehouses.		07-2021	behind schedule	
Deliverable description	This APP will be developed and tested to work in Android and Apple smartphones. This APP will also be used to link to all relevant stakeholders for long terms dissemination after getting GDPR consent from all parties.			
Description of progress achieved	Levstone have further improved the Mobile App functionality of processing data offline (no communication with the cloud or no data signal) and onlone. The Mobile App has been integrated with Low Energy Bluetooth sensors [by Maestro]. This required creation of interface between Levstone's Mobile Framework and IoT sensors using Bluetooth communication. Levstone deployed a working Mobile App on Playstore so that all partners can download it from Public facing Google Play Store and test it. The Mobile App can be downloaded from: https://play.google.com/store/apps/details?id=com.levstone.mobility.trustedtransport Levstone are in the process of preparing demonstrations of the Mobile App to get initial feedback from REAMIT partners and potential clients. Developing the data link between the Big Data server and the Mobile App is still work in progress. The self enrolment webpage is also work in progress as it depends on other activities to be finalised, but an initial version of web entry for testing is available.			
Evidence				
Deliverable T2.7.2				
Deliverable title		Planned delivery month	Deliverable status	
User manual for the use of the APP		07-2021	behind schedule	
Deliverable description	A user manual documenting the experience of creating and launching the APP and a step-by-step guide of good practice will be developed for the benefit of food owners, truck drivers and warehouse managers using the APP.			

Description of progress achieved		Levstone have started to develop Mobile App user manual, which shall be ready in autumn 2021.		
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.8	Delivering the integrated IoT/Big Data technology with capabilities on analytics and decision support to help reduce food waste in NWE.	01-2019	07-2022	not started
Deliverable T2.8.1				
Deliverable title		Planned delivery month		Deliverable status
Deployment of the integrated IoT/Big Data/analytics/Decision support technology		07-2022		not started
Deliverable description	This integrated technology will have the capability to bring together the outputs of sensor technology and analytics to provide decision support to owners of food at risk, truck drivers and warehouse managers via the Smartphone APP.			
Description of progress achieved				
Evidence				
Deliverable T2.8.2				
Deliverable title		Planned delivery month		Deliverable status
A user manual for the integrated IoT/Big Data/analytics/Decision support technology		07-2022		not started
Deliverable description	A user manual documenting the experience of creating and launching the integrated IoT/Big Data technology and a step-by-step guide of good practice will be developed for the benefit of future users willing to test REAMIT technologies.			
Description of progress achieved				
Evidence				

Work Package Business development of REAMIT technologies (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T3	Business development of REAMIT technologies	01-2020	07-2022	behind schedule	51 468.20	9.01

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

UU hosted two WP T3 online meetings (22/03/2021 and 13/05/2021) attended by UU, UCD, NTU and BED to discuss how to best prepare for the implementation of WP T3. Notes from meetings are in the REAMIT Project Handbook. UCD have developed the

general REAMIT questionnaire with the data required for the life cycle assessment. The questionnaire will be sent to companies in agri-food supply chains, mainly: food production companies (producing food from agricultural and animal origin), manufacturing companies, warehouse installations and transportation companies. The proposed approach was discussed in detail with REAMIT partners at RAC/WP/RSC meeting on 07/07/2021. UCD started to collect information regarding the amount of waste generated in different supply chains and the location in the supply chain where food becomes waste. UU have started to collect information about Technology Readiness Levels (TRL) and Market Readiness Levels (MRL) in the context of REAMIT technologies and approach. UU made a presentation on how to interpret TRL and MRL during the January 2021 RSC/RAC meetings.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Since implementation of pilot tests (WP T1) and Big Data analytics (WP T2) have been delayed due to COVID-19 pandemic, implementation of T3 has been inevitably delayed as well. Nevertheless, partners regularly met online to discuss how to best prepare for the implementation of WP T3.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T3.2 Companies introduced to REAMIT business case	The business cases will be used to encourage businesses to take up the REAMIT approach of combined technologies and turn them into marketable products. The output is the number of companies (not currently partners) benefitting from an in-depth introduction to the REAMIT approach.	CO29. Number of enterprises supported to introduce new to the firm products	07.2022	10.00			not started	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T3.1	Risk, technology and sustainability assessments of REAMIT technologies (led by UCD with support from NTU, UU and BED)	01-2021	07-2022	not started
Deliverable T3.1.1				
Deliverable title		Planned delivery month		Deliverable status
An assessment report of REAMIT technologies including a comprehensive systematic review (mapping) of the technical and business landscape in the fresh produce food chain.		09-2021		behind schedule
Deliverable description	The assessment report will be an internal document for partners, used as the basis for the business models development (AT3.4)			
Description of progress achieved	UCD started to collect information regarding the amount of waste generated in different supply chains and the location in the supply chain where food becomes waste.			
Evidence				
Deliverable T3.1.2				
Deliverable title		Planned delivery month		Deliverable status
Life Cycle Assessment (LCA) for REAMIT		07-2022		behind schedule
Deliverable description	The life cycle assessment system will allow environmental impact data to be integration with REAMIT IoT sensor and big data solutions.			
Description of progress achieved	UCD have developed the general REAMIT questionnaire with the data required for the life cycle assessment. Data collected through the questionnaire will be used for the in-depth environmental assessment of the REAMIT technologies. The questionnaire is divided into five steps to collect data from food production (from agricultural and animal origin), manufacturing, warehouse installations and transportation stages of the life cycle. This is considered as the general approach and will be refined to reflect the specific aspects of each of REAMIT pilot tests. The proposed approach will be discussed in detail at RSC+RAC+WP meeting with all pilot test leads on 07/07/2021. UCD also started to			

	collect information regarding the amount of waste generated in different supply chains and the location in the supply chain where food becomes waste in the context of the systematic review of the technical and business landscape of fresh products. The general LCA questionnaire has been customised for Yumchop and HMF. Excel files for both questionnaires are available at LP upon request.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.2	Future-proofing REAMIT Technologies (led by UCD with support from BED)	01-2020	07-2021	behind schedule
Deliverable T3.2.1				
Deliverable title		Planned delivery month		Deliverable status
Current and identified future REAMIT technology assessment report		07-2021		behind schedule
Deliverable description	The Future-proof report will be made available to SME technology developers with a view to identifying both the bottlenecks and potential solutions that can be used to drive future food quality analysis technology developments.			
Description of progress achieved	UU have started to collect information about Technology Readiness Levels (TRL) and Market Readiness Levels (MRL) in the context of REAMIT technologies and approach. UU made a presentation on how to interpret TRL and MRL during the January 2021 RSC/RAC meetings.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.3	Market assessment (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.3.1				
Deliverable title		Planned delivery month		Deliverable status
Market readiness report.		07-2022		not started
Deliverable description	A market analysis and foresight report identifying forthcoming opportunities for REAMIT technologies to be developed into marketable products			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.4	Development of business case (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.4.1				
Deliverable title		Planned delivery month		Deliverable status
Business prospectus		07-2022		not started
Deliverable description	An outward-facing document will be made available to SME technology developers, to potential buyers of technology approaches (large agri-business and logistics companies) and potential investors who can see the possibilities for product development.			
Description of progress achieved				
Evidence				
Deliverable T3.4.2				
Deliverable title		Planned delivery month		Deliverable status
Business case for achieving 40,000 tonnes of waste reduction		07-2022		not started
Deliverable description	The business case will use REAMIT data from continual monitoring of sensor data for			

	identifying/saving potential food waste and subsequent analytics to understand patterns of food waste in NWE with justification for saving 40,000 tonnes of food waste.
Description of progress achieved	
Evidence	

Work Package Communication (communication)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
C	Communication	01-2019	07-2022	behind schedule	62 101.44	13.19

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
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Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

NTU as the REAMIT Communication lead, pro-actively assisted PPs in communication activities. In particular: - NTU launched schedule for REAMIT video production plan for 2021. It detailed videos to be produced and published in 2021 on each pilot. All pilot leads actively engaged in production of videos. - Communication strategy has been updated with guidance for PPs to communicate more about REAMIT to local stakeholders. - Based on inputs from PPs, NTU developed 2 REAMIT newsletters (February and April 2021), posters and case studies, 2 accompanying pilot test videos; created a new tool 'Food Waste Stories' as interactive slide deck on REAMIT website, which aims to boost REAMIT online communication and reaching new businesses in NWE region. - Delivered 3 online trainings on social media for PPs (2 general and 1 customised). - Developed 1 template for PPs to use to communicate news about REAMIT, specific to their organisations, across their networks. - Based on input from PPs, NTU communicated through REAMIT social media channels (Twitter and LinkedIn) on REAMIT activities & progress. NTU tweets are regularly reposted by REAMIT PPs and other Interreg projects, Interreg Contact points for NL & Germany, and the main Interreg NWE Programme twitter page. There has been a boost in REAMIT LinkedIn communication and reshares due to NTU pushing PPs to reshare posts posted by NTU in their online networks. REAMIT LinkedIn views have increased by 83% in the last 6 months with an addition of 33% of unique visitors. This increased REAMIT's reach online to new audiences. REAMIT has been featured online on a number of external social media posts, particularly from NTU & other partner organisations. - NTU has launched new features on REAMIT website (where users can sign up to upcoming newsletters; 'News and Events'; a call-to-action button) - NTU proposed to develop a stand-alone website for REAMIT to boost REAMIT online presence and enhance communication. - Based on input from PPs, NTU developed new communication materials: 2 videos on 2 pilot tests, an interactive slide deck on food waste stories, new call to action on the REAMIT website, leading to a sign-up form. Whysor wrote 2 articles published in the local media; I&R and UoN developed 3 posters about REAMIT. Events attended by REAMIT staff where REAMIT was presented and promoted: 1) NTU attended Sustainable Food & Food Security Symposium held online at NTU. 2) BED made presentation for EuroOMA conference (July 2021). The outcome from this research was presented at invited lecture to a webinar series organised by Operations Research Society of India (ORSI), 12/06/2021. 3) RR presented REAMIT at Internet of Food Things Network, Lunch Talk, 22/01/2021. 4) KP attended Innovate UK 'Food Industry Innovation 2021' online event, 3-4/03/2021. 5) KP prepared presentation of REAMIT for "International Webinar on Business-Management 2021", 30/03/2021; theme was "Start a day with new business strategy". Presentation focused on aligning technology strategy in organisations for competitive advantage in businesses. 6) RR and KP attended NWE impact event 'Greener NWE networking event' organised by Interreg NWE Programme, 20/05/2021; RR facilitated round table session on achievements of REAMIT and synergies with other NWE projects focused on resource efficiency. 7) YD made online presentation of REAMIT at International Conference on Intelligent Agriculture (ICIA2021), Tianjin, China, 20-22/05/2021. 8) RR was keynote speaker at 2nd International Conference on Climate Change Impact on 25-26/05/2021, Kuala Lumpur, Malaysia. 9) RR and LM made presentation inspired by REAMIT (12/06/2021) on 'The application of IoT and Big Data technologies to reduce food waste in Europe' at Operations Research Society of India (ORSI). 10) MTU presented REAMIT at Enterprise Ireland Technology Gateways conference, 18/03/2021.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

A delay in the implementation of WP Communication is due to current travel restrictions caused by COVID-19 pandemic and lockdown. NTU were not able to travel to visit the sites of REAMIT pilot tests to take high quality video footage. Instead, videos had to be made based on materials sent to NTU by PPs via email. NTU resorted to remote working, and created animated REAMIT videos, recorded video and voiceovers remotely, based on files sent by PPs online.

Communication objectives - what is the progress toward the communication objectives as defined in the application form? The level of achievement should be cumulative; however the explanation should describe achievements in this reporting period

Project specific objectives	Level of achievement	Explanations
To raise awareness on the potential of sensor technology to monitor food quality in food supply chains. While there has been significant improvements in the capabilities of sensors and their connectivity over the internet, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains.	to a minor degree	REAMIT partners are continuously promoting the REAMIT approach and technology among agri-food companies. However, due to COVID-19 and lockdowns in NWE economies, all REAMIT promotion and communication activities are happening only online. Agri-food companies are still suffering from the pandemic, and many of them have confirmed that they needed to prioritise core business, not research, in order to bounce back and recover from the pandemic and the lock down. Nevertheless, REAMIT partners continue to engage in promotional activities and they present the REAMIT project and approach to companies and actors in agri-food supply chains, in their respective regions and countries. This has resulted in recruiting 3 new companies and 1 foundation which have committed to developing REAMIT pilot tests.
To convince agribusiness users using the results of pilot studies that food waste can be significantly reduced by adopting REAMIT's integrated IoT-Big Data-Analytics technology solution. REAMIT will conduct regular networking events with agribusiness users, popularise the benefits of using these new technologies, and showcase demonstrations to influence their attitude.	to a minor degree	Because of COVID-19, getting data from pilot tests has proven to be difficult, and in consequence the analytics partners do not have real data to do data analytics. Thus, they have not been able yet to demonstrate capabilities of IoT sensors and Big Data technology in monitoring and controlling conditions in which food is transported along food supply chains, which would be of interest to agri-food companies. REAMIT holds regular networking events, however we are not able to present the results of our work.
To raise awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. As highlighted earlier, while there has been significant improvements in the capabilities of sensors, their connectivity over the internet, and the potential of conducting data analytics, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains, collecting huge volumes of data on food quality across the NWE region to identify patterns of food wastage, most frequent causes of food waste, and, likely actions that would have maximum impact in reducing food waste. Policy briefs will be developed to provide action oriented solutions that can be favourably considered by policy makers in NWE.	to a minor degree	Because of COVID-19, getting data from pilot tests has proven to be difficult, and in consequence the analytics partners do not have real data to do data analytics. Thus, they have not been able yet to demonstrate capabilities of IoT sensors and Big Data technology in monitoring and controlling conditions in which food is transported along food supply chains, which would be of interest to agri-food companies.
Using the analytics algorithms and decision support, REAMIT will identify patterns on food waste in NWE and assess the most frequent causes of food wastage along supply chains. By regularly publishing this information through blogs, social media, project outputs and policy briefs, REAMIT will make efforts to change behaviour of relevant stakeholders. For example, targeted feedback of the results to owners of food, decision support on redistribution of food to avoid food becoming waster, etc. will help change behaviour of owners of food and members of food supply chains at micro levels. Policy briefings to suggest best ways of avoiding food waste and regulatory suggestions will help reduce food waste in the region at a macro level.	not achieved	Due to delay in the implementation of the project, we were not able to influence behaviour of actors in agri food supply chains yet.
Based on the risk and sustainability assessment,	not achieved	

the project aims to convince agribusiness users of the value of REAMIT's technologies in reducing food waste and increase profitability of their businesses. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help influence their attitude.		
Understand the risks involved in the technologies, to help design future-proof technologies for food waste reduction and also the sustainability issues. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help increase knowledge about sustainability aspects of technologies, knowledge and benefits of saving food waste, and policy oriented activities.	not achieved	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity C.1	Start-up activities including communication strategy	01-2019	01-2022	behind schedule
Deliverable C.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Communication strategy document		01-2022	behind schedule	
Deliverable description	A communication strategy approved by Steering Committee (RSC) including guidelines on local, regional and inter-regional strategies will be delivered in the first quarter, and reviewed annually. It will outline approach to reach all target groups.			
Description of progress achieved	REAMIT Communication Strategy document has been updated with (i) information on new approaches to communication and (ii) events attended by REAMIT partners.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.2	Digital activities	03-2019	07-2022	behind schedule
Deliverable C.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Website launch		03-2019	behind schedule	
Deliverable description	In line with communication rules specified in Interreg documents, the REAMIT webspace will be developed within the Interreg NWE site. It will include updated information on benefit to target groups, operational & technical specifications of IoT/ Big Data			
Description of progress achieved	NTU proposed to have a stand-alone REAMIT website and prepared justification for this idea: more creative freedom and variety in content presented resulting in showcasing the REAMIT project's results via interactive audio-visuals to reach wider audience; the use of auto-play animated videos playing at the head of a home page, to facilitate alternating layouts compared with the standard Interreg NWE project site, to present innovation in new and modern technologies. Since REAMIT uses IoT, Big data, cloud computing, and data analysis as main tools to reduce food waste in NWE region, and through this technology REAMIT project interacts with many other servers and APPS of end users, it is vital to have one, solid platform where all partners and end users can share information. The REAMIT smartphone app and access to the cloud server will be integrated through the REAMIT website. All this automation will be possible with REAMIT new stand alone website. Moreover, the new website will facilitate attracting specific target audiences, offer sign up forms directly embedded into the site with a fully integrated online marketing platform. This will help REAMIT Communication Manager effectively manage all enquiries from key stakeholders, and registering potential pilot test partners. A new, stand alone REAMIT website will facilitate more online engagement and interaction with pilot test end-users through allowing them to have a designated 'sign in' space on the website, linking website with the Big Data server, offering PPs, pilot test partners and end users to have a designated portal to access their data, which we wouldn't otherwise be able to access through Interreg's current site. Since all data are			

	encrypted and protected by end-user devices, the new stand alone website can give confidence to REAMIT end users. NTU have launched a new feature on the current REAMIT website, where users can sign up to upcoming newsletters using a call to action button.			
Evidence				
Deliverable C.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Social media		03-2019	proceeding according to work plan	
Deliverable desription	Social media - twitter, Whatsapp, and Facebook will be added to facilitate more active project communication. This will create opportunity for discussion on any technological development in IoT and operational success of food waste management.			
Description of progress achieved	Partners actively communicated about REAMIT project through social media channels (Twitter, Linkedin). Visits in REAMIT social media sites (Twitter and Linkedin) increased by at least 80% in the last 6 months.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.3	Promotional material	01-2019	07-2022	behind schedule
Deliverable C.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project banners, posters and flyers		07-2021	behind schedule	
Deliverable desription	Banners and posters about the project will be developed in 4 languages. Banners will be kept in partners' workplaces and also in event venues to create visibility of the project. Posters will be used to promote the project in all major events conducted			
Description of progress achieved	Based on input from PPs, NTU developed new communication materials: 2 new videos and posters (for WD Meats and Picnic); added to the REAMIT website a new, interactive slide deck of Food Waste Stories; added new website features including a call to action. UoN advanced work on two posters - one with IGRECA and one on the REAMIT project in French language. I&R developed the REAMIT poster for the 30th Interreg anniversary in Pays de La Loire region. Whysor wrote an article for the newsletter of Kiempunt Limburg and an article on the Get Whysor dashboard. NTU, based on input from PPs, have developed two REAMIT Newsletters (February 2021 and April 2021).			
Evidence				
Deliverable C.3.2				
Deliverable title		Planned delivery month	Deliverable status	
Policy briefs		01-2022	not started	
Deliverable desription	Based on the analytics of sensor data, policy oriented briefs will be developed for each country on the best ways to reduce food waste.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity C.4	Public Event(s)	01-2019	07-2022	proceeding according to work plan
Deliverable C.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Reports on REAMIT Networking events		12-2021	proceeding according to work plan	
Deliverable desription	Three REAMIT networking events will be conducted (1 annually) to reach all target groups in all five countries. The reports will be widely published to reach more more members of target groups using traditional and electronic channels.			
Description of progress achieved	There have been no REAMIT networking events in the past semster. The next one is planned in November 2021.			
Evidence				

Activity	Title	Start month	End month	Status
Activity C.5	Publication(s)	01-2019	07-2022	behind schedule
Deliverable C.5.1				
Deliverable title		Planned delivery month	Deliverable status	
Journal article		07-2022	behind schedule	
Deliverable description	Scientific publication will target high-level academic journal. At least 2 articles will be produced from the project results			
Description of progress achieved	Partners at NTU, UCD, MTU and UU have started to develop pilot test case studies for WD Meats, Picnic, Routhiau, Yumchop and HMF. Whysor have been actively involved in creating a case study around pilot test with Picnic. BED research team has developed a book chapter “Discovering potentials of Artificial Intelligence and Analytics in fighting against food waste”; Full paper has been submitted to the Logistics and Research Network 2021 conference; slides were developed and used for the webinar series.			
Evidence				

Project report tables

Project report expenditure summary

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Total co-financing	2 955 102.36	1 410 790.28	30 000.00	1 020 808.64	1 020 808.64	407 940.63	406 535.04	1 405.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Partner contribution	1 970 068.25	940 527.14	20 000.00	680 539.27	680 539.27	271 960.49	271 023.44	937.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	2 351 317.42	50 000.00	1 701 347.91	1 701 347.91	679 901.12	677 558.48	2 342.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per partner

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
BED	1 063 530.07	ERDF	508 493.10	50 000.00	428 227.01	428 227.01	130 266.09	130 266.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I&R	578 032.50	ERDF	170 685.41	0.00	128 581.36	128 581.36	35 082.04	35 221.71	-139.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

UCD	426 788.05	ERDF	129 816.85	0.00	0.00	0.00	129 816.85	127 596.92	2 219.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UoN	544 862.80	ERDF	366 148.83	0.00	302 975.97	302 975.97	62 920.07	62 919.82	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levstone	334 112.50	ERDF	268 024.03	0.00	216 471.89	216 471.89	51 552.14	51 552.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTU	454 041.89	ERDF	214 819.99	0.00	164 617.93	164 617.93	49 480.26	49 480.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Whysor	296 579.25	ERDF	239 119.61	0.00	154 741.99	154 741.99	84 377.62	84 377.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ITT	191 430.00	ERDF	69 377.51	0.00	15 052.36	15 052.36	54 480.16	54 314.72	165.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SenX	276 022.10	ERDF	147 546.69	0.00	119 311.22	119 311.22	26 562.05	26 465.36	96.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UU	759 771.45	ERDF	237 285.40	0.00	171 368.18	171 368.18	55 363.84	55 363.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DNI	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61		2 351 317.42	50 000.00	1 701 347.91	1 701 347.91	679 901.12	677 558.48	2 342.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per budgetline

Budgetline	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Staff costs	3 397 294.45	1 891 800.67	0.00	1 319 420.06	1 319 420.06	556 134.48	555 919.59	214.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office and administration	509 593.80	283 769.69	0.00	197 912.77	197 912.77	83 420.02	83 387.78	32.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel and accommodation	238 386.42	36 057.71	0.00	30 306.99	30 306.99	5 284.86	3 189.35	2 095.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External expertise and services	420 942.13	58 582.20	50 000.00	96 625.64	96 625.64	11 037.06	11 037.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	358 953.81	81 107.15	0.00	57 082.45	57 082.45	24 024.70	24 024.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Infrastructure and works	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4 925 170.61	2 351 317.42	50 000.00	1 701 347.91	1 701 347.91	679 901.12	677 558.48	2 342.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	2 351 317.42	50 000.00	1 701 347.91	1 701 347.91	679 901.12	677 558.48	2 342.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage

Workpackage	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Wp P	50 000.00	0.00	50 000.00	50 000.00	50 000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	382 332.76	121 158.97	0.00	77 466.40	77 466.40	43 447.17	43 447.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp M	735 506.69	612 226.89	0.00	411 185.61	411 185.61	199 591.07	197 327.56	2 263.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T1	1 682 887.56	830 318.05	0.00	591 291.89	591 291.89	227 095.45	227 080.18	15.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T2	1 101 982.93	348 840.59	0.00	252 963.46	252 963.46	96 190.24	96 133.93	56.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T3	487 100.03	142 176.15	0.00	87 542.12	87 542.12	51 468.20	51 468.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp C	485 360.64	296 596.77	0.00	230 898.43	230 898.43	62 108.99	62 101.44	7.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4 925 170.61	2 351 317.42	50 000.00	1 701 347.91	1 701 347.91	679 901.12	677 558.48	2 342.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	2 351 317.42	50 000.00	1 701 347.91	1 701 347.91	679 901.12	677 558.48	2 342.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage per budgetline (total values)

Wp number /		Office and	Travel and	External expertise		Infrastructure and			Total eligible
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budgetline	Staff costs	administration	accommodation	and services	Equipment	works	Total	Net Revenue	expenditure
Wp P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	37 780.17	5 667.00	0.00	0.00	0.00	0.00	43 447.17	0.00	43 447.17
Wp M	159 142.13	23 871.31	2 546.67	8 848.00	2 919.45	0.00	197 327.56	0.00	197 327.56
Wp T1	178 678.65	26 801.75	387.20	1 527.55	19 685.03	0.00	227 080.18	0.00	227 080.18
Wp T2	82 183.09	12 327.43	0.00	203.19	1 420.22	0.00	96 133.93	0.00	96 133.93
Wp T3	44 532.82	6 679.90	255.48	0.00	0.00	0.00	51 468.20	0.00	51 468.20
Wp C	53 602.73	8 040.39	0.00	458.32	0.00	0.00	62 101.44	0.00	62 101.44
Total	555 919.59	83 387.78	3 189.35	11 037.06	24 024.70	0.00	677 558.48	0.00	677 558.48

Project report expenditure - invoices outside of the eu part of the programme area

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)			Total amount declared to flc	Total amount certified by flc	Total amount included in project report - declared to js
		Declared to flc	Reported to js	Confirmed by ca			
Total co-financing	2 955 102.36	905.40	892.79	892.79	0.00	0.00	0.00
Partner contribution	1 970 068.25	603.61	595.20	595.20	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 509.01	1 487.99	1 487.99	0.00	0.00	0.00

Project expenditure spending profile

Period	Period start date	Period end date	Reporting date	Total eligible budget per period	Actual spending	Forecast from the previous project report (2.2)
Period 0	10.01.2019	10.01.2019	09.07.2022	50 000.00	50 000.00	598 042.50
Period 1	10.01.2019	31.12.2019	31.12.2019	1 284 257.14	605 184.04	
Period 2	01.01.2020	31.12.2020	31.12.2020	1 645 380.17	1 046 163.87	
Period 3	01.01.2021	31.12.2021	31.12.2021	1 388 335.23	677 558.48	
Period 4	01.01.2022	09.07.2022	09.07.2022	557 198.07	0.00	
Total	N/a	N/a	N/a	4 925 170.61	2 378 906.39	

Project report expenditure per partner (fund amounts)

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)						
	638		305		256	256											

BED	118.04	ERDF	095.84	30 000.00	936.19	936.19	78 159.65	78 159.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I&R	346 819.50	ERDF	102 411.22	0.00	77 148.81	77 148.81	21 049.22	21 133.02	-83.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UCD	256 072.83	ERDF	77 890.10	0.00	0.00	0.00	77 890.10	76 558.14	1 331.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UoN	326 917.68	ERDF	219 689.27	0.00	181 785.57	181 785.57	37 752.04	37 751.89	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levstone	200 467.50	ERDF	160 814.40	0.00	129 883.12	129 883.12	30 931.28	30 931.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTU	272 425.13	ERDF	128 891.98	0.00	98 770.75	98 770.75	29 688.15	29 688.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Whysor	177 947.55	ERDF	143 471.75	0.00	92 845.18	92 845.18	50 626.57	50 626.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ITT	114 858.00	ERDF	41 626.50	0.00	9 031.41	9 031.41	32 688.09	32 588.83	99.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SenX	165 613.26	ERDF	88 528.00	0.00	71 586.72	71 586.72	15 937.23	15 879.21	58.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UU	455 862.87	ERDF	142 371.22	0.00	102 820.89	102 820.89	33 218.30	33 218.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DNI	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	2 955 102.36		1 410 790.28	30 000.00	1 020 808.64	1 020 808.64	407 940.63	406 535.04	1 405.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project progress report NWE831 REAMIT

Project progress report identification

Title	Improving Resource Efficiency of Agribusiness supply chains by Minimising waste using Big Data and Internet of Things sensors
Acronym	REAMIT
Number	NWE831
Start date	01-07-2021
End date	31-12-2021
Priority	Priority Axis 3 Resource and materials efficiency
Specific objective	
Lead partner	
Contact person	
Reporting period	Period 3 : 01-01-2021 - 31-12-2021

Highlights of main achievements

<p>WP T1: 10 pilot tests running with 9 agri-food companies sending data on temperature and humidity; 4 pilot tests in pipe line; dashboard for Yumchop established and sending weekly reports.</p> <p>WP T2: Big Data server established at BED and accessed by all PPs; analysis performed on big data from pilot tests with Yumchop, HMF, WD Meats, Picnic, Biogros; MTU drafted Data Requirement and Collection Strategy from REAMIT pilot tests.</p> <p>WP T3: UCD developed general questionnaire with data required for LCA for in-depth environmental assessment of REAMIT technologies; two pilot-specific LCA questionnaires were developed for HMF and Yumchop; both companies approached for data for both LCA cases; 5 online meetings of WP T3 organised by UU.</p> <p>WP M: 2 new researchers and 1 intern joined REAMIT; REAMIT PI moved to UEssex; BED involved UEssex as sub-partner. BED organised 5th bi-annual meeting of RAC/WP/RSC hosted by NTU; developed and circulated minutes to PPs; developed and submitted to JS 5th progress report; transferred due amounts to PPs; prepared special project progress report 3.3; coordinated implementation of all WPs (over 30 online meetings); re-developed budget for REAMIT 12-months extension re-submitted to JS; updated REAMIT risk log and PH.</p> <p>WP LT: UCD hosted online 3rd REAMIT Symposium; PPs approached over 20 new companies and 7 new target audiences in NWE to promote REAMIT approach.</p> <p>WP C: NTU updated REAMIT CS; launched new website; published 3 newsletters; supported PPs in communication through local and online social media channels; supported UCD with developing communication materials for 3rd Symposium; developed storyboard; advanced work on new videos and 2 case studies (Yumchop and HMF). PPs presented REAMIT at 11 external and internal events; developed 2 posters and 1 leaflet for pilot test with Raman Spectroscopy (UoN), CyberBar (UCD), 3rd REAMIT Symposium (UCD). BED and NTU advanced work on 3 publications.</p>
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Project specific objectives

Project specific objectives	Level of achievement	Explanations
1 - To pilot test sensor technologies in agri-food supply chains in the five partner countries	to a large degree	9 pilot test companies have been engaged in 10 REAMIT technology demonstrations / pilot tests (WP T1). 6 pilot tests are in advanced stage as they are sending data for analysis. We hope that in the coming months we will receive enough sensor data from these pilot tests to progress with data analytics (WP T2). Out of the 10 pilot tests that we are working on, we hope that at least 5 will be completed and will provide satisfactory results to effectively support agri-food companies in reducing food waste.
2 - To develop Big Data infrastructure for analytics and decision support to reduce food waste	to a minor degree	Data analysis (WP T2) has started in Dec-2021, as first pilot tests started to send data. We hope that in the coming months, we will receive more data from the remaining pilot tests and will carry out data analytics of all Big Data received from IoT sensors installed in pilot test partner companies. Based on obtained results, we will be able to raise awareness on the potential of combining sensor technology with big data analytics.
3 - To bring the REAMIT combination of technologies closer to market	not achieved	

Project main outputs achievement

Programme output indicators	Sum of output indicator targets	Sum of achieved output indicators so far	Project main output indicator number	Project main output title	Project main output quantification target	Planned delivery	Achieved so far	Level of achievement
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	22.00	T1.1.1	Working prototypes of sensor technologies based on pilot tests with agribusiness users	5.00	10-06-2021	17.00	proceeding according to work plan
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	22.00	T2.4.1	Technology solutions developed	3.00	10-07-2022	5.00	proceeding according to work plan
CO01. Number of enterprises receiving support	10.00	21.00	T1.2.2	Agribusiness companies supported in food waste reduction pilots	5.00	10-06-2021	16.00	proceeding according to work plan
CO01. Number of enterprises receiving support	10.00	21.00	T2.5.2	Companies supported in technology development	5.00	10-07-2021	5.00	proceeding according to work plan
CO29. Number of enterprises supported to introduce new to the firm products	10.00	10.00	T3.2.1	Companies introduced to REAMIT business case	10.00	10-07-2022	10.00	proceeding according to work plan

Target groups reached

Target groups	Target value	Target groups reached (prev. periods)	Target groups reached current period	Source of verification	Description of target group involvement	Target groups reached so far (%)
local public authority	10.00	1.00	0.00			10.00
regional public authority	5.00	3.00	1.00	Minutes from RAC/WP/RSC meeting in July 2021; email exchanges; meetings with Blue Skies (UK).	SEMLEP: KP and RR from BED approached Richard Cook - Business Development Manager at South East Midlands Local Enterprise Partnership (SEMLEP). Several meetings were held with R. Cook in the past semester, who connected BED with agri food companies in SEMLEP region. In consequence, BED has started dialogue with Blue Skies (producer of fresh fruit snacks) on developing a new pilot test in REAMIT.	80.00
national public authority	5.00	2.00	1.00		MTU presented and promoted REAMIT at events organised by Enterprise Ireland (https://www.enterprise-ireland.com/en/).	60.00

interest groups including NGOs	5.00	24.00	1.00		MTU approached several NGOs engaged in minimising food waste and donating to charity. MTU approached the charity FoodCloud (https://food.cloud/) and Circular Bioeconomy Research Group (https://cbcs.wie/) to explore the opportunities for implementing REAMIT technologies in their work and through pilot tests. MTU conducted meetings with these organisations and pitched the REAMIT idea. The co-founder of FoodCloud has expressed interest in exploring it further and discussing possibilities of engaging in REAMIT pilot tests in 2022.	500.00
higher education and research	20.00	28.00	2.00		RR (BED) promoted REAMIT at Amity University, India; Birla Institute of Technology and Science, India; Iranian Data Envelopment Analysis Society. MTU initiated contacts with Meat Technology Ireland (http://www.mti.ie/) to pitch the REAMIT idea and explored pilot test possibilities.	150.00
enterprise, excluding SME	10.00	36.00	0.00			360.00
SME	10.00	17.00	1.00	Email exchanges; online meetings attended by BED, Whysor and Blue Skies teams.	BED approached Blue Skies, UK-based company producing fresh fruit snacks, imported from overseas territories (Brazil, Egypt, South Africa, etc.) and invited it to participate in REAMIT technology demonstrations.	180.00
business support organisation	5.00	9.00	0.00			180.00
sectoral agency	5.00	8.00	1.00		KP (BED) presented the REAMIT project at an online meeting of Trace & Trust network (Germany) on 13/12/2021. As a follow up, a bilateral meeting between BED, UEssex and a Dutch block chain company took place on 17/12/2021 to explore possibilities for cooperation. Also, it is likely that as a follow up, BED will become a member of Trace & Trust (international) Network facilitated by the Ministry in Germany.	180.00

Problems and solutions found

Due to COVID-19 and new restrictions since Nov-2021, all meetings of REAMIT consortium took place online. This affected networking and opportunities to promote REAMIT face-to-face to relevant stakeholders. REAMIT consortium has not met for nearly 2 years and all work and communication took place online. PPs got used to 'meeting online' and trying to work out challenges by 'screen sharing' although this affected effectiveness of work.

Since 20/12/2021, NL have been in full lockdown until mid-January 2022. Several team members across REAMIT were infected by COVID-19 and on sick leave. This delayed their work.

Whysor experienced shortage of sensors in market, caused by chip shortage due to pandemic. PPs were unable to purchase sensors from European suppliers and looked for sensors from overseas suppliers (South Africa). This delayed implementation of pilot tests. Suppliers often do not have equipment required by REAMIT or equipment it will be in stock in some months.

Pilot tests with WD Meats were delayed as winter was especially busy and many people were ill in factory. The qPCR machine at UU microbacteria lab broke down. This caused delay in ordering Mastermix kit as the kit depends on type of machine in lab. Original approach for Musgrave using Android mobile phone and bluetooth sensors was deemed unsuitable due to large overhead required in making an Android app, and wanting to reduce likelihood of user error.

Because of delay in implementation of REAMIT pilot tests, little data have been generated by pilot tests. Hence it was possible to start data analysis only in Dec-2021. This causes delay in developing policy briefs based on REAMIT.

Pilot test companies are reluctant to provide information for LCA due to level of detail required. Thus, it may be challenging for UCD to perform LCA for REAMIT to the extent foreseen in AF.

Horizontal Principles

Horizontal principles	Contribution in this reporting period	Description of the contribution
Equal opportunity and non-discrimination	as planned	Equal opportunities and non-discrimination: Every effort has been made in REAMIT project to promote equal opportunities and non-discrimination. The REAMIT consortium consists of a mix of men and women from different countries and cultures, and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (RF at BED) and men (Research Associate at UU and intern at Whysor). They are from the EU and outside of the EU (Iran).
Equality between men and women	as planned	Equality between men and women: Every effort has been made in the REAMIT project to promote equality between men and women. The REAMIT consortium consists of a mix of men and women and promotes equal participation wherever possible.
Sustainable development (environment)	as planned	REAMIT consortium will document the food waste saved and the corresponding impact on savings in carbon emissions, which will then be linked to sustainable development.

Fully implemented

Implemented (to be ticked at the last reporting period, only when the project has fully been achieved):	No
Implemented on:	

Reporting per WP overview

Start	End	Type	Title
Jan.2019	Jan.2019	preparation	Preparation
Jan.2019	Jul.2022	implementation	Long term
Jan.2019	Jul.2022	management	Project management
Mär.2019	Jun.2021	implementation	Adapting and pilot testing sensor technologies in agri-food supply chains
Jan.2019	Jul.2022	implementation	Big Data integration and applications to reduce food wastage.
Jan.2020	Jul.2022	implementation	Business development of REAMIT technologies
Jan.2019	Jul.2022	communication	Communication

Work Package Preparation (preparation)

WP no	Title	Start month	End month	WP Status
P	Preparation	01-2019	01-2019	completed

Partner's involvement

Abbreviation	Name
I&R	Images & Réseaux
Levstone	Levstone Ltd.
UoN	Université de Nantes
UCD	National University of Ireland, Dublin, University College Dublin
SenX	SenX
BED	University of Bedfordshire (Lead Partner)
Whysor	Whysor
ITT	Institute of Technology in Tralee
NTU	Nottingham Trent University

Summary description of activities carried out and contribution of each partner

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Work Package Long term (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
LT	Long term	01-2019	07-2022	behind schedule	44 861.29	18.92

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

On 8-9/12/2021, UCD hosted the 3rd REAMIT Symposium "Food Waste and Sustainable Development: Problems, Solutions and Perspectives for the Future". The event was delivered online only. The REAMIT partners and external speakers with broad expertise in the area of sustainable food systems presented insights on the topic, divided into three main sustainability sections: social, environmental and economic. 124 participants attended the Symposium. NTU, MTU and UCD have advanced 2 business case studies based on REAMIT's pilot tests with Yumchop and Human Milk Foundation, UK. They will be used as long term artefacts for REAMIT project. This involved attending weekly and monthly meetings facilitated by NTU, developing both case studies, researching the processes and businesses of both companies through meetings with the company staff, reviewing literature, presentations, videos shared by companies and publicly available information on the web, to identify and suggest use cases for intervention of REAMIT technologies for enhancing processes of both companies. Based on this research, case study team prepared a list of questions and a 'Question Bank' document containing questions for the partnering companies for the case study and shared it with PPs through REAMIT SharePoint. MTU also prepared a document on 'Benefits of Case Studies for Companies', to attract more companies to participate in REAMIT case studies. All materials related to case study development are shared in REAMIT SharePoint. Drafts of both case study documents have not been attached in eMS (as they are still work in progress), however they can be obtained from NTU upon request. BED engaged with the REAMIT officer at JS and started to look at EU food waste policy, in view of developing policy briefs based on REAMIT's approach, experience and technology. PPs continue to contact new companies for new REAMIT pilot tests: UoN approached local supermarkets (FR); thanks to Valorial, BED reached out to new target groups in Germany involved in Trace & Trust Network; MTU and UCD approached several agri-food companies in IE.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Because of a delay in the implementation of the REAMIT project, little data have been generated by the pilot tests so far. Hence it is only now possible to analyse the data and based on it develop in the future briefings for policy, governance and sector actors, about the approach and technology proposed by REAMIT. The third REAMIT Symposium was originally planned to be held online, then hybrid mode was considered but later changed to online only mode. This limited our possibilities of networking and promoting the REAMIT project. Costs were incurred by some partners (i.e. Whysor) in order to travel to attend the Symposium, which eventually were non-refundable.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity LT.1	Creating a self-sustaining REAMIT Network	01-2019	07-2022	behind schedule
Deliverable LT.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Network prospectus		09-2020	behind schedule	
Deliverable description	BED as coordinator will engage partners to develop a network prospectus, setting out the principles by which the network will operate, and ensure financial sustainability based on a low-cost model of voluntary contributions from partners and members.			
Description of progress achieved	MTU approached Circular Bioeconomy Research Group, FoodCloud, Enterprise Ireland and Meat Technology Ireland for exploring pilot tests opportunities. MTU held meetings with these companies to pitch REAMIT idea and received positive interest for further discussions from some of them. MTU are looking forward to further meetings with these organisations in 2022 for exploring collaboration possibilities. BED approached Trace & Trust Network in Germany and Blue Skies SME in UK and invited them to test REAMIT approach and technology.			
Evidence				
Deliverable LT.1.2				
Deliverable title		Planned delivery month	Deliverable status	
REAMIT networking events: 2019, 20 and 21 including invited lectures from experts		07-2021	proceeding according to work plan	
Deliverable description	Partners will bring together agribusiness & technology SMEs from REAMIT countries for a 1-day annual conference: (i) to ensure that REAMIT technologies keep pace with technology developments; and (ii) to maximize achievement of REAMIT's objectives.			

Description of progress achieved		On 8-9/12/2021, UCD Dublin hosted 3rd REAMIT Symposium in close collaboration with BED and NTU, and with support from all PPs. The theme of the symposium was “Food Waste and Sustainable Development: Problems, Solutions and Perspectives for the Future”. Symposium provided opportunities for food producers, food supply chain companies (processing and logistics), public authorities, academics, food charities, digital technology providers and consumer groups to explore the problem of food waste and the solutions to achieve more sustainable food systems by reducing food waste. Symposium also showcased the achievements of REAMIT so far and highlighted the associated impact on three key sustainability areas: social, environmental and economic. Symposium explored synergies between REAMIT and other initiatives (in IE, EU, and beyond) aiming to address food waste problem with the use IoT and Big Data technologies to identify opportunities for future collaborations. REAMIT partners and external speakers with broad expertise in the area of sustainable food systems, presented insights on the topic, divided into three main sustainability sections. Symposium run as as combination of presentations and round table discussions. 310 persons registered, and 124 eventually attended. UCD developed the Symposium's Agenda and sent it to Reamit partners; Created an Eventbrite link for registration; Designed and sent a formal email invitation for the speakers and roundtable facilitators; Designed and promoted a formal email invitation for the general audience using the university's channels and mailing lists; Created the event poster, highlighting the 3 themes: Economic, Environment and Social; With combined effort, UCD and NTU created promotional materials for Reamit and UCD website, to attract local stakeholders and academics, and the new hashtag for use on social media #REAMITSymposium2021; Created certificates of participation for all attendees.		
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.2	Regularly updating framework for measuring the impact of REAMIT technologies on food waste	01-2019	07-2022	behind schedule
Deliverable LT.2.1				
Deliverable title		Planned delivery month		Deliverable status
The agreed framework for measuring the impact of REAMIT technologies on food waste		12-2019		behind schedule
Deliverable desription	The framework for measuring the impact of REAMIT technologies on food waste will be agreed at the first networking event in December 2019.			
Description of progress achieved	No progress has been made in this reporting period.			
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.3	Ensuring policy impact	01-2019	07-2022	not started
Deliverable LT.3.1				
Deliverable title		Planned delivery month		Deliverable status
Policy briefings		03-2022		not started
Deliverable desription	Meetings or briefing papers issued jointly from the partnership to national or EU-level policy formers to engage in a dialogue over the fit of REAMIT technologies to national and EU food waste reduction targets and policies.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.4	Roll-out to other sectors	01-2019	07-2022	not started
Deliverable LT.4.1				
Deliverable title		Planned delivery month		Deliverable status
Cross-sector briefings		06-2022		not started

Deliverable description	REAMIT partners will identify and engage with industry bodies or policy organisations from other sectors where REAMIT technologies may have an application (e.g. EU Medicines Agency, EU Federation of Pharma industries, national health regulators)
Description of progress achieved	
Evidence	

Work Package Project management (management)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
M	Project management	01-2019	07-2022	behind schedule	70 868.73	50.39

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
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Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Dr Sahar Ahmadzadeh joined REAMIT team at BED as research fellow responsible for the implementation of WP T2; Dr James Gillespie has replaced Dr William Duffy at UU and took over responsibilities related to UU's role in the implementation of REAMIT project. Intern at Whysor was assigned to integrate WARP-10 within Whysor's existing cloud architecture. On 1/11/2021, Principal Investigator of REAMIT, Prof Ram Ramanathan, started a new role at the University of Essex (UEssex), UK. With the support of REAMIT officer at JS of Interreg NWE Programme, BED and UEssex initiated the process of formally involving UEssex as a sub-partner of BED. With support from NTU, on 7-8/07/2021, BED organised bi-annual online meetings of RAC/WP/RSC hosted by NTU. With support from UCD, MTU, UU and NTU, BED has developed minutes of RAC/WP/RSC in July 2021 and circulated it to PPs. Based on input from PPs, BED developed 5th REAMIT progress report and submitted it to JS in Sept 2021. In January 2022, finance at BED actioned transfers of due amounts from LP to PPs. Based on inputs from UCD, Whysor and NTU, BED prepared special project progress report and claim 3.3, as PPs from NTU, Whysor and UCD have been excluded from project progress report and claim 3.1 by mistake. BED's coordination of WPs has been limited as due to lockdown and restrictions on travels, there has been some progress in WP implementation, but slower than expected. BED was in regular contact with leads of all WPs (I&R, UU, NTU); supported I&R in organising WPT1 monthly meetings; UU in organising WP T3 meetings; and NTU in organising case study meetings. BED held 3 online monthly meetings of REAMIT team at BED and UEssex; 10 bi-weekly only meetings of REAMIT sub-group. BED with assistance from MTU and Levstone, set up the Big Data server; supported NTU with developing communication materials (newsletters, website updates). Following new instructions from JS, based on input from PPs, BED re-developed a budget for the REAMIT project 12-months extension and in Nov-2021 re-submitted it to JS. With support from UU, BED started preparations for RAC/RWP/RSC meeting hosted online by UU on 19-20/01/2022; developed agenda and circulated it to PPs, APs and pilot test partner companies; invited external speakers. BED updated REAMIT risk log by adding 2 new risks in REAMIT: delay in the supply of sensors for REAMIT pilot tests due to lack of sensors in the market caused by the lack of chips (essential component of sensors) caused by the pandemic; reluctance of pilot test companies (Yumchop, HMF) to provide detailed information for Life Cycle Assessment (LCA). Based on input from PPs, BED updated PH with information on calendar for 6th progress report and minutes from meetings (RAC/WP/RSC on 7-8/07/2021, monthly meetings of WPT1 and WPT2; meetings of WPT3; bi-weekly meetings of REAMIT sub-group; and monthly meetings of REAMIT team at BED and UEssex). NTU with support from LP manages the REAMIT SharePoint site – online, centralised storage space for REAMIT materials. NTU organised SharePoint site in specific folders according to WPs, provided log in access to new users, and ensured it has been effectively utilized by REAMIT PPs. BED started work on 6th REAMIT progress report and claim.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Due to COVID-19 and restrictions on travels, RAC/WP/RSC meetings on 7-8/07/2021 took place online; visits to the sites of pilot test in the UK to install sensors were organised physically only at the end of Sept-2021; shortage of sensors in the market (due to shortage of chips) has caused new delays in the implementation of REAMIT pilot tests.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity M.1	General project management	01-2019	01-2022	proceeding according to work plan
Deliverable M.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Project handbook		02-2019	proceeding according to work plan	
Deliverable description	A document which will collate all necessary information for project management purposes, including terms of reference of groups, project procedures, reporting requirements, partnership agreements, GDPR requirements etc			
Description of progress achieved	Based on input from PPs, BED updated PH with information on calendar for 6th progress report and minutes from meetings within the REAMIT partnership (RAC/WP/RSC on 07-08/07/2021, monthly meetings of WPT1 and WPT2, bi-monthly meetings of WPT3, bi-weekly meetings of REAMIT sub-group composed of full time staff in REAMIT at BED, NTU, UU, UCD, MTU; and monthly meetings of REAMIT team at BED and UEssex). All minutes included in the Project Handbook have been drafted by WP leads, I&R (lead of WP T1), BED (lead of WP T2), Ulster (Lead of WP T3). Project Handbook is uploaded in SharePoint, administered by NTU, and accessible by all PPs.			
Evidence				
Deliverable M.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Minutes of meetings of RSC, and RAC and WP meetings - minimum six meetings each. The meetings of RSC and RAC will provide overall strategic direction of the project.		01-2022	proceeding according to work plan	
Deliverable description	RSC and RAC will meet every six months -two in the UK and one each in the remaining four partner countries. WP meetings will be organized one day before RSC meetings. Minutes of all these meetings will be circulated & agreed within 1 month.			
Description of progress achieved	With support from NTU, on 07-08/07/2021, BED organised online meetings of RAC/WP/RSC hosted by NTU. With support from NTU, UCD, MTU and UU, BED developed draft minutes of RAC/WP/RSC and circulated it to PPs. Draft minutes, including action log for all partners, were discussed and approved at RSC online meeting on 19-20/01/2022.			
Evidence				
Deliverable M.1.3				
Deliverable title		Planned delivery month	Deliverable status	
Intermediate Work Package coordination		01-2022	behind schedule	
Deliverable description	The leaders of WP will be in regular touch with partners via emails, website and social media sites. Whenever needed, conference facilities via phone, Skype or similar technology will be organised out by leaders of each WP or partners on demand.			
Description of progress achieved	BED's coordination of WPs has been limited as due to lockdown and travel restrictions there has been some progress in WP implementation, but slower than expected. BED was in regular contact with leads of all WPs (I&R, UU, NTU); supported I&R in organising WPT1 monthly meetings; coordinated input from technology partners in setting up Big Data server; supported NTU with developing communication materials (newsletters, website updates). BED held 3 monthly meetings of REAMIT team at BED and UEssex; and 10 meetings of REAMIT sub-group. Minutes of these meetings are included in the REAMIT Project Handbook.			
Evidence				
Deliverable M.1.4				
Deliverable title		Planned delivery month	Deliverable status	
Key control register for Project Management		09-2019	proceeding according to work plan	
Deliverable description	A register of key control milestones will be prepared by LP and made available to all partners. This register will include useful information (e.g., timetable, risks, meetings, etc.). This will be available online and updated regularly.			

Description of progress achieved		Key control register is part of the REAMIT Project Handbook.		
Evidence				
Activity	Title	Start month	End month	Status
Activity M.2	Risk register and risk review	01-2019	07-2022	proceeding according to work plan
Deliverable M.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Risk register		03-2019	proceeding according to work plan	
Deliverable description	Development & partner sign-off of a written risk register, forming an appendix to the project handbook.			
Description of progress achieved	BED updated REAMIT risk log by adding two new risks in REAMIT: delay in the supply of sensors for REAMIT pilot tests due to lack of sensors in the market caused by the lack of chips (essential component of sensors) caused by the pandemic; reluctance of pilot test companies (Yumchop, HMF) to provide detailed information for LCA.			
Evidence				
Deliverable M.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Annual risk reviews		01-2022	proceeding according to work plan	
Deliverable description	Written notes of annual risk register reviews for 2020 & 2021.			
Description of progress achieved	Risks in REAMIT are reviewed bi-annually at RSC meetings.			
Evidence				
Activity	Title	Start month	End month	Status
Activity M.3	Record keeping and reporting	01-2019	07-2022	proceeding according to work plan
Deliverable M.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project reports		07-2022	proceeding according to work plan	
Deliverable description	Submission of complete, accurate & timely, activity & financial reports every six months by the LP partners.			
Description of progress achieved	Based on input from PPs, BED developed 5th REAMIT progress report and submitted it to JS in September 2021. In December 2021, BED received funds from the funder and transferred due amounts to PPs in January 2022.			
Evidence				
Deliverable M.3.2				
Deliverable title		Planned delivery month	Deliverable status	
Finance training for partners		04-2019	completed and achieved as planned	
Deliverable description	An event for all finance managers of all partners, to clearly set out the processes & procedures for claims & payments, & the partners' financial obligations in the project.			
Description of progress achieved				
Evidence				

Work Package Adapting and pilot testing sensor technologies in agri-food supply chains (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T1	Adapting and pilot testing sensor technologies in agri-food supply chains	03-2019	06-2021	proceeding according to work plan	208 224.90	22.35

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
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DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Pilot tests running: -Clostridium bacteria, BED, UK: Aim is to strengthen method of detection of CB allowing for immediate clean-up of surfaces when detected and reduce beef waste in abattoirs, retailers and homes. UU hope to obtain some CB material from UCD to calculate minimum level of detection early in 2022. -Dry aging chamber, Ulster, UK: Aim is to reduce weight and quality loss from beef meat during the dry-aging process by installing temperature and humidity sensors to map readings across chambers. Next trial will run early in 2022. -Picnic, Whysor, NL: Aim is to monitor conditions in cool food boxes during transport. Whysor designed bedding with flexible ring to protect sensors. BED purchased 20 new sensors which were installed in Picnic's boxes. -Human Milk Foundation, BED, UK: Whysor configured and installed 2 sensors at HMF in Sept-2021, which recorded temperature data during trips of human milk (donor-human milk bank-hospital). HMF confirmed they were keen to install 10 more sensors. In Dec-2021, Whysor secured new sensors to be purchased by BED. -Yumchop, BED, UK: In Sept-2021 Whysor visited Yumchop factory and installed sensors in 10 zones (cool, cold, freezing). All sensors are sending data. Whysor developed REAMIT dashboard for Yumchop, which shows temperature in all zones where sensors are installed and sends correct alerts when temperature raises. Whysor sends weekly reports to Yumchop for every sensor installed at Yumchop's factory. -BIOGROS, Whysor, LU: Aim is to gain insights into climatic conditions (temperature/humidity) through the complete supply chain (trucks, warehouse, grower) for several fragile vegetables (mushrooms, onions, potatoes, celery root). 2 sensors were installed at BIOGROS's truck and coldstore to test connectivity. Whysor will define the best sensors for this pilot test and install them in Feb-2022. -Van de Huijgevoort Groep (VHG), Whysor, NL: Aim is to shorten checks process on presence of bacteria (listeria, salmonella) and avoid quality product loss (due to freezing and thawing); and check production room pressure. -Musgrave, Ulster, UK: Aim is to install temperature and humidity sensors and have alerting system/cloud upload from Musgrave phone, which can warn if food is at risk of spoilage. Whysor worked with device manufacturer to enable x/y/z detection for autonomous alerting system avoiding driver/logistics staff intervention. In Dec-2021 sensor and programming module arrived at Ulster. Next steps: testing sensor, ensuring cellular recording works in Belfast; determining how to translate accelerometer data to Whysor architecture. -Glen Affric Brewery, NTU, UK: Aim is to minimise wastage during brewing and maintain the highest quality in beer produce, considering factors such as oxygen levels, gravity levels, temperature and yeast content. GA and Whysor met for the configuration of sensors. Next steps: NTU to procure sensors (temperature and flow meter), installation of sensors and collecting data. -Raman Spectroscopy, UoN, FR: Routhiau: Automation of analysis, and development of algorithm for selection of "interesting areas" (motorised stage for automatic analysis); integration of Raman system in cold room (real conditions). IGRECA: UoN completed work on IGRECA samples. Data was shared with PPs and report sent to IGRECA & Valorial. Pilots in pipeline: 3DF to reduce food waste by determining total bacterial count in food. TA supervised JS who did experiments with Fresh Detect sensors; Blue Skies, UK; Landgard, DE; UCD & MTU explored developing a new trial in IE inspired by Proof of Concept and Fresh Box ideas. I&R facilitated 6 online meetings of WP T1 with pilot test leads (BED, Whysor, UU, UoN, NTU, UCD), who cooperated to advance all pilot tests; drafted minutes from each WPT1 meeting. Whysor hosted online meeting on REAMIT dashboard for Yumchop. Levstone advanced testing Low Energy Bluetooth Technology solution.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Covid-19 has had huge impact on the implementation of WP T1 and pilot tests. WP T1 is a key WP in REAMIT as it generates data for data analysis (WP T2). The pandemic situation worsened in the winter, with the number of infection cases raising since mid-November 2021. The NL and Ireland were the most affected countries, with restrictions on indoor activities and events. A new lockdown was put in place in the NL. In most partner economies, people were encouraged to work from home. Due to restrictions on travels, partners from Whysor were able to visit UK and install sensors at HMF and Yumchop only in Sept-2021. This implies that data from these sensors started to be generated only from Oct-2021. In Dec-2021, Whysor reported a lack of sensors in the global market due to shortage of chips (essential component in sensors) caused by COVID-19 pandemic. This implies that there may be additional delays with the purchase of sensors, which may further delay implementation of pilot tests. Partners agreed that to speed up the purchase of sensors, they would buy sensors from overseas suppliers, to reduce negative effects of the delay on the implementation of pilot tests. Due to COVID-19 there has been delays with starting the Cyberbar/REAMIT pilot tests lead by UCD in IE. Previously initiated contacts became unresponsive during lockdown that occurred in IE since 2020. The UCD team has experienced that many businesses in IE have been prioritizing their business activities rather than technology demonstrations promoted by REAMIT. Still, UCD team are actively looking for a pilot test company in agri food supply chains in IE.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T1.1 Working prototypes of sensor technologies based on pilot tests with agribusiness users	Five prototypes that use traditional and new sensor technologies to monitor quality of fresh produce and sends the data over WiFi, Cat-M, NB-IOT (or other radio technology) will be produced with agribusiness users recruited through the open call (A1.1)	5.01. Number of efficient natural and material resources solutions implemented and tested	06.2021	5.00			proceeding according to work plan	
T1.2 Agribusiness companies supported in food waste reduction pilots	Agribusiness companies will be recruited through an open call to participate in the pilot tests in A1.2. Each company will benefit from the installation of new technologies for the test period, giving reductions in waste and savings in their costs.	CO01. Number of enterprises receiving support	06.2021	5.00			proceeding according to work plan	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T1.1	Open call for Agri-business agribusiness user companies for pilot tests	03-2019	03-2020	completed
Deliverable T1.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Publication of open call		03-2019	completed and achieved as planned	
Deliverable desription	Partners would develop an open call for participation from companies willing to offer their premises & equipment to the testing of technologies. The call would be issued on the project webspace and through partner networks so that Risk 2 is minimised.			
Description of progress achieved				
Evidence				
Deliverable T1.1.2				

Deliverable title		Planned delivery month	Deliverable status	
Companies recruited from across agri-business supply chain. Minimum 4 companies will be recruited across NWE so that there is a total of 5 user companies (including the one UK agribusiness user (PP12) that is already a partner) for minimum 5 pilot tests.		03-2020	completed and achieved more than planned	
Deliverable description	Partners expect to recruit a minimum of 4 companies to participate in the technology tests, with a representative mix of locations, sub-sectors etc. A simple MoU would be issued to them; no funding is involved. One UK user company is already a partner.			
Description of progress achieved	Routhiau, IGRECA, Yumchop, Human Milk Foundation, Musgrave, WD Meats, Glen Affric Brewery, Picnic, VHG, Biogros.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.2	Transnational synthesis of sensor technologies (Raman Spectroscopy from UoN, 3D Fluorescence from Ulster and CyberBar from UCD) and big data integration	03-2019	01-2021	completed
Deliverable T1.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Partner workshop on sensors and big data		06-2019	completed and achieved as planned	
Deliverable description	A workshop between knowledge partners and sensor/big data SME partners will bring forward all available knowledge about technologies, applications and potential combinations for food supply chains. An internal workshop with around 20 attendees.			
Description of progress achieved				
Evidence				
Deliverable T1.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Test roadmap		09-2019	proceeding according to work plan	
Deliverable description	The output from the workshop will be the production of an internal 'test roadmap' combining the results from the call for test companies (so we know how many tests, what kind of companies, and where) with the optimum technologies combinations.			
Description of progress achieved	I&R advanced the document showing the impact of the Covid 19 on pilot tests and Pilot Test Roadmap.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.3	Adapting and pilot testing of sensor technologies with agribusiness users	10-2019	06-2021	proceeding according to work plan
Deliverable T1.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Working prototypes using sensor technology		06-2021	proceeding according to work plan	
Deliverable description	The sensor and scanning technologies will tested along with other traditional sensors where needed and adaptations carried out wherever needed. Data flow to be checked. At the end of the pilot test, new working prototypes will be developed.			
Description of progress achieved	11 IoT sensors prototypes are being tested and developed by the REAMIT consortium, with the hope that 5 will be completed and operational by the end of the REAMIT project.			
Evidence				
Deliverable T1.3.2				
Deliverable title		Planned delivery month	Deliverable status	
User manual for each pilot test		06-2021	not started	

Deliverable description	A user manual documenting the experience of pilot test and a step-by-step guide of good practice in each pilot test will be developed for the benefit of users willing to test REAMIT technologies in the future.		
Description of progress achieved			
Evidence			
Deliverable T1.3.3			
Deliverable title		Planned delivery month	Deliverable status
Report on the pilot test and development of the sensor prototypes		06-2021	not started
Deliverable description	A report on the 5 sensor-based pilot tests will be compiled by participating partners and posted on the project webspace. It will describe in detail the experiences with the pilot test and give recommendations for future pilot tests.		
Description of progress achieved			
Evidence			

Work Package Big Data integration and applications to reduce food wastage. (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T2	Big Data integration and applications to reduce food wastage.	01-2019	07-2022	proceeding according to work plan	141 846.67	21.04

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
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Whysor	Whysor
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DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Big Data server: BED configured server for different IP addresses assigned to BED and provided University network access and created MSSQL Server instances for SenX, UCD, Whysor, Levstone, MTU, UU. Linked server was created to permit 'read' and 'download' functions. MTU and UU helped BED test connection to BED's big data server and ensured connection issues were resolved. Before Big Data server at BED was available, Whysor built temporary data export scripts so CSV-files could be shared with analytics PPs. Whysor built scripts to push all pilot data from Whysor cloud to Big Data server at BED, tested it and carried out the sending of data to Big Data server in Dec-2021. BED started to develop user manual for Big Data Server. Data analysis: BED coordinated work of data analysis of data coming from REAMIT pilot tests (Yumchop, HMF, Picnic, WD Meats, Glen Affric, Biogros) to Big Data server at BED. Analytics PPs accessed data in Big data server, thanks to Whysor pushing data manually once a week from Whysor cloud to Big Data server at BED. BED coordinated 5 online meetings of WP T2 focused on data analysis (labelling data, formation of REAMIT data analytics strategy and practices); UU created a System Requirement Specification (SRS) template to allow for the accurate capturing of system and data requirements prior to the launch of future pilots. SRS shall help ensure correct data is collected from each pilot test for meaningful data analytics. UU proposed 'first steps to data cleaning and analysis' approach based on WD Meats dry-ageing pilot data. It demonstrates how data from Big Data server can be directly accessed and data cleaning and analysis performed from Python. The Jupyter notebook with the python code is available to PPs. For data from Picnic and HMF, SenX defined a suitable model according to context, as explained by Whysor, and also according to SenX best practices concerning modelling of time series. This model is dually relational: by time and time series can be related using subsets of tags (labels). It has the merit of table dataset models (relational columnar manipulation), but without enforcing a set number of rows and a set of fixed columns for in-memory processing, making it much more flexible and memory efficient. To access shared SQL server set up by Whysor, Warp10 connector to JDBC database was deployed in testing environment. A patch was made to improve data conversion for continuous integration data queries afterward. Whysor and SenX advanced integrating WARP-10 into REAMIT dashboard at Whysor, which is beneficial for data-analytics and speeding of the dashboard. Intern was assigned to integrate WARP-10 within Whysor's existing cloud architecture. Proof of concept was built. Currently WARP-10 integration is tested in Whysor's development environment. Staging server was set up to validate WARP-10 integration with production data. Middleware app was built and is tested. REAMIT dashboard: Whysor made changes to improve existing, and add new functionality to REAMIT dashboard (widget for manually entering data, advanced tooltip, syslog module, reporting module, advanced comparison filter, ChartJS v. 3). Whysor developed 1st version of weekly Dashboard report for Yumchop. MTU drafted Data Requirement and Collection Strategy from REAMIT pilot tests; consolidated and updated it in line with REAMIT's objectives. This would be foundation and reference for all REAMIT pilot tests and data analysis. MTU conducted meetings with pilot test leads to develop common understanding and formulate data requirement and collection strategy. MTU coordinated work on quantifying food quality and came up with new, important suggestions on data capturing during pilot tests (i.e. capturing Food Score Index, Wastage of Ice packs, Fuel Consumption Data and Carbon Emission Data with Whysor and Picnic).

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

SenX used Warp 10 to do a preliminary analysis of the Picnic, HMF and Yumshop datasets. As the context was more clearly defined and the dataset was bigger for the Picnic case, SenX also produced some visualizations of the data to better comprehend the lifecycle of food delivery at Picnic. More information about the food quality and status of the delivery could give more insight and could help provide more meaningful information concerning the food quality. These findings mean that the datasets as of now still lacks information or external documentation that would allow the application of specific XAI (explainable artificial intelligence) algorithms thereupon, because at this point analytics partners cannot easily formulate a well-defined problem to be solved by an AI. In order to find what to solve, more thorough exploration is needed, so data analytics PPs start to implement programs for that purpose. Problems in WP T2: Due to COVID-19, most pilot tests have been delayed. This had a knock on effect on the data available for analysis. Consequently, the analytics partners have only recently (Dec-2021) started to do data analysis. Analytics PPs formed analytics sub-group and examined ideas for analysis and techniques for it before data was available so that when data became available, the partners were ready to start analysing the data instantly. Whysor was not able to test the integration with WARP-10 in its development environment with test data, because the test data did not reflect the real data coming from pilot testing companies

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T2.4 Technology solutions developed	3 solutions will be developed: 1) a Big Data platform to detect loss of food quality and understand underlying factors, 2) a Smartphone APP to alert truck drivers, warehouse managers and owners of the produce of the potential quality issues with food in transport and make decisions on rerouting, 3) an integrated IoT sensor and big data solution which will help monitor food quality, make rapid decisions to reroute the food if there is deteriorating quality, and save food waste.	5.01. Number of efficient natural and material resources solutions implemented and tested	07.2022	3.00			proceeding according to work plan	
T2.5 Companies supported in technology development	In this WP, potential suppliers and consumers linked to REAMIT corridors can self-enrol to participate in tests and trials. Our network events will be used to run proactive campaign to include users subject to resource availability.	CO01. Number of enterprises receiving support	07.2021	5.00			proceeding according to work plan	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T2.4	Develop an interface to collect sensor data and send to cloud	07-2019	07-2021	proceeding according to work plan
Deliverable T2.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Creation and launch of interface		07-2021	proceeding according to work plan	
Deliverable description	An interface will be developed for each of the 5 pilot tests for collecting data from sensors and sending them to the cloud for use in a transnational Big Data infrastructure			
Description of progress achieved	In the past six months Whysor has made various changes to improve existing REAMIT dashboard as well as added some new functionalities to it: widget for manually entering data, advanced tooltip, syslog module, reporting module, advanced comparison filter, ChartJS version 3. Whysor built a first version of a report for pilot partner Yumchop.			
Evidence				
Deliverable T2.4.2				
Deliverable title		Planned delivery month	Deliverable status	
User Manual on launching the interface		07-2021	proceeding according to work plan	
Deliverable description	A user manual documenting the experience of creating and launching the interface and a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			

Description of progress achieved		BED in cooperation with PPs started to collect first ideas to draft the Big Data user manual.		
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.5	Development of Big Data infrastructure for analytics of sensor data and for rerouting to minimise food waste	01-2020	07-2022	proceeding according to work plan
Deliverable T2.5.1				
Deliverable title		Planned delivery month		Deliverable status
A big data platform with capability to collect and store sensors data from all REAMIT corridors		07-2021		proceeding according to work plan
Deliverable description	This big data platform will be used as the hub for conducting business analytics, and will create an understanding of complex, transnational supply chains. This will be hosted in BED.			
Description of progress achieved	The Big Data Server at BED is now fully operational. BED with support from MTU, UU and Levstone have troubleshoot various challenges with the server. Consequently, analytics partners can now access the Big Data server to analyse data. Also, data from pilot tests have been pushed from Whysor REAMIT cloud to the Big Data server on regular basis (once a week). Whysor is integrating WARP-10 from project partner SenX, in order to collect data more efficiently. The big data server at BED is now fully operational and data can be pushed from Whysor REAMIT cloud to the big data server.			
Evidence				
Deliverable T2.5.2				
Deliverable title		Planned delivery month		Deliverable status
Reports on Big Data platform performance		07-2022		not started
Deliverable description	Partners leading the activity will provide regular annual reports on the performance of the platform.			
Description of progress achieved				
Evidence				
Deliverable T2.5.3				
Deliverable title		Planned delivery month		Deliverable status
A web-interface with self-enrol facility for enrolment of potential suppliers and consumers of food produce		07-2022		behind schedule
Deliverable description	Potential suppliers and consumers can self-enrol after approval from the lead partner. This will be augmented using Google Maps data to identify potential destinations for rerouting food that would otherwise become waste.			
Description of progress achieved				
Evidence				
Deliverable T2.5.4				
Deliverable title		Planned delivery month		Deliverable status
User manuals for the big data platform and the web-interface highlighted in the two deliverables above		07-2022		behind schedule
Deliverable description	The user manuals will document the experience of creating the big data platform and the web-interface and include a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved	BED started to develop user manual for the Big Data Server which covers: Big Data basic concepts; Creating instances; Big Data access rights; Data route; Big Data Architecture Processes.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.7	Development of smartphone APP for use by truck drivers and warehouses	01-2020	07-2021	behind schedule

Deliverable T2.7.1				
Deliverable title		Planned delivery month		Deliverable status
Launch of smartphone APP for linking to food owners, truck drivers and warehouses.		07-2021		behind schedule
Deliverable desription	This APP will be developed and tested to work in Android and Apple smartphones. This APP will also be used to link to all relevant stakeholders for long terms dissemination after getting GDPR consent from all parties.			
Description of progress achieved	Levstone reported that this work is in progress, but it is now possible to use Low Bluetooth Energy Sensors which can be installed in trucks and linked to the driver's Android phone and the Levstone cloud upstream. Levstone refers PPs to look at Google Play Store to download the LEVSTONE App.			
Evidence				
Deliverable T2.7.2				
Deliverable title		Planned delivery month		Deliverable status
User manual for the use of the APP		07-2021		behind schedule
Deliverable desription	A user manual documenting the experience of creating and launching the APP and a step-by-step guide of good practice will be developed for the benefit of food owners, truck drivers and warehouse managers using the APP.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.8	Delivering the integrated IoT/Big Data technology with capabilities on analytics and decision support to help reduce food waste in NWE.	01-2019	07-2022	not started
Deliverable T2.8.1				
Deliverable title		Planned delivery month		Deliverable status
Deployment of the integrated IoT/Big Data/analytics/Decision support technology		07-2022		not started
Deliverable desription	This integrated technology will have the capability to bring together the outputs of sensor technology and analytics to provide decision support to owners of food at risk, truck drivers and warehouse managers via the Smartphone APP.			
Description of progress achieved				
Evidence				
Deliverable T2.8.2				
Deliverable title		Planned delivery month		Deliverable status
A user manual for the integrated IoT/Big Data/analytics/Decision support technology		07-2022		not started
Deliverable desription	A user manual documenting the experience of creating and launching the integrated IoT/Big Data technololgy and a step-by-step guide of good practice will be developed for the benefit of future users willing to test REAMIT technologies.			
Description of progress achieved				
Evidence				

Work Package Business development of REAMIT technologies (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T3	Business development of REAMIT technologies	01-2020	07-2022	behind schedule	76 883.10	19.57

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

LCA: The general REAMIT questionnaire with the data required for the life cycle assessment that will be used for the in-depth environmental assessment of the REAMIT technologies implemented has been created and reviewed by UCD. The questionnaire is divided into five steps to collect data from food production (from agricultural and animal origin), manufacturing, warehouse installations and transportation stages of the life cycle. The first LCA case study proposed was the Human Milk Foundation (HMF) pilot test. The questionnaire was adapted for HMF to reflect their processes (transportation, milk processing and storage), based on other LCA studies of breastfeeding and breastmilk substitutes. UCD and BED participated in a meeting with HMF on 30/08/2021. In this meeting, UCD: (1) introduced the concepts to develop a life cycle analysis, the main impact categories that effects the climate change, human health, ecosystem quality and non-renewable resources, (2) presented the main benefits to perform a LCA, e.g. the LCA results can help the company to improve the product development, marketing, strategic planning and even policymaking, consumers can learn how sustainable a product is, it is possible to identify opportunities to improve systems and explore how their design choices affect the sustainability of the products, (3) explained how the case study of HMF would be handled and (4) discussed how REAMIT strategies to reduce milk waste can improve the environmental performance of the human milk bank. UCD presented the questionnaire that would be used to collect data from HMF to perform an LCA analysis and the data requirements, e.g. mode of transport (refrigeration, cooling or none), material used to storage the milk (e.g. polypropylene bottles, glass bottles), material used to transport the milk (e.g. polyester insulated bag, polystyrene insulated boxes), material used to maintain the milk temperature (e.g. ice, gel packs, etc.), final destination of the wastes (e.g. landfill, recycling, incineration, etc.) and others. No quantitative data has been collected so far, since a life cycle assessment is currently being carried out at the company by other university at the moment. The second LCA case study proposed during this period was the Yumchop pilot test. The general questionnaire was adapted for Yumchop to reflect their processes (transportation, food pre-processing, cooking, frozen storage, distribution and retail at vending machines). A similar presentation about the LCA task was introduced to Yumchop during a meeting on 10/12/2021 to introduce the questionnaire and explain the benefits of conducting an LCA. In this meeting Yumchop explained the processing steps in their factory and drafted their life cycle. No quantitative data were collected during the meeting because Yumchop needs to check upon the data on records. The questions will be collected in a disaggregated form over the next meetings. A sequence of meetings, 1h per month to work on the LCA task with Yumchop, was planned. UU organised 5 online meetings (PPs, bilateral and internal) related to the implementation of WP T3. based on input from PPs, UU advanced work on the Market Readiness Report and created its draft template to allow for data capture; discussed with UCD progress with Life Cycle Assessment; discussed how UU REAMIT sensors white paper prepared in 2019 could be used for Activity 1 - assessing the business and technical landscape.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

The LCA planned in this WP relies on data obtained from the WPT1 and from the companies, and some difficulties have been observed to motivate the companies to share the necessary information to conducted the LCA. For this reason, UCD will try to use secondary data sources for most of the data requirements.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T3.2 Companies introduced to REAMIT business case	The business cases will be used to encourage businesses to take up the REAMIT approach of combined technologies and turn them into marketable products. The output is the number of companies (not currently partners) benefitting from an in-depth introduction to the REAMIT approach.	CO29. Number of enterprises supported to introduce new to the firm products	07.2022	10.00			proceeding according to work plan	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T3.1	Risk, technology and sustainability assessments of REAMIT technologies (led by UCD with support from NTU, UU and BED)	01-2021	07-2022	behind schedule
Deliverable T3.1.1				
Deliverable title		Planned delivery month		Deliverable status
An assessment report of REAMIT technologies including a comprehensive systematic review (mapping) of the technical and business landscape in the fresh produce food chain.		09-2021		behind schedule
Deliverable description	The assessment report will be an internal document for partners, used as the basis for the business models development (AT3.4)			
Description of progress achieved	UU organised 5 online meetings (PPs, bilateral and internal) related to the implementation of WP T3. based on input from PPs, UU advanced work on the Market Readiness Report and created its draft template to allow for data capture; discussed with UCD progress with Life Cycle Assessment; discussed how UU REAMIT sensors white paper prepared in 2019 could be used for Activity 1 - assessing the business and technical landscape.			
Evidence				
Deliverable T3.1.2				
Deliverable title		Planned delivery month		Deliverable status
Life Cycle Assessment (LCA) for REAMIT		07-2022		behind schedule
Deliverable description	The life cycle assessment system will allow environmental impact data to be integration with REAMIT IoT sensor and big data solutions.			
Description of progress achieved	UCD participated in several meetings with companies involved in the pilots (Human Milk Foundation and Yumchop). During these meetings UCD discussed and raised technical questions linked with the life cycle assessment (LCA) and presented the questionnaire with the data requirements for the environmental analysis to the companies. The idea is to give an overview about the LCA task and the data needed to assess the environmental benefits offered by the REAMIT approach.			
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.2	Future-proofing REAMIT Technologies (led by UCD with support from BED)	01-2020	07-2021	not started
Deliverable T3.2.1				
Deliverable title		Planned delivery month		Deliverable status

Current and identified future REAMIT technology assessment report		07-2021	not started	
Deliverable description	The Future-proof report will be made available to SME technology developers with a view to identifying both the bottlenecks and potential solutions that can be used to drive future food quality analysis technology developments.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.3	Market assessment (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Market readiness report.		07-2022	not started	
Deliverable description	A market analysis and foresight report identifying forthcoming opportunities for REAMIT technologies to be developed into marketable products			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.4	Development of business case (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2022	not started
Deliverable T3.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Business prospectus		07-2022	not started	
Deliverable description	An outward-facing document will be made available to SME technology developers, to potential buyers of technology approaches (large agri-business and logistics companies) and potential investors who can see the possibilities for product development.			
Description of progress achieved				
Evidence				
Deliverable T3.4.2				
Deliverable title		Planned delivery month	Deliverable status	
Business case for achieving 40,000 tonnes of waste reduction		07-2022	not started	
Deliverable description	The business case will use REAMIT data from continual monitoring of sensor data for identifying/saving potential food waste and subsequent analytics to understand patterns of food waste in NWE with justification for saving 40,000 tonnes of food waste.			
Description of progress achieved				
Evidence				

Work Package Communication (communication)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
C	Communication	01-2019	07-2022	behind schedule	97 705.57	26.11

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

NTU, with support from PPs, created and launched new REAMIT website: www.reamit.eu. New website is live with features including the REAMIT Whysor dashboard and data analytics platform for receiving data from pilot tests. In July, Oct and Dec 2021, based on inputs from PPs, NTU published 3 REAMIT newsletters with updates on pilot tests: Glen Affric, HMF and Yumchop. REAMIT Newsletters are published through MailChimp, with an integrated mailing list. Since linking NTU's mailing list to REAMIT websites, subscriptions and views of the REAMIT website have increased by 20% in the current reporting period. NTU, with support from LP and PPs, conducted RAC/WP/RSC online meeting in July 2021, attended by 35 participants. NTU and BED invited 4 external speakers who attended RAC/WP/RSC meeting: Chris Nankervis of Weather Logistics, Richard Cook of SEMLEP, Abi Adefisan of Yumchop Foods and Gillian Weaver of the Human Milk Foundation. NTU supported REAMIT PPs in communication actions through local and online social media channels (LinkedIn, Twitter, FB) using organisation's and private accounts to reach out to wider audiences across NWE. PPs published more than 30 social media posts (LinkedIn, Twitter, FB), including on the promotion of 3rd REAMIT Symposium (Dec-2021). As the organiser and host of 3rd REAMIT Symposium, UCD promoted the Symposium and disseminated symposium materials (posters, flyers). UCD created a dedicated hashtag for the Symposium to promote the Symposium on Reamit and UCD websites. UCD created the Eventbrite link for registration at the symposium and the promotional email to invite the audience to participate in the event. A total of 310 registrations were received, with a final 124 participants actually attending the Symposium. PPs have published news about REAMIT through various channels: PPs' own websites, PRME report 2021 (NTU), NBS's Newsletter to the Food and Drink Forum's Newsletter (NTU), to gain new end-users and raise awareness of the REAMIT project. Valorial communicated about REAMIT through its own online newsletters published each month. PPs presented the REAMIT project, its achievements and case studies at 11 external and internal events focusing on ICT, food supply chains, agri-food production and business strategies: 1. EurOMA21 Conference, 7-8 July 2021 (BED); 2. Indian Institute of Plantation Management, 26-30/07/2021, (BED); 3. 'Make UK: Meet the Buyer. Food and Drink Supply Chain, 5/10/2021 (BED); 4. Supply chain master class students at BED, 11/10/2021 (BED); 5. Online meeting of Trust & Trace Network, Germany, 13/12/2021 (BED); 6. 19th Annual World Food Innovate Virtual Summit, 18th-19th October 2021 (BED); 7. Transforming Food Production: Series A Investor Partnership event, 19/10/2021 (BED); 8. International Conference on Innovative Research in Science and Technology, 26-27/11/2021 (BED) 9. Yumchop's Food Factory Launch, Sept-2021 (BED and NTU) 10. Circular Bioeconomy conference, October 2021, Ireland (NTU) 11. Congress "Microbes 2021", 22-24/09/2021, Nantes, FR (UoN) NTU, with help from PPs, developed a storyboard on REAMIT website, took photos and made short video footage during pilot test visits (which will be used in the production of longer videos on the REAMIT project). NTU with Whysor's assistance made progress on developing a video on pilot test with Picnic. UoN developed a poster on pilot test with Raman Spectroscopy; UCD on 3rd REAMIT Symposium. NTU updated REAMIT Communication Strategy document with new information on communication actions by PPs. Whysor translated to German language REAMIT infographics on benefits for pilot test companies from participating in REAMIT pilot tests.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Due to COVID-19 pandemic and restrictions on travel and meetings, all meetings of the REAMIT consortium, including 3rd REAMIT Symposium in Dec-2021, took place online. This affected networking and opportunities to promote the REAMIT project face-to-face among relevant stakeholders at local, regional and international networks. The REAMIT consortium has not met for nearly 2 years and all the work and communication have taken place online. We have got used to 'meeting online' and trying to work out challenges by 'screen sharing' which naturally has affected effectiveness and efficiency of our work.

Communication objectives - what is the progress toward the communication objectives as defined in the application form? The level of achievement should be cumulative; however the explanation should describe achievements in this reporting period

Project specific objectives	Level of achievement	Explanations
To raise awareness on the potential of sensor technology to monitor food quality in food supply chains. While there has been significant improvements in the capabilities of sensors and their connectivity over the internet, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains.	to a minor degree	REAMIT partners are continuously promoting the REAMIT approach and technology among agri-food companies. However, due to COVID-19 and lockdowns in NWE economies, all REAMIT promotion and communication activities are happening only online. Agri-food companies are still suffering from the pandemic, and many of them have confirmed that they needed to prioritise core business, not research, in order to bounce back and recover from the pandemic and the lock down. Nevertheless, REAMIT partners continue to engage in promotional activities and they present the REAMIT project and approach to companies and actors in agri-food supply chains, in their respective regions and countries. This has resulted in recruiting 1 new company committed to developing REAMIT pilot tests.
To convince agribusiness users using the results of pilot studies that food waste can be significantly reduced by adopting REAMIT's integrated IoT-Big Data-Analytics technology solution. REAMIT will conduct regular networking events with agribusiness users, popularise the benefits of using these new technologies, and showcase demonstrations to influence their attitude.	to a minor degree	Because of COVID-19, getting data from pilot tests has proven to be difficult, and in consequence the analytics partners do not have real data to do data analytics. Thus, they have not been able yet to demonstrate capabilities of IoT sensors and Big Data technology in monitoring and controlling conditions in which food is transported along food supply chains, which would be of interest to agri-food companies. REAMIT holds regular networking events, however we are not able to present the results of our work.
To raise awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. As highlighted earlier, while there has been significant improvements in the capabilities of sensors, their connectivity over the internet, and the potential of conducting data analytics, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains, collecting huge volumes of data on food quality across the NWE region to identify patterns of food wastage, most frequent causes of food waste, and, likely actions that would have maximum impact in reducing food waste. Policy briefs will be developed to provide action oriented solutions that can be favourably considered by policy makers in NWE.	to a minor degree	Only recently sensors from pilot tests started to send data for Big data analytics, hence the work on data analytics is now becoming the main focus of the REAMIT consortium. We expect that in the next 6 months, we will be able to achieve this objective to a large extent.
Using the analytics algorithms and decision support, REAMIT will identify patterns on food waste in NWE and assess the most frequent causes of food wastage along supply chains. By regularly publishing this information through blogs, social media, project outputs and policy briefs, REAMIT will make efforts to change behaviour of relevant stakeholders. For example, targeted feedback of the results to owners of food, decision support on redistribution of food to avoid food becoming waster, etc. will help change behaviour of owners of food and members of food supply chains at micro levels. Policy briefings to suggest best ways of avoiding food waste and regulatory suggestions will help reduce food waste in the region at a macro level.	not achieved	

Based on the risk and sustainability assessment, the project aims to convince agribusiness users of the value of REAMIT's technologies in reducing food waste and increase profitability of their businesses. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help influence their attitude.	not achieved	
Understand the risks involved in the technologies, to help design future-proof technologies for food waste reduction and also the sustainability issues. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help increase knowledge about sustainability aspects of technologies, knowledge and benefits of saving food waste, and policy oriented activities.	not achieved	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity C.1	Start-up activities including communication strategy	01-2019	01-2022	behind schedule
Deliverable C.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Communication strategy document		01-2022	behind schedule	
Deliverable description	A communication strategy approved by Steering Committee (RSC) including guidelines on local, regional and inter-regional strategies will be delivered in the first quarter, and reviewed annually. It will outline approach to reach all target groups.			
Description of progress achieved	NTU has updated REAMIT Communication Strategy with information on local communication channels that can be targeted by REAMIT partners to communicate about REAMIT.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.2	Digital activities	03-2019	07-2022	behind schedule
Deliverable C.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Website launch		03-2019	behind schedule	
Deliverable description	In line with communication rules specified in Interreg documents, the REAMIT webspace will be developed within the Interreg NWE site. It will include updated information on benefit to target groups, operational & technical specifications of IoT/ Big Data			
Description of progress achieved	The new REAMIT website www.reamit.eu has been launched successfully which has helped boost our online communication. This new website allows us to monitor clicks, views and online traffic directed to the site. Also, it has several new features such as partner log in as well as in the future it will be linked to the Big Data server. Currently, NTU (lead of WP C) are operating and managing both REAMIT websites. Partners from MTT, UU, UCD and BED systematically support NTU by providing suggestions on the improvements and updates on both websites.			
Evidence				
Deliverable C.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Social media		03-2019	proceeding according to work plan	
Deliverable description	Social media - twitter, Whatsapp, and Facebook will be added to facilitate more active project communication. This will create opportunity for discussion on any technological development in IoT and operational success of food waste management.			

Description of progress achieved		Partners have communicated about REAMIT through social media (LinkedIn, Twitter and FB), both through company accounts and staff personal accounts. More than 30 posts have been made about REAMIT in the past semester.		
Evidence				
Activity	Title	Start month	End month	Status
Activity C.3	Promotional materiel	01-2019	07-2022	behind schedule
Deliverable C.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project banners, posters and flyers		07-2021	behind schedule	
Deliverable desription	Banners and posters about the project will be developed in 4 languages. Banners will be kept in partners' workplaces and also in event venues to create visibility of the project. Posters will be used to promote the project in all major events conducted			
Description of progress achieved	UCD have developed promotional material in the form of a leaflet highlighting REAMIT and the Cyberbar technology. It was shared across social media platforms to encourage companies in IE to join the REAMIT project for technology demonstrations (pilot tests). UoN developed a poster on pilot test with Raman Spectroscopy. UCD developed a poster on 3rd REAMIT Symposium. NTU developed 3 Newsletters. Valorial promoted REAMIT at numerous occasions, not only French but all REAMIT pilot test, encouraging companies to join any of the REAMIT pilot test. For example, in its November newsletter https://mailchi.mp/pole-valorial.fr/live-by-valorial-107-octobre-2021-1146174 , continuously present the project as part of Valorial portfolio of project opening opportunities to members and ecosystem on one on one meetings, on online communication https://www.pole-valorial.fr/une-rentree-tonique-a-leurope-linternationale/ as well as on their day events for example Valorial Connection: "What new high-impact technologies for the food industry?" https://www.pole-valorial.fr/agenda/valorialconnection-queelles-nouvelles-technologies-a-fort-impact-p-our-lagroalimentaire/			
Evidence				
Deliverable C.3.2				
Deliverable title		Planned delivery month	Deliverable status	
Policy briefs		01-2022	behind schedule	
Deliverable desription	Based on the analytics of sensor data, policy oriented briefs will be developed for each country on the best ways to reduce food waste.			
Description of progress achieved	At REAMIT 3rd Symposium (Dec-2021), LP initiated dialogue with the REAMIT officer at JS (Peter Campobasso) on developing policy briefs based on REAMIT. P. Campobasso's comprehensive presentation on the EU policy for reducing food waste as well as his hints how other Interreg NWE projects succeed in developing policy briefs, have been very helpful guidance for the REAMIT consortium on how to develop effective policy briefs inspired by the REAMIT project.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.4	Public Event(s)	01-2019	07-2022	proceeding according to work plan
Deliverable C.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Reports on REAMIT Networking events		12-2021	proceeding according to work plan	
Deliverable desription	Three REAMIT networking events will be conducted (1 annually) to reach all target groups in all five countries. The reports will be widely published to reach more more members of target groups using traditional and electronic channels.			
Description of progress achieved	In Dec-2021, UCD with support from REAMIT consortium, organised 3rd REAMIT Symposium which took place online. A total of 124 participants attended this two-day virtual networking event. A report summarising the Symposium has been attached.			
Evidence				
Activity	Title	Start month	End month	Status

Activity C.5	Publication(s)	01-2019	07-2022	behind schedule
Deliverable C.5.1				
Deliverable title		Planned delivery month	Deliverable status	
Journal article		07-2022	behind schedule	
Deliverable description	Scientific publication will target high-level academic journal. At least 2 articles will be produced from the project results			
Description of progress achieved	BED and NTU advanced work on 3 publications: Book chapter 'Fighting food waste: How can Artificial Intelligence and Analytics help?'; 'A THEORETICAL SUSTAINABILITY MODEL ON USING IOT SENSORS AND CLOUD SYSTEMS FOR REDUCING FOOD WASTE AND EMISSIONS IN THE FRESH FOOD SECTOR'; 'An optimisation model for cost effective integration of transportation network design with quality control to reduce fresh food wastage'.			
Evidence				

Project report tables

Project report expenditure summary

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Total co-financing	2 955 102.36	1 795 995.73	30 000.00	1 427 866.73	1 427 866.73	384 681.69	384 234.12	447.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Partner contribution	1 970 068.25	1 197 330.87	20 000.00	951 911.42	951 911.42	256 454.54	256 156.14	298.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	2 993 326.60	50 000.00	2 379 778.15	2 379 778.15	641 136.23	640 390.26	745.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per partner

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
BED	1 063 530.07	ERDF	629 088.58	50 000.00	558 493.10	558 493.10	120 594.29	120 594.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I&R	578 032.50	ERDF	183 992.12	0.00	163 803.07	163 803.07	13 306.71	13 308.83	-2.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UCD	426 788.05	ERDF	217 977.64	0.00	127 596.92	127 596.92	88 160.79	88 160.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UoN	544 862.80	ERDF	452 161.66	0.00	365 895.79	365 895.79	86 012.83	84 618.07	1 394.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levstone	334 112.50	ERDF	333 229.70	0.00	268 024.03	268 024.03	65 205.67	65 205.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTU	454 041.89	ERDF	269 352.60	0.00	214 896.71	214 896.71	53 734.09	53 734.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Whysor	296 579.25	ERDF	301 603.81	0.00	239 192.85	239 192.85	62 410.96	62 410.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ITT	191 430.00	ERDF	109 128.74	0.00	69 367.08	69 367.08	39 751.23	39 745.20	6.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SenX	276 022.10	ERDF	177 375.26	0.00	145 776.58	145 776.58	29 828.57	30 481.27	-652.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UU	759 771.45	ERDF	319 416.49	0.00	226 732.02	226 732.02	82 131.09	82 131.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DNI	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61		2 993 326.60	50 000.00	2 379 778.15	2 379 778.15	641 136.23	640 390.26	745.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per budgetline

Budgetline	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Staff costs	3 397 294.45	2 407 003.30	0.00	1 876 004.63	1 876 004.63	514 537.65	513 888.98	648.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office and administration	509 593.80	361 049.94	0.00	281 400.29	281 400.29	77 180.51	77 083.21	97.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel and accommodation	238 386.42	40 548.62	0.00	33 496.34	33 496.34	4 490.91	4 490.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External expertise and services	420 942.13	73 965.60	50 000.00	107 696.50	107 696.50	15 348.41	15 348.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment	358 953.81	110 759.14	0.00	81 180.39	81 180.39	29 578.75	29 578.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Infrastructure and works	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4 925 170.61	2 993 326.60	50 000.00	2 379 778.15	2 379 778.15	641 136.23	640 390.26	745.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	2 993 326.60	50 000.00	2 379 778.15	2 379 778.15	641 136.23	640 390.26	745.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage

Workpackage	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
Wp P	50 000.00	0.00	50 000.00	50 000.00	50 000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	382 332.76	166 112.76	0.00	121 006.07	121 006.07	44 861.29	44 861.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp M	735 506.69	683 100.51	0.00	608 546.97	608 546.97	70 838.63	70 868.73	-30.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T1	1 682 887.56	1 038 580.98	0.00	818 464.56	818 464.56	208 170.44	208 224.90	-54.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T2	1 101 982.93	490 202.38	0.00	349 170.63	349 170.63	141 288.55	141 846.67	-558.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp T3	487 100.03	220 454.01	0.00	139 010.32	139 010.32	78 277.86	76 883.10	1 394.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp C	485 360.64	394 875.96	0.00	293 579.60	293 579.60	97 699.46	97 705.57	-6.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	4 925 170.61	2 993 326.60	50 000.00	2 379 778.15	2 379 778.15	641 136.23	640 390.26	745.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	2 993 326.60	50 000.00	2 379 778.15	2 379 778.15	641 136.23	640 390.26	745.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage per budgetline (total values)

Wp number / budgetline	Staff costs	Office and administration	Travel and accommodation	External expertise and services	Equipment	Infrastructure and works	Total	Net Revenue	Total eligible expenditure
Wp P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	38 016.67	5 702.48	0.00	1 142.14	0.00	0.00	44 861.29	0.00	44 861.29
Wp M	52 355.38	7 853.28	18.25	9 537.16	1 104.66	0.00	70 868.73	0.00	70 868.73
Wp T1	152 255.29	22 838.27	2 198.58	3 770.34	27 162.42	0.00	208 224.90	0.00	208 224.90
Wp T2	121 863.49	18 279.51	177.83	214.17	1 311.67	0.00	141 846.67	0.00	141 846.67
Wp T3	65 204.75	9 780.70	1 897.65	0.00	0.00	0.00	76 883.10	0.00	76 883.10
Wp C	84 193.40	12 628.97	198.60	684.60	0.00	0.00	97 705.57	0.00	97 705.57
Total	513 888.98	77 083.21	4 490.91	15 348.41	29 578.75	0.00	640 390.26	0.00	640 390.26

Project report expenditure - invoices outside of the eu part of the programme area

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)			Total amount declared to flc	Total amount certified by flc	Total amount included in project report - declared to js
		Declared to flc	Reported to js	Confirmed by ca			
Total co-financing	2 955 102.36	905.40	892.79	892.79	0.00	0.00	0.00
Partner contribution	1 970 068.25	603.61	595.20	595.20	0.00	0.00	0.00
Total eligible expenditure	4 925 170.61	1 509.01	1 487.99	1 487.99	0.00	0.00	0.00

Project expenditure spending profile

Period	Period start date	Period end date	Reporting date	Total eligible budget per period	Actual spending	Forecast from the previous project report (3.1)
Period 0	10.01.2019	10.01.2019	09.07.2022	50 000.00	50 000.00	543 759.45
Period 1	10.01.2019	31.12.2019	31.12.2019	1 284 257.14	605 184.04	
Period 2	01.01.2020	31.12.2020	31.12.2020	1 645 380.17	1 046 163.87	
Period 3	01.01.2021	31.12.2021	31.12.2021	1 388 335.23	1 318 820.50	
Period 4	01.01.2022	09.07.2022	09.07.2022	557 198.07	0.00	
Total	N/a	N/a	N/a	4 925 170.61	3 020 168.41	

Project report expenditure per partner (fund amounts)

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
BED	638 118.04	ERDF	377 453.12	30 000.00	335 095.84	335 095.84	72 356.57	72 356.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I&R	346 819.50	ERDF	110 395.24	0.00	98 281.83	98 281.83	7 984.02	7 985.29	-1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UCD	256 072.83	ERDF	130 786.57	0.00	76 558.14	76 558.14	52 896.47	52 896.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UoN	326 917.68	ERDF	271 296.96	0.00	219 537.46	219 537.46	51 607.69	50 770.84	836.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Levstone	200 467.50	ERDF	199 937.80	0.00	160 814.40	160 814.40	39 123.40	39 123.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTU	272 425.13	ERDF	161 611.54	0.00	128 938.01	128 938.01	32 240.45	32 240.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Whysor	177 947.55	ERDF	180 962.26	0.00	143 515.69	143 515.69	37 446.57	37 446.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ITT	114 858.00	ERDF	65 477.23	0.00	41 620.24	41 620.24	23 850.73	23 847.12	3.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SenX	165 613.26	ERDF	106 425.14	0.00	87 465.93	87 465.93	17 897.14	18 288.76	-391.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UU	455 862.87	ERDF	191 649.87	0.00	136 039.19	136 039.19	49 278.65	49 278.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DNI	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	2 955 102.36		1 795 995.73	30 000.00	1 427 866.73	1 427 866.73	384 681.69	384 234.12	447.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project progress report NWE831 REAMIT

Project progress report identification

Title	Improving Resource Efficiency of Agribusiness supply chains by Minimising waste using Big Data and Internet of Things sensors
Acronym	REAMIT
Number	NWE831
Start date	01-01-2022
End date	01-07-2022
Priority	Priority Axis 3 Resource and materials efficiency
Specific objective	
Lead partner	
Contact person	
Reporting period	Period 4 : 01-01-2022 - 31-12-2022

Highlights of main achievements

WP T1: BED supported pilot test leads at Whysor, Ulster, UoN, UCD, I&R, MTU, NTU with implementation of 11 pilot tests; developed template for pilot test story telling.

WP T2: BED, MTU, Ulster, Whysor supported daily maintenance, optimization and trouble shooting of Big Data server; wrote codes to synchronise data coming from Whysor to shared instance; performed data analytics for 7 pilot tests; met 20 times online on WP T2 matters; Levstone advanced mobile APP development.

WP T3: UCD with help from BED obtained data for LCA and advanced LCA for REAMIT; BED explored possibilities for REAMIT legacy by combining Interreg grant with venture capital funds for investing in innovative solutions in agri food supply chains.

WP M: BED updated Project Handbook with minutes from over 20 meetings (RAC/WP/RSC, sub-group, BED/UEssex team, WP T1, WP T2, WP T3); based on inputs from partners, BED developed 6th and 7th REAMIT project progress reports and addressed queries from funder; supported I&R, UU, NTU in coordinating work within all WPs; coordinated development of revised 12-months project extension and budget approved by JS in May 2022; assisted PI with paper work related to his transfer to UEssex including modification of REAMIT AF in eMS; prepared agenda and content of RAC/WP/RSC meeting (July 2022) hosted by Whysor; took over from finance at BED all tasks related to financial reporting and FLC audit.

WP C: PPs presented REAMIT at 10 events; supported NTU with developing REAMIT documentary video, 3 newsletters, 4 posters, 2 case studies and updating website; BED, NTU and Ulster edited special issue of Sustainability journal; PPs advanced work on REAMIT inspired research publications led by BED, UEssex, UCD, UU, NTU.

WP LT: PPs added 3 new organisations to the REAMIT prospectus.

Project specific objectives

Project specific objectives	Level of achievement	Explanations
1 - To pilot test sensor technologies in agri-food supply chains in the five partner countries	to a large degree	Progress with the implementation of current REAMIT pilot tests helps showcase the REAMIT approach and attract new agri food companies to engage with REAMIT consortium for new technology demonstrations.
2 - To develop Big Data infrastructure for analytics and decision support to reduce food waste	to a minor degree	The REAMIT consortium has only recently started to perform data analytics on data coming from IoT sensors. We expect that more analytics will be done in the next months, as more data will be collected and available for data analytics.
3 - To bring the REAMIT combination of technologies closer to market	to a minor degree	The REAMIT consortium has only recently started to look into WP T3, as WP T3 depends on the results obtained from WP T2 and WP T1. We expect that work under WP T3 will be advanced in the remaining of 2022 and 2023.

Project main outputs achievement

Programme output indicators	Sum of output indicator targets	Sum of achieved output indicators so far	Project main output indicator number	Project main output title	Project main output quantification target	Planned delivery	Achieved so far	Level of achievement
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	10.00	T1.1.1	Working prototypes of sensor technologies based on pilot tests with agribusiness users	5.00	10-03-2023	5.00	proceeding according to work plan
5.01. Number of efficient natural and material resources solutions implemented and tested	8.00	10.00	T2.4.1	Technology solutions developed	3.00	10-07-2023	5.00	proceeding according to work plan
CO01. Number of enterprises receiving support	10.00	22.00	T1.2.2	Agribusiness companies supported in food waste reduction pilots	5.00	10-03-2023	17.00	proceeding according to work plan
CO01. Number of enterprises receiving support	10.00	22.00	T2.5.2	Companies supported in technology development	5.00	10-07-2023	5.00	proceeding according to work plan
CO29. Number of enterprises supported to introduce new to the firm products	10.00	10.00	T3.2.1	Companies introduced to REAMIT business case	10.00	10-07-2023	10.00	proceeding according to work plan

Target groups reached

Target groups	Target value	Target groups reached (prev. periods)	Target groups reached current period	Source of verification	Description of target group involvement	Target groups reached so far (%)
local public authority	10.00	1.00	0.00			10.00
regional public authority	5.00	4.00	0.00			80.00
national public authority	5.00	3.00	0.00			60.00
interest groups including NGOs	5.00	25.00	0.00			500.00
higher education and research	20.00	30.00	1.00		NTU have linked with Ajman University, UAE and made a presentation of REAMIT during Research Day of College of Business Administration, Ajman University, UAE on 25/05/2022.	155.00
enterprise, excluding SME	10.00	36.00	0.00			360.00
SME	10.00	18.00	0.00			180.00
business support organisation	5.00	9.00	0.00			180.00
sectoral agency	5.00	9.00	2.00	List of attendees at events, email exchanges.	ITT have connected with FoodCloud Ireland and Origin Chain Networks at Ludgate and Walton Institute in Ireland and explored possibilities for collaboration.	220.00

Problems and solutions found

WP T1: Given that the end of REAMIT is approaching, the consortium decided to focus on the pilot tests already under deployment and adjudicate on the status of the ones that are not progressing or were judged not possible. In the first semester of 2022, consortium decided not to progress with the pilot test with Blue Skies (UK company producing fresh fruit snacks originating from overseas locations) since the technology required for this pilot test did not exist in the market yet. The consortium expected that internet connectivity issues in overseas locations such as Ghana, South Africa, Brazil, etc. may cause challenges that REAMIT partners will not be able to address. A pilot test with Glen Affric Brewery, UK (started in September 2021) has also been ended. Main reason - since January 2022, there has been no communication from the company despite multiple emails and phone calls from REAMIT partners at NTU and Whysor.

WP T2: BED notified REAMIT team of an ongoing security review which has impacted the ability of partners from outside BED to connect to the server via VPN. Whysor in particular was unable to transmit data into the Big Data server at BED as the connection with VPN was paused for some weeks. BED has worked with Whysor and resolved this challenge. Due to COVID-19 pandemic, many pilot tests have been delayed with an effect on the data available for analysis and delay in data analytics.

WP M: Due to travel restrictions due to Covid-19, RAC/WP/RSC meeting on 19-20 of January 2022 took place on line, and not in person as originally planned in Northern Ireland. Nevertheless, the meeting was attended by all partners and resulted in fruitful discussions.

Horizontal Principles

Horizontal principles	Contribution in this reporting period	Description of the contribution
Sustainable development (environment)	as planned	REAMIT contribution to sustainable development is linked to the success of the REAMIT pilot tests. We aim to document the food waste saved and the corresponding impact on savings in carbon emissions. This in turn will be linked to sustainable development.
Equal opportunity and non-discrimination	as planned	Every effort has been made in REAMIT project to promote equal opportunities and non-discrimination. The REAMIT consortium consists of a mix of men and women from different countries and cultures, and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (RF at UCD and BED; VL at BED) and men (Research Fellow at UCD and UU; trainee at Whysor). They are from the EU and outside of the EU (India and Iran).
Equality between men and women	as planned	Every effort has been made in the REAMIT project to promote equality between men and women. The REAMIT consortium consists of a mix of men and women and promotes equal participation wherever possible. Also, new staff employed by REAMIT partners are both women (RF at UCD and BED; VL at BED) and men (Research Fellow at UCD and UU; trainee at Whysor).

Fully implemented

Implemented (to be ticked at the last reporting period, only when the project has fully been achieved):	No
Implemented on:	

Reporting per WP overview

Start	End	Type	Title
Jan.2019	Jan.2019	preparation	Preparation
Jan.2019	Jul.2023	implementation	Long term
Jan.2019	Jul.2023	management	Project management
Mär.2019	Mär.2023	implementation	Adapting and pilot testing sensor technologies in agri-food supply chains
Jan.2019	Jul.2023	implementation	Big Data integration and applications to reduce food wastage.
Jan.2020	Jul.2023	implementation	Business development of REAMIT technologies
Jan.2019	Jul.2023	communication	Communication

Work Package Preparation (preparation)

WP no	Title	Start month	End month	WP Status
P	Preparation	01-2019	01-2019	not started

Partner's involvement

Abbreviation	Name
Whysor	Whysor
UCD	National University of Ireland, Dublin, University College Dublin
SenX	SenX
Levstone	Levstone Ltd.
BED	University of Bedfordshire (Lead Partner)
NTU	Nottingham Trent University
ITT	Institute of Technology in Tralee
I&R	Images & Réseaux
UoN	Université de Nantes

Summary description of activities carried out and contribution of each partner

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Work Package Long term (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
LT	Long term	01-2019	07-2023	proceeding according to work plan	6 510.44	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

PPs started to discuss ideas for 4th REAMIT Symposium hosted by UoN in France in December 2022. PPs have linked with new organisations that have been added to the REAMIT network prospectus: NTU have linked with Ajman University, UAE; ITT have connected with FoodCloud Ireland and Origin Chain Networks at Ludgate and Walton Institute in Ireland.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

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Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity LT.1	Creating a self-sustaining REAMIT Network	01-2019	07-2023	proceeding according to work plan

Deliverable LT.1.1

Deliverable title	Planned delivery month	Deliverable status
Network prospectus	09-2022	proceeding according to work plan
Deliverable description	BED as coordinator will engage partners to develop a network prospectus, setting out the principles by which the network will operate, and ensure financial sustainability based on a low-cost model of voluntary contributions from partners and members.	
Description of progress achieved	PPs have linked with new organisations that have been added to the REAMIT network prospectus: UoN have linked with Ajman University, UAE; ITT have connected with FoodCloud Ireland and Origin Chain Networks at Ludgate and Walton Institute in Ireland.	
Evidence		

Deliverable LT.1.2

Deliverable title	Planned delivery month	Deliverable status
REAMIT networking events: 2019, 20 and 21 including invited lectures from experts	03-2023	proceeding according to work plan
Deliverable description	Partners will bring together agribusiness & technology SMEs from REAMIT countries for a 1-day annual conference: (i) to ensure that REAMIT technologies keep pace with technology developments; and (ii) to maximize achievement of REAMIT's objectives.	
Description of progress achieved	PPs started to discuss ideas for 4th REAMIT Symposium hosted by UoN in France in December 2022.	
Evidence		

Activity	Title	Start month	End month	Status
Activity LT.2	Regularly updating framework for measuring the impact of REAMIT technologies on food waste	01-2019	07-2023	behind schedule

Deliverable LT.2.1

Deliverable title	Planned delivery month	Deliverable status
The agreed framework for measuring the impact of REAMIT technologies on food waste	12-2022	behind schedule
Deliverable description	The framework for measuring the impact of REAMIT technologies on food waste will be agreed at the first networking event in December 2019.	
Description of progress achieved		
Evidence		

Activity	Title	Start month	End month	Status
Activity LT.3	Ensuring policy impact	01-2019	07-2023	not started

Deliverable LT.3.1

Deliverable title	Planned delivery month	Deliverable status
Policy briefings	03-2023	not started
Deliverable description	Meetings or briefing papers issued jointly from the partnership to national or EU-level policy formers to engage in a dialogue over the fit of REAMIT technologies to national and EU food waste reduction targets and policies.	

Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity LT.4	Roll-out to other sectors	01-2019	07-2023	behind schedule
Deliverable LT.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Cross-sector briefings		06-2023	behind schedule	
Deliverable description	REAMIT partners will identify and engage with industry bodies or policy organisations from other sectors where REAMIT technologies may have an application (e.g. EU Medicines Agency, EU Federation of Pharma industries, national health regulators)			
Description of progress achieved				
Evidence				

Work Package Project management (management)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
M	Project management	01-2019	07-2023	proceeding according to work plan	20 587.52	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Based on input from PPs, BED updated Project Handbook with information on calendar for 7th progress report and minutes from meetings: RAC/WP/RSC on 19-20 January 2022, 5 monthly meetings of WP T1, 4 monthly meetings of WP T2, 1 meeting of WP T3, 8 bi-weekly meetings of REAMIT sub-group, 2 monthly meetings of REAMIT team at BED-UESsex. With support from Ulster on 19-20 January 2022, BED organised online meetings of RAC/WP/RSC hosted by Ulster. With support from Ulster, NTU, UCD and MTU, BED developed minutes of RAC/WP/RSC and circulated it to PPs. Based on input from PPs, BED developed 6th REAMIT progress report (3.2) and special REAMIT project progress report 3.3 (covering claims from Whysor, UCD and NTU) and submitted it to JS in May 2022 and March 2022 respectively. Following funder's request, BED collected inputs and clarifications from PPs to address funder's queries related to project progress report 3.2. In April 2022 BED, actioned transfers of funds from BED to PPs claimed in project progress report 3.1 and special project progress report 3.3. BED was in regular contact with leads of all WPs. BED supported I&R in organising WP T1 monthly meetings, attended these meetings and reviewed minutes; supported pilot test leads with implementation of pilot tests; worked with technology partners to trouble shoot challenges with the Big Data server; coordinated data analysis; supported UCD with collecting data for LCA for Yumchop and HMF; organised and facilitated visits at company sites in UK (HMF and Yumchop); supported NTU with developing communication materials (newsletters, website updates, posters, videos); supported Whysor with organisation of RAC/WP/RSC meeting in the NL on 6-7 July 2022 (developed the agenda and content of the meeting, worked with Whysor on arranging visits to company sites in NL and Luxembourg; held 3 monthly meetings of REAMIT team at BED; 8 bi-weekly meetings of REAMIT sub-group and 4 monthly meetings of WP T2. BED assisted partners with addressing multiple queries related to extended budget, budget changes, reporting, eMS, financial claims, eligibility of costs, etc. In March 2022, BED hosted the partner from Ulster who came to help wire sensors for HMF. In May 2022 BED hosted a visit from partners from Ulster and UCD who helped wire sensors for HMF and attended visits at HMF and Yumchop. Based on input from PPs and new instructions from the funder, BED re-developed the budget for the REAMIT project 12-months extension, which was approved by the funder in February 2022. BED coordinated updates of the REAMIT application form in eMS. In May 2022 modifications in the REAMIT AF were accepted by the funder. PM supported PI with paper work related to his transition from BED to UEssex. BED coordinated work of 2 staff members (visiting staff) and started the recruitment process of a third staff member to support BED with running of the Big Data server, developing research publications and data analytics. Due to shortage of staff at finance team at BED, PM took over all tasks related to finance part of REAMIT progress report and daily work and communication with BED FLC auditor. These tasks were previously performed by finance team at BED. BED prepared for on the spot audit of BED in the REAMIT project (originally planned in autumn 2022).

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Due to travel restrictions due to Covid-19, RAC/WP/RSC meeting on 19-20 of January 2022 took place on line, and not in person as originally planned in Northern Ireland. Nevertheless, the meeting was attended by all partners and resulted in fruitful discussions.

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity M.1	General project management	01-2019	01-2023	proceeding according to work plan
Deliverable M.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Project handbook		01-2023	proceeding according to work plan	
Deliverable description	A document which will collate all necessary information for project management purposes, including terms of reference of groups, project procedures, reporting requirements, partnership agreements, GDPR requirements etc			
Description of progress achieved	Based on input from PPs, BED updated Project Handbook with information on calendar for 7th progress report and minutes from meetings: RAC/WP/RSC on 19-20 January 2022, 5 monthly meetings of WP T1, 4 monthly meetings of WP T2, 1 meeting of WP T3, 8 bi-weekly meetings of REAMIT sub-group, 2 monthly meetings of REAMIT team at BED-UEssex.			
Evidence				
Deliverable M.1.2				
Deliverable title		Planned delivery month	Deliverable status	
Minutes of meetings of RSC, and RAC and WP meetings - minimum six meetings each. The meetings of RSC and RAC will provide overall strategic direction of the project.		01-2023	proceeding according to work plan	
Deliverable description	RSC and RAC will meet every six months -two in the UK and one each in the remaining four partner countries. WP meetings will be organized one day before RSC meetings. Minutes of all these meetings will be circulated & agreed within 1 month.			

Description of progress achieved	With support from Ulster on 19-20 January 2022, BED organised online meetings of RAC/WP/RSC hosted by Ulster. With support from Ulster, NTU, UCD and MTU, BED developed minutes of RAC/WP/RSC in January 2022 and circulated it to PPs.			
Evidence				
Deliverable M.1.3				
Deliverable title		Planned delivery month		Deliverable status
Intermediate Work Package coordination		01-2023		proceeding according to work plan
Deliverable description	The leaders of WP will be in regular touch with partners via emails, website and social media sites. Whenever needed, conference facilities via phone, Skype or similar technology will be organised out by leaders of each WP or partners on demand.			
Description of progress achieved	BED was in regular contact with leads of all WPs. BED supported I&R in organising WP T1 monthly meetings and reviewed minutes; supported pilot test leads with implementation of pilot tests; worked with technology partners to trouble shoot challenges with the Big Data server; coordinated data analysis; supported UCD with collecting data for LCA for Yumchop and HMF; organised and facilitated visits at company sites in UK (HMF and Yumchop); supported NTU with developing communication materials (newsletters, website updates, posters, videos); supported Whysor with organisation of RAC/WP/RSC meeting in the NL on 6-7 July 2022 (developed the agenda and content of the meeting, worked with Whysor on arranging visits to company sites in NL and Luxembourg); held 3 monthly meetings of REAMIT team at BED; 8 bi-weekly meetings of REAMIT sub-group and 4 monthly meetings of WP T2. BED assisted partners with addressing multiple queries related to extended budget, budget changes, reporting, eMS, financial claims, eligibility of costs, etc. In March 2022, BED hosted the partner from Ulster who came to help wire sensors for HMF. In May 2022 BED hosted a visit from partners from Ulster and UCD who helped wire sensors for HMF and attended visits at HMF and Yumchop. Minutes of WPs meetings are uploaded under relevant WP and saved in the Project Handbook.			
Evidence				
Deliverable M.1.4				
Deliverable title		Planned delivery month		Deliverable status
Key control register for Project Management		09-2020		proceeding according to work plan
Deliverable description	A register of key control milestones will be prepared by LP and made available to all partners. This register will include useful information (e.g., timetable, risks, meetings, etc.). This will be available online and updated regularly.			
Description of progress achieved	Milestones, risks and timetables for all WPs are discussed at WP regular online meetings.			
Evidence				
Activity	Title	Start month	End month	Status
Activity M.2	Risk register and risk review	01-2019	07-2023	proceeding according to work plan
Deliverable M.2.1				
Deliverable title		Planned delivery month		Deliverable status
Risk register		03-2019		proceeding according to work plan
Deliverable description	Development & partner sign-off of a written risk register, forming an appendix to the project handbook.			
Description of progress achieved	BED identified the following risk in the project: Over-reliance on partners at Whysor could be a risk as the progress will be stalled if they were to leave the consortium. However, we consider the chance of their leaving the project is very low. Risks in the REAMIT project are discussed at bi-annual meetings of REAMIT Steering Committee as well as during monthly meetings of WPs. All PPs are involved in identifying risks and discussing how to address them.			
Evidence				
Deliverable M.2.2				
Deliverable title		Planned delivery month		Deliverable status
Annual risk reviews		07-2023		proceeding according to work plan
Deliverable description	Written notes of annual risk register reviews for 2020 & 2021.			
Description of progress achieved	Risks in the project are discussed at monthly meetings of WPs and bi-annual meetings of RAC/WP/RSC.			
Evidence				

Activity	Title	Start month	End month	Status
Activity M.3	Record keeping and reporting	01-2019	07-2023	proceeding according to work plan
Deliverable M.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Project reports		07-2023	proceeding according to work plan	
Deliverable desription	Submission of complete, accurate & timely, activity & financial reports every six months by the LP partners.			
Description of progress achieved	Based on input from PPs, BED developed 6th REAMIT progress report (3.2) and special REAMIT project progress report 3.3 (covering claims from Whysor, UCD and NTU) and submitted it to JS in May 2022 and March 2022 respectively. Following funder's request, BED collected inputs and clarifications from PPs to address funder's queries related to project progress report 3.2. In April 2022 BED, actioned transfers of funds from BED to PPs claimed in project progress report 3.1 and special project progress report 3.3.			
Evidence				
Deliverable M.3.2				
Deliverable title		Planned delivery month	Deliverable status	
Finance training for partners		04-2019	completed and achieved as planned	
Deliverable desription	An event for all finance managers of all partners, to clearly set out the processes & procedures for claims & payments, & the partners' financial obligations in the project.			
Description of progress achieved				
Evidence				

Work Package Adapting and pilot testing sensor technologies in agri-food supply chains (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T1	Adapting and pilot testing sensor technologies in agri-food supply chains	03-2019	03-2023	proceeding according to work plan	177 871.70	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED supported pilot leads at Whysor, Ulster, UoN, UCD, I&R, MTU, NTU with implementation of 11 pilot tests. 1) Clostridium Bacteria (CB), WD Meats: Aim is to strengthen method of detection of CB allowing for immediate clean-up of surfaces when detected and reducing beef waste in abattoirs, retailers and homes. Since CB material from UCD was dead, in May 2022 Ulster purchased DNA of CB from DSMZ. WD Meats purchased Genesys PCR machine to perform their own testing at the factory. WD Meats and Ulster aim to collaborate to calibrate Genesys machine to identify source of CB. 2) Dry aging chamber, WD Meats: Aim is to reduce weight and quality loss from beef meat during dry-aging process by installing temperature/humidity sensors to map readings across chambers. Second trial ran in April 2022 for 21 days. Based on measurements of meat quality loss during second trial, WD Meats and Ulster will suggest different structuring of carcasses, temperature and humidity settings, to see how they will affect weight loss in 3rd trial. 3) Picnic: Aim is to monitor conditions in cool food boxes transported by e-van. Sensor housing with flexible ring to protect sensor appears not suitable for use with heavy groceries on top. Second batch of sensors got broken too. Picnic was disappointed with REAMIT's system. They expected a ready/plug-and-play solution from REAMIT. In May 2022, Picnic shared with Whysor data on trip details to facilitate data analytics. 4) BIOGROS: Aim is to gain insights into climatic conditions (temperature/humidity) through the complete supply chain (grower, trucks, warehouse) for fragile vegetables (mushrooms, onions, potatoes, celery root). 10 sensors were installed inside BIOGROS's trucks and 7 sensors in different areas of warehouse (e.g. salad department, incoming fresh foods, potatoes). BIOGROS will provide input on thresholds of temperature and alerts. BED to action purchase of 6 new sensors. 5) Van de Huijgevoort Groep (VHG): Aim is to shorten checks process on presence of bacteria (listeria, salmonella), avoid quality product loss due to freezing and thawing, check production room pressure. 2 sub-pressure sensors are being tested in Whysor's office before the tests move to VHG's premises. 6) Landgard: to investigate the cause of quality difference in the same produce coming from 2 different growers (A and B) and reduce food waste of produce coming from producer B. Whysor to install the sensor from the Weyers pilot. 7) Human Milk Foundation: BED purchased 10 new temperature, humidity and binary sensors which were installed by Ulster at HMF during on site visit on 23/05/2022; REAMIT partners had a tour of HMF, collected data for LCA and took footage for a REAMIT documentary. 8) Yumchop: All 10 sensors installed at Yumchop's food factory send data from cool, cold and freezing zones. Dashboard for Yumchop correctly shows temperature in all zones with sensors and sends alerts when temperature raises. On site visit at Yumchop's took place on 25/05/2022 to correct installation of 1 sensor, collect data for LCA and take footage for a REAMIT documentary. 9) Musgrave: Aim is to install temperature and humidity sensors and have an alerting system/cloud upload from Musgrave phone, which can warn if food is at risk of spoilage. In April 2022 Ulster installed the dual-zone (chill and freeze) monitoring sensors in 3 delivery vans at Musgrave. Videos were recorded for REAMIT documentary. Dashboard accounts were set up for 3 staff members at Musgrave to allow them to monitor the vans. 10) Burns Farm Meats: Aim is to monitor temperature and humidity in cold storage rooms of abattoir to reduce food waste. On 23/03/2022 UCD, MTU and Ulster visited the company to assess the needs. UCD actioned purchase of 10 temperature and humidity sensors. 11) Raman Spectroscopy: testing in real conditions in trucks of Routhiau expected to start in September 2022. BED & I&R developed pilot story telling template.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

Given that the end of the REAMIT project is approaching, the consortium decided to focus on the pilot tests already under deployment and adjudicate on the status of the ones that are not progressing or were judged not possible. In the first semester of 2022, the consortium decided not to progress with the pilot test with Blue Skies (UK company producing fresh fruit snacks originating from overseas locations) since the technology required for this pilot test did not exist in the market yet. The REAMIT consortium expected that internet connectivity issues in overseas locations such as Ghana, South Africa, Brazil, etc. may cause many challenges, that REAMIT partners will not be able to address. A pilot test with Glen Affric Brewery, UK (started in September 2021) has also been ended. The main reason is that since the beginning of January 2022, there has been no communication from the company despite multiple emails and phone calls from REAMIT partners at NTU and Whysor.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T1.1 Working prototypes of sensor technologies based on pilot tests with agribusiness users	Five prototypes that use traditional and new sensor technologies to monitor quality of fresh produce and sends the data over WiFi, Cat-M, NB-IOT (or other radio technology) will be produced with agribusiness users recruited through the open call (A1.1)	5.01. Number of efficient natural and material resources solutions implemented and tested	03.2023	5.00			proceeding according to work plan	
T1.2 Agribusiness companies supported in food waste reduction pilots	Agribusiness companies will be recruited through an open call to participate in the pilot tests in A1.2. Each company will benefit from the installation of new technologies for the test period, giving reductions in waste and savings in their costs.	CO01. Number of enterprises receiving support	03.2023	5.00			proceeding according to work plan	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T1.1	Open call for Agri-business agribusiness user companies for pilot tests	03-2019	03-2023	completed
Deliverable T1.1.1				
Deliverable title		Planned delivery month	Deliverable status	
Publication of open call		06-2020	completed and achieved as planned	
Deliverable desription	Partners would develop an open call for participation from companies willing to offer their premises & equipment to the testing of technologies. The call would be issued on the project webspace and through partner networks so that Risk 2 is minimised.			
Description of progress achieved	Additional information about pilot tests with Raman spectroscopy and at WD Meats: French pilots: Actions were undertaken by UoN to complete stage 2 of experiments within lab. The automation of the analysis and the development of an algorithm for the selection of interesting areas have been achieved. Identification of a focal distance enabled to reconfigure the probe positioning. A quality monitoring process has been launched beginning of May 2022. While the system is currently functioning thanks to the adjustments determined in lab, next step is to initiate tests into Routhiau's trucks with the integration of Rama system. WD Meats: 2nd trial has been conducted at WD Meats on Dry Aging in March/ April 2022, taking into account the lessons learned from the previous one. The company will provide soon the measurements of quality/loss at the end of dry-aging cycle, which will enable to suggest different structuring of carcass's / or temperature / humidity control settings before running experiment again. Main issue is to identify the ideal parameters for the dry ageing process which minimize dark facings while avoids harmful bacteria formulation. For the Clostridium pilot, in March a new clostridium mastermix kit has been ordered and delivered to UU. WD Meats have purchased a Genesys PCR machine to perform their own testing at the factory. The next step discussed with the company will be to verify the reliability of their Genesys machine by running DNA at the Ulster lab and at WD Meats and ensuring the same results are achieved. UU is studying the possibility to perform a DNA sequencing study to identify the source of the clostridium.			
Evidence				
Deliverable T1.1.2				
Deliverable title		Planned delivery month	Deliverable status	

Companies recruited from across agri-business supply chain. Minimum 4 companies will be recruited across NWE so that there is a total of 5 user companies (including the one UK agribusiness user (PP12) that is already a partner) for minimum 5 pilot tests.		03-2023	proceeding according to work plan	
Deliverable description	Partners expect to recruit a minimum of 4 companies to participate in the technology tests, with a representative mix of locations, sub-sectors etc. A simple MoU would be issued to them; no funding is involved. One UK user company is already a partner.			
Description of progress achieved	Yumchop (UK), Human Milk Foundation (UK), Musgrave (UK), WD Meats (UK), Picnic (NL), Van de Huijgevoort Groep (NL), Biogros (Luxembourg), Routhiau (France), Landgard (Germany), Burns Farm Meats (Ireland).			
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.2	Transnational synthesis of sensor technologies (Raman Spectroscopy from UoN, 3D Fluorescence from Ulster and CyberBar from UCD) and big data integration	03-2019	03-2023	completed
Deliverable T1.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Partner workshop on sensors and big data		06-2019	completed and achieved as planned	
Deliverable description	A workshop between knowledge partners and sensor/big data SME partners will bring forward all available knowledge about technologies, applications and potential combinations for food supply chains. An internal workshop with around 20 attendees.			
Description of progress achieved				
Evidence				
Deliverable T1.2.2				
Deliverable title		Planned delivery month	Deliverable status	
Test roadmap		03-2023	not started	
Deliverable description	The output from the workshop will be the production of an internal 'test roadmap' combining the results from the call for test companies (so we know how many tests, what kind of companies, and where) with the optimum technologies combinations.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T1.3	Adapting and pilot testing of sensor technologies with agribusiness users	03-2019	03-2023	proceeding according to work plan
Deliverable T1.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Working prototypes using sensor technology		03-2023	proceeding according to work plan	
Deliverable description	The sensor and scanning technologies will tested along with other traditional sensors where needed and adaptations carried out wherever needed. Data flow to be checked. At the end of the pilot test, new working prototypes will be developed.			
Description of progress achieved	11 IoT sensors prototypes are being tested and developed by the REAMIT consortium, with the hope that 5 will be completed and operational by the end of the REAMIT project. Due to its size, presentations of prototypes for WD Meats and Musgrave cannot be uploaded in eMS and can be obtained upon request from REAMIT PM or PI.			
Evidence				
Deliverable T1.3.2				
Deliverable title		Planned delivery month	Deliverable status	
User manual for each pilot test		03-2023	not started	

Deliverable description	A user manual documenting the experience of pilot test and a step-by-step guide of good practice in each pilot test will be developed for the benefit of users willing to test REAMIT technologies in the future.		
Description of progress achieved			
Evidence			
Deliverable T1.3.3			
Deliverable title		Planned delivery month	Deliverable status
Report on the pilot test and development of the sensor prototypes		03-2023	not started
Deliverable description	A report on the 5 sensor-based pilot tests will be compiled by participating partners and posted on the project webspace. It will describe in detail the experiences with the pilot test and give recommendations for future pilot tests.		
Description of progress achieved			
Evidence			

Work Package Big Data integration and applications to reduce food wastage. (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T2	Big Data integration and applications to reduce food wastage.	01-2019	07-2023	proceeding according to work plan	70 199.01	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

REAMIT Big Data server at BED installed in 2020 has supported the project through collection of data from pilot tests. BED is responsible for daily maintenance and optimization of Big Data server speed and life, data management and access by PPs. MTU, Ulster and Whysor regularly support BED with trouble shooting and smooth running of Big Data server architecture and framework. BED added 3 new users from Ulster to Big Data server and provided them with connection guides and access manuals. With help from MTU and Ulster, BED resolved multiple queries from PPs (e.g. when connection attempt was rejected because of authentication failure that involved wrong password or user name). BED manually transferred data from Whysor REAMIT database to Shared instance. As this was not sustainable and required database being deleted and recreated causing some data analytics partners losing their access in the process, BED, MTU, Ulster and Whysor wrote an automated code to synchronise data coming from Whysor instance (database) to common database in Big Data server (shared instance). Ulster wrote data cleaning scripts to remove duplicate data on the shared instance of the database. Shared instance gives PPs access rights to view, read and perform data analytics on data from different pilot tests without altering original data. This made it possible for BED to ensure that data continued to flow into the Big Data server at BED from different pilot tests through Whysor REAMIT database. BED facilitated over 20 online meetings attended by data analytics and technical PPs from MTU, SenX, Ulster, Whysor and Levstone (meetings of WP T2; data analytics possibilities in REAMIT; data analytics for HMF; data analytics for Yumchop; bilateral meetings with Whysor; meetings with Ulster and MTU on Big Data server architecture, design and maintenance). BED coordinated data analytics work carried out by MTU, SenX, BED and Ulster, of data coming from 7 pilot tests: HMF, Picnic, Yumchop, Biogros, Glen Affric, WD Meats, Raman. BED facilitated 6 meetings where analytic partners presented findings, insights and approaches to data analytics, and explored other possibilities for data analytics (e.g. capturing other data points such as journey start and stop times, external weather parameters, quantity of milk & ice in bags (HMF), usage of binary sensors, traffic conditions and integrating with API, predicting maximum journey duration/lengths, optimal routes for journey etc). BED supported MTU and Ulster with developing REAMIT data analytics strategy and data architecture document (a spreadsheet which documents each pilot test, the data that is currently being collected by the sensors, and what data may be required from each company in order to achieve meaningful analytics). With help from MTU and Ulster, BED started to develop statistical and analytical data models for pilot tests. BED held online meetings with Whysor to improve Whysor REAMIT dashboard. Consequently, Whysor made several changes to improve existing, and added new functionalities to Whysor REAMIT dashboard (favourites, dashboard date filter, Whysor on-demand analytics, back-up system, voice-alarming module). Levstone advanced the mobile REAMIT APP.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

BED notified REAMIT team of an ongoing security review which has impacted the ability of partners from outside BED to connect to the server via VPN. Whysor in particular was unable to transmit data into the Big Data server at BED as the connection with VPN was paused for some weeks. BED has worked with Whysor and resolved this challenge.

Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T2.4 Technology solutions developed	3 solutions will be developed: 1) a Big Data platform to detect loss of food quality and understand underlying factors, 2) a Smartphone APP to alert truck drivers, warehouse managers and owners of the produce of the potential quality issues with food in transport and make decisions on rerouting, 3) an integrated IoT sensor and big data solution which will help monitor food quality, make rapid decisions to reroute the food if there is deteriorating quality, and save food waste.	5.01. Number of efficient natural and material resources solutions implemented and tested	07.2023	3.00			proceeding according to work plan	
T2.5 Companies supported in technology development	In this WP, potential suppliers and consumers linked to REAMIT corridors can self-enrol to participate in tests and trials. Our network events will be used to run proactive campaign to include users subject to resource availability.	CO01. Number of enterprises receiving support	07.2023	5.00			proceeding according to work plan	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T2.4	Develop an interface to collect sensor data and send to cloud	07-2019	12-2021	proceeding according to work plan
Deliverable T2.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Creation and launch of interface		12-2021	proceeding according to work plan	
Deliverable desription	An interface will be developed for each of the 5 pilot tests for collecting data from sensors and sending them to the cloud for use in a transnational Big Data infrastructure			
Description of progress achieved	BED worked with Whysor to improve the REAMIT dashboard at Whysor for REAMIT pilot tests. Whysor executed weekly synchronisation scripts to push data from Whysor cloud to Big Data server at BED. The pictures of the interface are included in power points for specific pilot tests.			
Evidence				
Deliverable T2.4.2				
Deliverable title		Planned delivery month	Deliverable status	
User Manual on launching the interface		12-2021	proceeding according to work plan	
Deliverable desription	A user manual documenting the experience of creating and launching the interface and a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			

Description of progress achieved		Work in progress.		
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.5	Development of Big Data infrastructure for analytics of sensor data and for rerouting to minimise food waste	01-2020	12-2022	proceeding according to work plan
Deliverable T2.5.1				
Deliverable title		Planned delivery month		Deliverable status
A big data platform with capability to collect and store sensors data from all REAMIT corridors		12-2022		proceeding according to work plan
Deliverable description	This big data platform will be used as the hub for conducting business analytics, and will create an understanding of complex, transnational supply chains. This will be hosted in BED.			
Description of progress achieved	REAMIT Big Data server at BED installed in 2020 has supported the project through collection of data from pilot tests. BED is responsible for daily maintenance and optimization of Big Data server speed and life, data management and access by PPs. MTU, Ulster and Whysor regularly supported BED with trouble shooting and smooth running of Big Data server architecture and framework. BED added 3 new users from Ulster to Big Data server and provided them with connection guides and access manuals. With help from MTU and Ulster, BED resolved multiple queries from PPs (e.g. when connection attempt was rejected because of authentication failure that involved wrong password or user name). BED facilitated over 20 meetings of data analytics and technology partners from MTU, SenX, Ulster and BED to link big data analytics with decision support system for agri food companies participating in REAMIT pilot tests.			
Evidence				
Deliverable T2.5.2				
Deliverable title		Planned delivery month		Deliverable status
Reports on Big Data platform performance		12-2022		not started
Deliverable description	Partners leading the activity will provide regular annual reports on the performance of the platform.			
Description of progress achieved				
Evidence				
Deliverable T2.5.3				
Deliverable title		Planned delivery month		Deliverable status
A web-interface with self-enrol facility for enrolment of potential suppliers and consumers of food produce		12-2022		not started
Deliverable description	Potential suppliers and consumers can self-enrol after approval from the lead partner. This will be augmented using Google Maps data to identify potential destinations for rerouting food that would otherwise become waste.			
Description of progress achieved				
Evidence				
Deliverable T2.5.4				
Deliverable title		Planned delivery month		Deliverable status
User manuals for the big data platform and the web-interface highlighted in the two deliverables above		12-2022		not started
Deliverable description	The user manuals will document the experience of creating the big data platform and the web-interface and include a step-by-step guide of good practice will be developed for the benefit of users willing to test REAMIT technologies in the future.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status

Activity T2.7	Development of smartphone APP for use by truck drivers and warehouses	01-2020	07-2022	behind schedule
Deliverable T2.7.1				
Deliverable title		Planned delivery month	Deliverable status	
Launch of smartphone APP for linking to food owners, truck drivers and warehouses.		07-2022	behind schedule	
Deliverable description	This APP will be developed and tested to work in Android and Apple smartphones. This APP will also be used to link to all relevant stakeholders for long terms dissemination after getting GDPR consent from all parties.			
Description of progress achieved	Levstone have updated the APP to fit the Android Operating system as new IoT devices are available on the market. At the moment there is no real time pilot test data coming in the main Big Data Server, but Levstone are active and having a first look at the historic data and taking initial steps to identify all the missing data sets so that they can start to visualise a working solution. Levstone proposed creating a second database. This database has been developed up to a point but requires in depth input from partners as to what data is needed by whom, etc. It is envisaged that this is to ensure that REAMIT partners will have something to show to new companies (to be engaged in REAMIT pilot tests) i.e. to show real data so these companies can see what REAMIT can offer. As more and more data is coming to the Big Data server from the Whysor cloud, this will enable Levstone to visualize the next step of interfaces with the App. As of now, there is a no data flowing to or from the Levstone cloud to the UoB server. This will require configuration of matching Whysor data with the App.			
Evidence				
Deliverable T2.7.2				
Deliverable title		Planned delivery month	Deliverable status	
User manual for the use of the APP		07-2022	not started	
Deliverable description	A user manual documenting the experience of creating and launching the APP and a step-by-step guide of good practice will be developed for the benefit of food owners, truck drivers and warehouse managers using the APP.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T2.8	Delivering the integrated IoT/Big Data technology with capabilities on analytics and decision support to help reduce food waste in NWE.	01-2019	07-2023	proceeding according to work plan
Deliverable T2.8.1				
Deliverable title		Planned delivery month	Deliverable status	
Deployment of the integrated IoT/Big Data/analytics/Decision support technology		07-2022	proceeding according to work plan	
Deliverable description	This integrated technology will have the capability to bring together the outputs of sensor technology and analytics to provide decision support to owners of food at risk, truck drivers and warehouse managers via the Smartphone APP.			
Description of progress achieved	The consortium has started to integrate the IoT technology at pilot test companies with the Big Data analytics technology and decision support system technology, which sends alerts to agri food actors when conditions in which food is stored or transported change, and thus affect quality of food leading to food waste. Integration is done for each pilot test individually. Results obtained so far are presented in the power points on data analytics for pilot test (Yumchop, HMF, Biogros, Musgrave). Due to size, some presentations can not be uploaded in eMS and can be presented upon request.			
Evidence				
Deliverable T2.8.2				
Deliverable title		Planned delivery month	Deliverable status	
A user manual for the integrated IoT/Big Data/analytics/Decision support technology		07-2023	not started	
Deliverable description	A user manual documenting the experience of creating and launching the integrated IoT/Big Data technology and a step-by-step guide of good practice will be developed for the benefit of future users willing to test REAMIT technologies.			

Description of progress achieved	
Evidence	

Work Package Business development of REAMIT technologies (implementation)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
T3	Business development of REAMIT technologies	01-2020	07-2023	proceeding according to work plan	73 159.76	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

BED supported Ulster with the implementation of WP T3: organisation of WP T3 meeting facilitated by Ulster on 16/02/2022; developing Market Readiness Report and research publications. BED, with support from Ulster and NTU, drafted the qualitative questionnaire on the use of IoT sensors by agri food companies. It will be finalised in the next weeks and sent to agri-food companies in UK to collect information. BED supported Ulster and UCD in mapping sensors and business landscape, which is being written up as a journal article (led by Ulster and UCD). BED supported UCD with obtaining data for LCA for Yumchop and HMF by organising visits to companies' sites at HMF (23/05/2022, Rothamsted Research, Harpenden, UK) and Yumchop (25/05/2022, Towcester, UK). During these visits, meetings with key staff members took place to discuss technical questions linked to LCA. Data collection for HMF is based on specifically requested data on their primary processes, i.e. milk collection, first transportation, milk handling at HMF (milk unloading, labelling for identification, serology screening, pasteurisation, microbial screening, freezing and storage), second transportation. Data include main inputs (materials and energy) and direct outputs (wastes), e.g. energy consumed by breast pumps, number of polystyrene bottles for milk storage, milk transport mode, average transport distance, the quantity of milk transported, insulated and weather-resistant bags used to transport the milk, dry ice or cool packs to maintain the milk temperature, energy consumed during freezing and pasteurisation and the percentage of milk wasted. Data collection for Yumchop is based on the following processes, raw materials acquisition and transportation, food preparation (vegetable cleaning and dicing and meat marination), cooking, packaging, blast freezing, long-term cold frozen storage, transportation and retail in vending machines. Data collected include mainly type and amount of vegetable and meat, average transport distance from suppliers to factory, mode of transport, packaging materials (paper), energy consumed during blast freezing and cold frozen storage and average transportation distance from factory to vending machines or consumer's home. Data unavailable from companies is being estimated based on other data sources, such as other LCA studies and LCA databases. The life cycle impact assessment method ReCiPe will be used to convert the data into a set of potential impacts to better understand the damage caused by resource use, emissions and wastes and assess the benefits of installing sensors and the environmental consequences of reducing food wastes. BED started to explore ideas for REAMIT legacy i.e. possibilities for setting up a spin off company funded by venture capital that can continue to provide services (offered by the REAMIT project) to agri-food companies after the Interreg grant has expired in July 2023. PM attended Private Capital Symposium for venture capital investors, London, 30 June 2022.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

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Project main outputs	Project main output description	Programme output indicator	Planned delivery month	Main output quantification target	Achieved so far (not including this reporting period)	Achieved in this report	Level of achievement	Attachment
T3.2 Companies introduced to REAMIT business case	The business cases will be used to encourage businesses to take up the REAMIT approach of combined technologies and turn them into marketable products. The output is the number of companies (not currently partners) benefitting from an in-depth introduction to the REAMIT approach.	CO29. Number of enterprises supported to introduce new to the firm products	07.2023	10.00			proceeding according to work plan	

Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity T3.1	Risk, technology and sustainability assessments of REAMIT technologies (led by UCD with support from NTU, UU and BED)	01-2021	07-2023	proceeding according to work plan

Deliverable T3.1.1

Deliverable title	Planned delivery month	Deliverable status
An assessment report of REAMIT technologies including a comprehensive systematic review (mapping) of the technical and business landscape in the fresh produce food chain.	09-2022	proceeding according to work plan
Deliverable description	The assessment report will be an internal document for partners, used as the basis for the business models development (AT3.4)	
Description of progress achieved	BED supported UCD and Ulster with developing an assessment report of REAMIT technologies including a comprehensive systematic review (mapping) of the technical and business landscape in the fresh produce food chain.	
Evidence		

Deliverable T3.1.2

Deliverable title	Planned delivery month	Deliverable status
Life Cycle Assessment (LCA) for REAMIT	07-2023	proceeding according to work plan
Deliverable description	The life cycle assessment system will allow environmental impact data to be integration with REAMIT IoT sensor and big data solutions.	
Description of progress achieved	BED supported UCD with obtaining data for LCA for Yumchop and HMF by organising visits to companies' sites at HMF (23/05/2022, Rothamsted Research, Harpenden, UK) and Yumchop (25/05/2022, Towcester, UK). During these visits, meetings with key staff members took place to discuss technical questions linked to LCA. Data collection for HMF is based on specifically requested data on their primary processes, i.e. milk collection, first transportation, milk handling at HMF (milk unloading, labelling for identification, serology screening, pasteurisation, microbial screening, freezing and storage), second transportation. Data include main inputs (materials and energy) and direct outputs (wastes), e.g. energy consumed by breast pumps, number of polystyrene bottles for milk storage, milk transport mode, average transport distance, the quantity of milk transported, insulated and weather-resistant bags used to transport the milk, dry ice or cool packs to maintain the milk temperature, energy consumed during freezing and pasteurisation and the percentage of milk wasted. Data collection for Yumchop is based on the following processes, raw materials acquisition and transportation, food preparation (vegetable cleaning and dicing and meat marination), cooking, packaging, blast freezing, long-term cold frozen storage, transportation and retail in vending machines. Data collected include type and amount of vegetable and meat, average transport distance from suppliers to factory, mode of transport, packaging materials (paper), energy consumed during blast freezing and cold frozen storage and average transportation distance from factory to vending machines or consumer's home. Data unavailable from companies is being estimated based on other data sources, such as other LCA studies and LCA databases.	
Evidence		

Activity	Title	Start month	End month	Status
Activity T3.2	Future-proofing REAMIT Technologies (led by UCD with support from BED)	01-2020	07-2023	not started
Deliverable T3.2.1				
Deliverable title		Planned delivery month	Deliverable status	
Current and identified future REAMIT technology assessment report		07-2023	not started	
Deliverable description	The Future-proof report will be made available to SME technology developers with a view to identifying both the bottlenecks and potential solutions that can be used to drive future food quality analysis technology developments.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.3	Market assessment (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2023	not started
Deliverable T3.3.1				
Deliverable title		Planned delivery month	Deliverable status	
Market readiness report.		07-2023	not started	
Deliverable description	A market analysis and foresight report identifying forthcoming opportunities for REAMIT technologies to be developed into marketable products			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity T3.4	Development of business case (led by UU with support from BED, I&R, Valorial and NTU)	01-2020	07-2023	not started
Deliverable T3.4.1				
Deliverable title		Planned delivery month	Deliverable status	
Business prospectus		07-2023	not started	
Deliverable description	An outward-facing document will be made available to SME technology developers, to potential buyers of technology approaches (large agri-business and logistics companies) and potential investors who can see the possibilities for product development.			
Description of progress achieved				
Evidence				
Deliverable T3.4.2				
Deliverable title		Planned delivery month	Deliverable status	
Business case for achieving 40,000 tonnes of waste reduction		07-2023	not started	
Deliverable description	The business case will use REAMIT data from continual monitoring of sensor data for identifying/saving potential food waste and subsequent analytics to understand patterns of food waste in NWE with justification for saving 40,000 tonnes of food waste.			
Description of progress achieved				
Evidence				

Work Package Communication (communication)

WP no	Title	Start month	End month	WP status	Expenditure (current report)	% of WP reported so far
C	Communication	01-2019	07-2023	proceeding according to work plan	23 000.25	0.00

Partner's involvement

Abbreviation	Name
BED	University of Bedfordshire (Lead Partner)
I&R	Images & Réseaux
UCD	National University of Ireland, Dublin, University College Dublin
UoN	Université de Nantes
Levstone	Levstone Ltd.
NTU	Nottingham Trent University
Whysor	Whysor
ITT	Institute of Technology in Tralee
SenX	SenX
UU	Ulster University
DNI	Dunbia (Northern Ireland) exited REAMIT since Feb-2020

Please describe the overall project progress in this reporting period, and explain how the partners jointly implemented their activities.

Based on inputs from PPs, NTU updated REAMIT Communication Strategy. BED supported NTU with the development of the REAMIT documentary video. NTU have connected with a UK based film director, Rich Osborne of Type40 Creative. During the reporting period, NTU coordinated recordings and video footage at the premises of pilot test companies - Yumchop and Human Milk Foundation. NTU arranged filming to take place in Luxembourg and the Netherlands in July 2022. The purpose of this documentary is to showcase our journey in the REAMIT project so far and highlight the work of the consortium through pilot tests to help reduce food waste. BED supported NTU with updating the REAMIT websites, developing 3 REAMIT newsletters (two in January 2022 and one in March 2022) published on REAMIT website and sent to our network through MailChimp with an integrated mailing list; developing REAMIT posters and case studies. PPs communicated about REAMIT through social media (LinkedIn, Twitter). PPs have made over 50 instances of communication about REAMIT in social media. REAMIT PPs presented, represented and promoted REAMIT project at 9 internal and external events focusing on ICT, food supply chains, agri-food production and business strategies: 1. SA from BED presented REAMIT at Institute for Research in Applicable Computing, UoB, 2/02/2022. 2. 'The role of food waste in improving sustainability of food supply chains', RR from UEssex and Abi Adefisan (Yumchop), UEssex, 22/05/2022. 3. RR from UEssex and JG from UU co-presented the REAMIT at the Essex Business School seminar "Flooded by data: What can businesses do with the huge volumes of data they collect and how can data improve their supply chains", 26/4/2022 UEssex. 4. KP and SA from BED presented REAMIT at UoB 2022 Annual Research Conference, Luton, 17/06/2022. 5. UoN presented REAMIT at '21st ISBC & XIX ISLS symposium', Gijon-Spain, 31/05/2022 - 3/06/2022. 6. NTU presented REAMIT at 'Research Day of College of Business Administration at Ajman University', UAE, 25/05/2022. 7. NTU presented REAMIT at Food Waste Fest 2022, 11-12/05/2022 (online). 8. NTU: 'Race to Zero -Decarbonisation Conference for Food and Drink Manufacturing', School of Artisan Food, Welbeck, Nottinghamshire. UK, 21/06/2022. 9. MTU: promoted REAMIT at 'Industry Day', 2/03/2022, MTU Kerry campus, Ireland.

Please describe and justify any problems and deviations including delays from the work plan presented in the application form and the solutions found.

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Communication objectives - what is the progress toward the communication objectives as defined in the application form? The level of achievement should be cumulative; however the explanation should describe achievements in this reporting period

Project specific objectives	Level of achievement	Explanations
To raise awareness on the potential of sensor technology to monitor food quality in food supply chains. While there has been significant improvements in the capabilities of sensors and their connectivity over the internet, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains.	to a large degree	At least 10 companies in agri food supply chains in NWE (UK, IE, FR, NL, LU) have actively engaged in REAMIT pilot tests aiming to demonstrate the potential of IoT sensor technology to monitor conditions in which food is stored and transported and thus help reduce food waste. Several other companies have learnt about the potential of IoT technologies through external events where REAMIT has been presented.
To convince agribusiness users using the results of pilot studies that food waste can be significantly reduced by adopting REAMIT's integrated IoT-Big Data-Analytics technology solution. REAMIT will conduct regular networking events with agribusiness users, popularise the benefits of using these new technologies, and showcase demonstrations to influence their attitude.	to a large degree	Several companies engaged in REAMIT pilot tests have been convinced that adopting IoT and Big Data analytics technologies can help them reduce food waste.
To raise awareness on the potential of combining sensor technology with big data analytics to monitor food quality in food supply chains. As highlighted earlier, while there has been significant improvements in the capabilities of sensors, their connectivity over the internet, and the potential of conducting data analytics, agribusinesses engaged in food supply chains are not currently knowledgeable on these capabilities. REAMIT will engage with agribusiness users in NWE in order to raise awareness on the useful capabilities of sensor technologies in monitoring and controlling food along supply chains, collecting huge volumes of data on food quality across the NWE region to identify patterns of food wastage, most frequent causes of food waste, and, likely actions that would have maximum impact in reducing food waste. Policy briefs will be developed to provide action oriented solutions that can be favourably considered by policy makers in NWE.	to a large degree	Partners are presenting the REAMIT project at various events which give the opportunity of presenting the potential of combining IoT sensors with big data analytics to monitor food quality in agri food supply chains. Also, we are planning to conduct a survey among agri food companies to understand what challenges and barriers they face regarding the use of these technologies. Having a better understanding of barriers and challenges with the adoption of IoT and Big Data analytics technologies will help us better reach out to agri food companies who are keen in adopting these technologies.
Using the analytics algorithms and decision support, REAMIT will identify patterns on food waste in NWE and assess the most frequent causes of food wastage along supply chains. By regularly publishing this information through blogs, social media, project outputs and policy briefs, REAMIT will make efforts to change behaviour of relevant stakeholders. For example, targeted feedback of the results to owners of food, decision support on redistribution of food to avoid food becoming waster, etc. will help change behaviour of owners of food and members of food supply chains at micro levels. Policy briefings to suggest best ways of avoiding food waste and regulatory suggestions will help reduce food waste in the region at a macro level.	not achieved	
Based on the risk and sustainability assessment, the project aims to convince agribusiness users of the value of REAMIT's technologies in reducing food waste and increase profitability of their businesses. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help influence their attitude.	not achieved	

Understand the risks involved in the technologies, to help design future-proof technologies for food waste reduction and also the sustainability issues. Business cases, business prospectus, market readiness report, and other assessment reports prepared based on WP T3 will be targeted at various agribusiness users in NWE (using traditional channels and electronic channels including social media) to help increase knowledge about sustainability aspects of technologies, knowledge and benefits of saving food waste, and policy oriented activities.	not achieved	
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Please describe progress achieved in this reporting period

Activity	Title	Start month	End month	Status
Activity C.1	Start-up activities including communication strategy	01-2019	01-2023	proceeding according to work plan
Deliverable C.1.1				
Deliverable title		Planned delivery month		Deliverable status
Communication strategy document		01-2023		proceeding according to work plan
Deliverable description	A communication strategy approved by Steering Committee (RSC) including guidelines on local, regional and inter-regional strategies will be delivered in the first quarter, and reviewed annually. It will outline approach to reach all target groups.			
Description of progress achieved	Based on inputs from PPs, NTU have updated the REAMIT Communication Strategy.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.2	Digital activities	03-2019	07-2023	proceeding according to work plan
Deliverable C.2.1				
Deliverable title		Planned delivery month		Deliverable status
Website launch		03-2019		proceeding according to work plan
Deliverable description	In line with communication rules specified in Interreg documents, the REAMIT webspace will be developed within the Interreg NWE site. It will include updated information on benefit to target groups, operational & technical specifications of IoT/ Big Data			
Description of progress achieved	Based on inputs from PPs, NTU have updated REAMIT websites.			
Evidence				
Deliverable C.2.2				
Deliverable title		Planned delivery month		Deliverable status
Social media		03-2019		proceeding according to work plan
Deliverable description	Social media - twitter, Whatsapp, and Facebook will be added to facilitate more active project communication. This will create opportunity for discussion on any technological development in IoT and operational success of food waste management.			
Description of progress achieved	The REAMIT twitter account has seen a 25% increase in engagement in the past reporting period, with 52 total retweets and 106 total likes. NTU and PPs share regular news about REAMIT at least once a week on LinkedIn and/or Twitter.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.3	Promotional material	01-2019	07-2022	proceeding according to work plan

Deliverable C.3.1				
Deliverable title		Planned delivery month		Deliverable status
Project banners, posters and flyers		07-2022		proceeding according to work plan
Deliverable description	Banners and posters about the project will be developed in 4 languages. Banners will be kept in partners' workplaces and also in event venues to create visibility of the project. Posters will be used to promote the project in all major events conducted			
Description of progress achieved	Based on input from PPs, NTU have developed 4 new posters of REAMIT pilot tests and a new logo banner (taking into account University of Essex joining REAMIT as a new sub-partner of BED). REAMIT documentary video is being developed by Type40 Creative Ltd and directed by NTU. 3 REAMIT newsletters were published in the past semester (two in January 2022 and one in March 2022). They are published on the REAMIT website and sent to REAMIT network through MailChimp with an integrated mailing list. NTU with help from BED, Ulster, UCD and MTU advanced case studies on HMF and Yumchop.			
Evidence				
Deliverable C.3.2				
Deliverable title		Planned delivery month		Deliverable status
Policy briefs		07-2022		not started
Deliverable description	Based on the analytics of sensor data, policy oriented briefs will be developed for each country on the best ways to reduce food waste.			
Description of progress achieved				
Evidence				
Activity	Title	Start month	End month	Status
Activity C.4	Public Event(s)	01-2019	07-2023	proceeding according to work plan
Deliverable C.4.1				
Deliverable title		Planned delivery month		Deliverable status
Reports on REAMIT Networking events		12-2022		proceeding according to work plan
Deliverable description	Three REAMIT networking events will be conducted (1 annually) to reach all target groups in all five countries. The reports will be widely published to reach more more members of target groups using traditional and electronic channels.			
Description of progress achieved	4th REAMIT Symposium is planned in December 2022 or January 2023 in Nantes, France.			
Evidence				
Activity	Title	Start month	End month	Status
Activity C.5	Publication(s)	01-2019	07-2023	proceeding according to work plan
Deliverable C.5.1				
Deliverable title		Planned delivery month		Deliverable status
Journal article		07-2023		proceeding according to work plan
Deliverable description	Scientific publication will target high-level academic journal. At least 2 articles will be produced from the project results			
Description of progress achieved	BED, NTU, Ulster, UCD, MTU, Whysor have been developing the following research publications: - 2 pilot test case studies: Yumchop and HMF; - 'EXAMINING THE INFLUENCE OF ABILITY, TRUST, OPPORTUNITY AND MOTIVATION ON IOT SENSORS ADOPTION FOR PREVENTING FOOD WASTE', Y. Duan, accepted, ICT 2022 conference, June 2022; - Editing Sustainability Journal - All REAMIT related articles will be published in this journal. - Research articles on Life Cycle Assessment for HMF and Yumchop			
Evidence				



Project report tables

Project report expenditure summary

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
											16.06.2023	16.06.2023					
Total co-financing	3 443 243.92	2 461 169.56	30 000.00	1 812 100.85	1 812 100.85	392 236.78	411 688.56	31 174.81	0.00	50 626.57	411 688.56	411 688.56	0.00	0.00	0.00	0.00	0.00
Partner contribution	2 295 495.99	1 640 780.26	20 000.00	1 208 067.56	1 208 067.56	261 491.31	274 459.13	20 783.21	0.00	33 751.05	274 459.13	274 459.13	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	5 738 739.91	4 101 949.82	50 000.00	3 020 168.41	3 020 168.41	653 728.09	686 147.69	51 958.02	0.00	84 377.62	686 147.69	686 147.69	0.00	0.00	0.00	0.00	0.00

Project report expenditure per partner

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation on cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
												16.06.2023	16.06.2023					
BED	1 261 536.94	ERDF	789 800.44	50 000.00	679 087.39	679 087.39	160 711.86	160 711.86	0.00	0.00	0.00	160 711.86	160 711.86	0.00	0.00	0.00	0.00	0.00
I&R	616 664.35	ERDF	282 341.05	0.00	177 111.90	177 111.90	33 094.03	33 411.84	-317.81	0.00	0.00	33 411.84	33 411.84	0.00	0.00	0.00	0.00	0.00
UCD	550 484.74	ERDF	289 093.20	0.00	215 757.71	215 757.71	71 115.56	71 115.56	0.00	0.00	0.00	71 115.56	71 115.56	0.00	0.00	0.00	0.00	0.00
UoN	620 198.15	ERDF	603 866.03	0.00	450 513.86	450 513.86	81 427.91	80 335.49	1 092.42	0.00	0.00	80 335.49	80 335.49	0.00	0.00	0.00	0.00	0.00
Levstone	398 652.50	ERDF	365 080.73	0.00	333 229.70	333 229.70	11 766.93	11 766.93	0.00	0.00	0.00	11 766.93	11 766.93	0.00	0.00	0.00	0.00	0.00
NTU	524 094.58	ERDF	436 735.83	0.00	268 630.80	268 630.80	103 079.64	53 599.38	49 480.26	0.00	0.00	53 599.38	53 599.38	0.00	0.00	0.00	0.00	0.00
Whysor	357 776.47	ERDF	446 563.11	0.00	301 603.81	301 603.81	39 750.18	124 127.80	0.00	0.00	84 377.62	124 127.80	124 127.80	0.00	0.00	0.00	0.00	0.00
ITT	191 430.00	ERDF	173 395.55	0.00	109 112.28	109 112.28	41 213.73	41 233.86	-20.13	0.00	0.00	41 233.86	41 233.86	0.00	0.00	0.00	0.00	0.00
SenX	276 022.10	ERDF	212 179.12	0.00	176 257.85	176 257.85	17 853.43	16 130.15	1 723.28	0.00	0.00	16 130.15	16 130.15	0.00	0.00	0.00	0.00	0.00
UU	941 880.08	ERDF	502 894.76	0.00	308 863.11	308 863.11	93 714.82	93 714.82	0.00	0.00	0.00	93 714.82	93 714.82	0.00	0.00	0.00	0.00	0.00
DNI	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	5 738 739.91		4 101 949.82	50 000.00	3 020 168.41	3 020 168.41	653 728.09	686 147.69	51 958.02	0.00	84 377.62	686 147.69	686 147.69	0.00	0.00	0.00	0.00	0.00

Project report expenditure per budgetline

Budgetline	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
											16.06.2023	16.06.2023					
Staff costs	4 070 878.37	3 265 669.53	0.00	2 389 893.61	2 389 893.61	527 947.42	553 264.69	43 045.76	0.00	68 363.03	553 264.69	553 264.69	0.00	0.00	0.00	0.00	0.00
Office and administration	610 631.25	489 849.64	0.00	358 483.50	358 483.50	79 191.99	82 989.57	6 456.86	0.00	10 254.44	82 989.57	82 989.57	0.00	0.00	0.00	0.00	0.00
Travel and accommodation	238 386.42	58 317.91	0.00	37 987.25	37 987.25	2 378.11	2 404.19	361.12	0.00	387.20	2 404.19	2 404.19	0.00	0.00	0.00	0.00	0.00
External expertise and services	457 510.06	122 063.96	50 000.00	123 044.91	123 044.91	19 127.37	17 840.59	2 094.28	0.00	807.50	17 840.59	17 840.59	0.00	0.00	0.00	0.00	0.00
Equipment	361 333.81	166 048.78	0.00	110 759.14	110 759.14	25 083.20	29 648.65	0.00	0.00	4 565.45	29 648.65	29 648.65	0.00	0.00	0.00	0.00	0.00
Infrastructure and works	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	5 738 739.91	4 101 949.82	50 000.00	3 020 168.41	3 020 168.41	653 728.09	686 147.69	51 958.02	0.00	84 377.62	686 147.69	686 147.69	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	5 738 739.91	4 101 949.82	50 000.00	3 020 168.41	3 020 168.41	653 728.09	686 147.69	51 958.02	0.00	84 377.62	686 147.69	686 147.69	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage

Workpackage	Project total budget	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
		Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
											16.06.2023	16.06.2023					
Wp P	50 000.00	0.00	50 000.00	50 000.00	50 000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	518 843.74	242 578.41	0.00	165 867.36	165 867.36	46 135.70	40 404.20	5 731.50	0.00	0.00	40 404.20	40 404.20	0.00	0.00	0.00	0.00	0.00
Wp M	848 484.87	773 306.57	0.00	679 415.70	679 415.70	52 261.66	57 966.76	2 094.28	0.00	7 799.38	57 966.76	57 966.76	0.00	0.00	0.00	0.00	0.00
Wp T1	1 862 184.01	1 428 985.51	0.00	1 026 689.46	1 026 689.46	219 184.23	258 875.21	7 112.36	0.00	46 803.34	258 875.21	258 875.21	0.00	0.00	0.00	0.00	0.00
Wp T2	1 229 834.51	718 455.56	0.00	491 017.30	491 017.30	127 318.32	148 404.34	1 117.28	0.00	22 203.30	148 404.34	148 404.34	0.00	0.00	0.00	0.00	0.00
Wp T3	644 913.27	349 163.26	0.00	215 893.42	215 893.42	93 958.07	93 978.20	-20.13	0.00	0.00	93 978.20	93 978.20	0.00	0.00	0.00	0.00	0.00
Wp C	584 479.51	589 460.51	0.00	391 285.17	391 285.17	114 870.11	86 518.98	35 922.73	0.00	7 571.60	86 518.98	86 518.98	0.00	0.00	0.00	0.00	0.00
Total	5 738 739.91	4 101 949.82	50 000.00	3 020 168.41	3 020 168.41	653 728.09	686 147.69	51 958.02	0.00	84 377.62	686 147.69	686 147.69	0.00	0.00	0.00	0.00	0.00
Net Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	5 738 739.91	4 101 949.82	50 000.00	3 020 168.41	3 020 168.41	653 728.09	686 147.69	51 958.02	0.00	84 377.62	686 147.69	686 147.69	0.00	0.00	0.00	0.00	0.00

Project report expenditure per workpackage per budgetline (total values)

Wp number / budgetline	Staff costs	Office and administration	Travel and accommodation	External expertise and services	Equipment	Infrastructure and works	Total	Net Revenue	Total eligible expenditure
Wp P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wp LT	34 347.91	5 152.17	46.38	857.74	0.00	0.00	40 404.20	0.00	40 404.20
Wp M	38 651.55	5 797.69	612.77	7 319.16	5 585.59	0.00	57 966.76	0.00	57 966.76
Wp T1	201 143.02	30 171.42	1 155.26	5 773.03	20 632.48	0.00	258 875.21	0.00	258 875.21
Wp T2	125 915.11	18 887.25	0.00	221.75	3 380.23	0.00	148 404.34	0.00	148 404.34
Wp T3	81 163.54	12 174.53	589.78	0.00	50.35	0.00	93 978.20	0.00	93 978.20
Wp C	72 043.56	10 806.51	0.00	3 668.91	0.00	0.00	86 518.98	0.00	86 518.98
Total	553 264.69	82 989.57	2 404.19	17 840.59	29 648.65	0.00	686 147.69	0.00	686 147.69

Project report expenditure - invoices outside of the eu part of the programme area

Fund	Project total budget	Previous reports (state of play at the date of submission to js of the current report)			Total amount declared to flc	Total amount certified by flc	Total amount included in project report - declared to js
		Declared to flc	Reported to js	Confirmed by ca			
Total co-financing	3 443 243.92	905.40	892.79	892.79	0.00	0.00	0.00
Partner contribution	2 295 495.99	603.61	595.20	595.20	0.00	0.00	0.00
Total eligible expenditure	5 738 739.91	1 509.01	1 487.99	1 487.99	0.00	0.00	0.00

Project expenditure spending profile

Period	Period start date	Period end date	Reporting date	Total eligible budget per period	Actual spending	Forecast from the previous project report (3.3)
Period 0	10.01.2019	10.01.2019	09.07.2022	50 000.00	50 000.00	157 153.53
Period 1	10.01.2019	31.12.2019	31.12.2019	1 284 257.14	605 184.04	
Period 2	01.01.2020	31.12.2020	31.12.2020	1 645 380.17	1 046 163.87	
Period 3	01.01.2021	31.12.2021	31.12.2021	1 388 335.23	1 318 820.50	
Period 4	01.01.2022	31.12.2022	31.12.2022	689 862.42	0.00	
Period 5	01.01.2023	09.07.2023	10.07.2023	680 904.95	0.00	
Total	N/a	N/a	N/a	5 738 739.91	3 020 168.41	

Project report expenditure per partner (fund amounts)

Partner	Project total budget	Fund	Previous reports (state of play at the date of submission to js of the current report)				Total amount declared to flc	Total amount certified by flc	Flc difference			Total amount included in project report - declared to js	Total amount to be approved by js	Total amount approved by js	Total amount approved by ma	Total amount confirmed by ca (included in ca confirmation)	Total amount not yet processed by ca (ca sitting ducks)	Total amount included in project report but found ineligible by js, ma or ca
			Declared to flc	Preparation cost lump sum (skipped the flc)	Reported to js	Confirmed by ca			Total amount verified by flc and found ineligible	Total amount declared to flc in current report but not processed with the current certificate (flc sitting duck)	Total amount declared to flc in different report(s) but processed with current certificate (flc sitting duck)							
												16.06.2023	16.06.2023					
BED	756 922.16	ERDF	473 880.23	30 000.00	407 452.41	407 452.41	96 427.11	96 427.11	0.00	0.00	0.00	96 427.11	96 427.11	0.00	0.00	0.00	0.00	0.00
I&R	369 998.61	ERDF	169 404.59	0.00	106 267.12	106 267.12	19 856.41	20 047.10	-190.68	0.00	0.00	20 047.10	20 047.10	0.00	0.00	0.00	0.00	0.00
UCD	330 290.84	ERDF	173 455.90	0.00	129 454.61	129 454.61	42 669.33	42 669.33	0.00	0.00	0.00	42 669.33	42 669.33	0.00	0.00	0.00	0.00	0.00
UoN	372 118.89	ERDF	362 319.57	0.00	270 308.30	270 308.30	48 856.74	48 201.29	655.45	0.00	0.00	48 201.29	48 201.29	0.00	0.00	0.00	0.00	0.00
Levstone	239 191.50	ERDF	219 048.41	0.00	199 937.80	199 937.80	7 060.15	7 060.15	0.00	0.00	0.00	7 060.15	7 060.15	0.00	0.00	0.00	0.00	0.00
NTU	314 456.74	ERDF	262 041.46	0.00	161 178.46	161 178.46	61 847.77	32 159.62	29 688.15	0.00	0.00	32 159.62	32 159.62	0.00	0.00	0.00	0.00	0.00
Whysor	214 665.88	ERDF	267 937.83	0.00	180 962.26	180 962.26	23 850.10	74 476.67	0.00	0.00	50 626.57	74 476.67	74 476.67	0.00	0.00	0.00	0.00	0.00
ITT	114 858.00	ERDF	104 037.30	0.00	65 467.36	65 467.36	24 728.23	24 740.31	-12.07	0.00	0.00	24 740.31	24 740.31	0.00	0.00	0.00	0.00	0.00
SenX	165 613.26	ERDF	127 307.44	0.00	105 754.69	105 754.69	10 712.05	9 678.09	1 033.96	0.00	0.00	9 678.09	9 678.09	0.00	0.00	0.00	0.00	0.00
UU	565 128.04	ERDF	301 736.83	0.00	185 317.84	185 317.84	56 228.89	56 228.89	0.00	0.00	0.00	56 228.89	56 228.89	0.00	0.00	0.00	0.00	0.00
DNI	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	ERDF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total eligible expenditure	3 443 243.92		2 461 169.56	30 000.00	1 812 100.85	1 812 100.85	392 236.78	411 688.56	31 174.81	0.00	50 626.57	411 688.56	411 688.56	0.00	0.00	0.00	0.00	0.00