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CASE STUDY

REVISED Lessons learned starting and running the first phase of the CRANE PCP process

[version 2; peer review: 4 approved with reservations, 1 not approved]

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Abstract

Background

CRANE is a Horizon 2020 Pre-Commercial Procurement project. The aim is to develop an integrated and flexible self-management system for treating chronic patients at home in rural areas. Learning and improvements running CRANE have been part of the development process.

Objective

This Lessons Learned study aims to help the partners with knowledge sharing and improvements in running the early phase of the CRANE PCP process. The suggested learnings and improvements can be useful for other internet and digital-based Pre-Commercial Procurement projects.

Methods

A Lessons Learned workshop including follow up activities are the basis for the data presented and analyzed in this study. The workshop was conducted digitally and led by the corresponding author. Notes were taken by a dedicated member of the CRANE management team. The participants were CRANE Partners, i.e. professionals working within healthcare.

Results

Positive- and negative factors are identified connected to cooperation and teamwork, and to the deliverables in the start and first phase of the CRANE Pre-Commercial Procurement process. These were the

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version 1 18 Mar 2026	? view				

1. **Maximilian Otte**, EuroScan International Network, Cologne, Germany
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4. **Crossman Mayavo**, Midlands State University, Gweru, Zimbabwe
5. **Claire F. Lindsay**, Heriot-Watt University, Edinburgh, UK

Any reports and responses or comments on the article can be found at the end of the article.

basis for a list of improvements.

Conclusion

It is important to make the process flexible and agile in designing and running complex projects like the CRANE project. Including the process itself, the deliverables, and the organization. Several positive and negative factors have been identified during the early phase of CRANE PCP. The main improvement is that it's important to build a common level of understanding and it's important to make and adjust detailed plans. This includes having a good follow-up structure. It's also important to have frequent meetings, especially in the early phase of the process, ensuring trust and a common level of understanding of expectations and roles.

Plain Language summary
CRANE is an H2020 PRE-COMMERCIAL PROCUREMENT (PCP) project that aims to develop an integrated self-management model to improve chronic patients' wellbeing. This Lessons Learned study aims to help the partners with knowledge sharing and improvements in running the early phase of the CRANE PCP process. A workshop including follow-up activities has given inputs for improving the early phase of CRANE. The participants were from the 7 partners from 3 countries in Europe. The lessons learned point out that it is important to make the process flexible and agile in designing and running complex projects like CRANE. Several positive and negative factors have been identified and improvements summarized to the following: Building a common level of understanding of the overall vision, goal, and focus of the project.

Planning and structured execution of meetings, especially digital meetings, and follow-up of agreed deadlines. This includes agreed workplans, fixed meeting series, and more efforts used on coordination.

More physical meetings, especially in the early phase of the PCP process, i.e., ensuring trust and a common level of understanding of expectations and roles.

Keywords
Pre-Commercial Procurement (PCP) of internet and digital based solutions in healthcare; Value-Based Procurement; early Health Technology Assessment; Value-Based Procurement; Key Performance Indicators.

H2020 This article is included in the Horizon 2020 gateway.

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Author roles: Ørjasæter NO: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Validation, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

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REVISED **Amendments from Version 1**

The major difference between this version and the previous one is the explicit framing of the conclusion as the perceptions of the workshop participants. This includes links between key conclusions and the inputs from participants given in Tables 1 and 3. Some more details are also included in the Method and Results chapter.

Any further responses from the reviewers can be found at the end of the article

Introduction

Background

CRANE is an internet and digital based healthcare Pre-Commercial Procurement (PCP) project, i.e. Horizon 2020 project (Horizon, 2020). The aim is to develop an integrated and flexible self-management system for treating chronic patients at home in rural areas, thus improving the quality of life of patients, and optimizing health and care resources. The goal has been to run an iterative development process, and to create a Value-Based solution. The iterative development approach requires that the actors test, evaluate and adjust their hypothesis, designs and solutions throughout a process from idea to implemented solution (Ries, 2011).

Value-Based Procurement (VBP) is increasingly becoming part of the innovation procurement processes (Boston Consulting Group, 2024). VBP must focus not only on the price of a particular product or service, but also on the overall value of the solution it can create, in terms of improved patient outcomes, reduced total cost of care, and benefits to stakeholders such as healthcare workers (Boston Consulting Group, 2024).

Learning and improvements from running the PCP process has been part of the CRANE project design. A total of five workshops with the partners and management team running the process are planned.

The basis for this study

CRANE is run by 7 partners with multidisciplinary backgrounds from 4 European countries and three rural regions- Region Västerbotten in Sweden, Extremadura in Spain, and Agder in Norway Consortium | CRANE. The project is divided into three phases as shown in Figure 1 below.

Twenty providers shown in Figure 2 responded on request for tenders participating in the CRANE PCP process. Five of these providers were selected to develop a final design of their suggested solution, i.e. phase 1 of the CRANE PCP

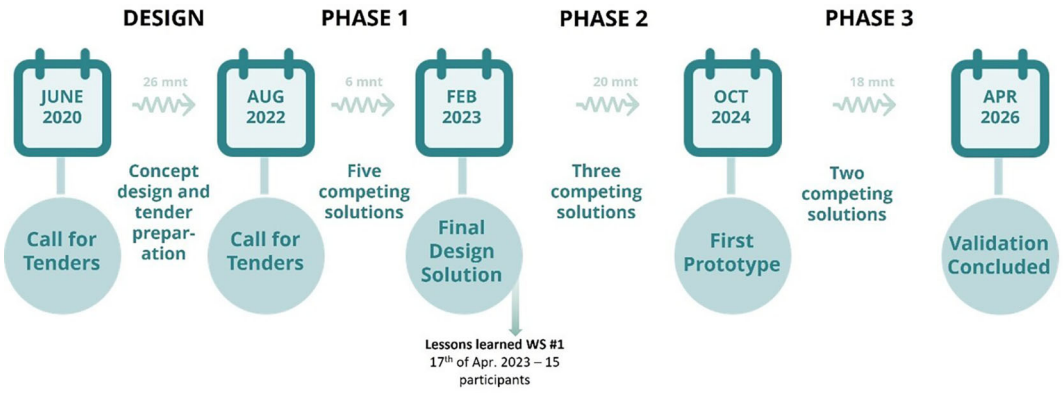


Figure 1. The CRANE Pre-Commercial Process (PCP).

ADDI Medical	Egde Consulting	Tiga Bilgi Teknolojileri
Adhera Health	EPR-forum	Vidavo
AIT Austrian Institute of Technology	Foundation for Research and Technology Hellas	Wiring Technologies
Altericare	Fundación TECNALIA Research & Innovation	XTREM INDUSTRIA DE SOFTWARE
Care Communicator Europe	NEXTER	
Combitech	polypoly coop	
DATA for GOOD foundation	PULSO EDICIONES	
Doole Health	Televes	

Figure 2. Tenders received from a list of providers on 20th of January 2023.

Table 1. Positive and negative factors connected to the cooperation and teamwork.

Cooperation and teamwork	
Positive factors	**Negative factors**
The importance of meeting physically • The kick-off meeting in Copenhagen and the meeting in Extremadura was extremely important • The impact of face-to-face meetings was so much higher than the online meetings • We work when we meet • Over timer we have built trust in the project team. Physical meetings have been important building this trust. We have found each other • Very productive during our physical meetings – good dialogue *Dedication and learning* • All partners have been very committed • Strong motivation has been shown from all partners • Cooperation is great and we have learned a lot • The learning of partners has become very good *Capability of change* • We have been able to adjust and learn from each other • We have been very agile developing and changing the scope • Sharing knowledge with each other • Great dynamic and free speak – sometimes 'hot' but seems to be okay • Worked differently – found our own way • We solved problems on the run and when needed *Competence* • Strong professionals • Multidisciplinary team – a lot of capabilities and competences in the project • The project has developed to be more technically oriented then original planned • We had to improve the technical competence into the project team, i.e. handled but a bit late • We have competencies that have been very aligned with EHDS *In general* • International project set-up is very good • Manage to use PCP as a tool! • Well-coordinated application phase • Although all last-minute changes and updates we manage to get a solid partnership that is strongly aligned and trust each other • The evaluation process and selection of the tenders was very well • Excellent support by knowledge partners also on admin support • We should be proud, a complexed project with late developed partnership. We got 21 bids, which is quite a success	*Change of focus* • Difficult to change the scope of the project, from more service to more technological scope • Unbalance of the project; change of focus • Frustrating for some of the stakeholders changing the focus/scope • Very late to find a tech expert. The tech expert entered the project just before the submission *Change of partners* • Changing partner from Norwegian Centre for e-health research to OUS and just 2 days before the submission • This late entrance also caused some delays, and challenges. Difficult to start up and have a common view *Partners* • Many partners • Cultural personality differences • Many of the partners have low experience and knowledge concerning Horizon projects *Work situation* • We were working separately but after meeting we were working more collectively and smoothly • Difficult with deliveries during holiday • The project team did not meet physically before June 2021 due to Covid • Some unbalance in the application, added to some difficulty since workplan and team was not addressed *Admin: structure, planning and communication* • Challenge to coordinate the partners • Poor structure in the meetings, especially in the beginning • Deadlines were tight and could have been planned better Poor structure and deadline • Unclear what to do, and by whom • Difficult to follow the emails and many meetings and some meetings are too long • Information coming from different sources and not one Project platform – project space • Time management is not the best and therefor the feedback on the work done is very difficult to give quality feedback • Didn't manage to start working as soon as we would have needed • Lack of information flow in right time • Tight time plan in many WPs • Better budget for the tech team *In general* • Experienced some tension in the beginning • Takes time learning from each other • A very technical focus • More health professional recruited for the workshops should have been done • Hard to explain our project, especially the technical parts

process. These five providers were: Combitech AB (dHDSI), Data for Good (Data for Care), Egde Consultants AS (Antigone), Televes S.A.U. (MyRuralHealth) and Wiring Technologies SL.

We used a framework for early Health Technology Assessment (eHTA) (Ørjasæter et al., 2025) to select the five providers continuing to the next phase of the CRANE PCP process. eHTA evaluates technologies still in development and can be defined as the early examination of a health intervention's potential value in terms of medical, social, economic and ethical issues. Thus, eHTA is a suitable prioritization tool in the early development stages before a solution is final. Key Performance Indicators (KPIs) were developed based on the eHTA framework and used as selection criteria.

Aim of this study

This Lessons Learned study aims to help the regional management team with knowledge sharing, giving these actors insights into methods used, i.e. identifying positive- and negative factors, improving the process of developing project documents, inviting providers and developing design solutions in the CRANE PCP process.

Table 2. Improvements connected toed to the cooperation and teamwork.

Improvements
Cooperation and teamwork
1) Common level of understanding • It's important to develop and agree upon a vision early. Defining the vision should be the first step. Define the focus and vision from the beginning. Agreeing on the vision and focus early! • Establishment of a common level of understanding early of the vision, the concept, focus and project goals. Clear focus from the beginning *2) Physical meetings* • It's important to have physical meetings early and frequently. Digital meetings are not enough. The impact of the face-to-face meeting was tremendous – social part important • Earlier kick off and first meetings, physical meetings are superior – This secures a joint point of departure and common view • We should have used more time in the beginning to learn to know the different partners • Better interaction during the application phases • Meet physically more often to align and keep developed trust *3) Planning and coordination* • More efforts to make a workplan consistent with the developed scope. We should have been better in planning and sticking to the plan! Better planning to meet deadlines! • How to follow the time plan is difficult with different cultures/personalities. Stick to agree plans • Improve the Project Handbook to handle changes and challenges in the project • Agree on the project handbook and follow it! • Clear roles and expectation descriptions • What the role of the different partners are, and what to deliver when is of crucial importance. We should have spent more time to update the workplan to make it clearer and more understandable • Revise the workplan frequently, since agile development may require updates to description • Better organize the work for the non-leading partners, so they know when to contribute, i.e. during an early workshop • The process of reviewing documents should have been more structured • Structuring how to cooperate should have been better from the beginning. The coordinator role is of crucial importance in a project like Crane, i.e. making process lean and efficient • More communication, both internal and external • Important to find a good date for the meetings – Plan for holiday periods. The holidays are sometimes different from the partners home countries were • Agree on and use a cooperation tool • More traditional governance structure – separate consortium meetings from other meetings • Less democracy in some ways. Not everyone needs to attend every meeting • It has been a challenge to coordinate work packages. An overall lack of EU project experience is partly the reason for this challenge. We should have been better in learn from each other, i.e. building on different experience of EU participation. Some of this problem was problems meeting physically due to Covid *4) Competence* • Important to have the core competence from the beginning; We had a lack of technical competence in the beginning. This competence is now in place • Experiences from EU projects helps being efficient

Table 3. Positive and negative factors connected to the deliverables.

Deliverables	
Positive factors	**Negative factors**
Commitment and interest • Strong interest among industry. Many bids… • Managed to propose a call for tender that was unique and selling • We have addressed a field, that experienced actors feels that we need to solve • Users onboard • Challenge is fun and makes us improve! *An innovative project* • Disruptive approach that may disturb industry business models. • Deliver a unique project in the end *The documents* • High quality of the deliverables • There has been put a lot of effort in creating the deliverables • Many pages but good result • We did deliver in the end but not in always in time • On the positive note the TD 1 & 2 seems to be understood by the contractors – most of them are happy • D6.1 is very good, but we did not spend enough time to go through it and reflect in the team • Content of deliverables was changed when needed • We managed to deliver required documents	*Change* • Some of the deliverables where not tailored to the new scope • Created some inconsistency due to change of scope • Might disrupt industry with our requirements *Needed skills and experience* • Lack of tech skills were a clear challenge. Lack of technical skills • Lack PCP experience, and Horizon 2020 procedure. • Lack of alignment between Insights User needs, challenges and requirements *Complexity* • Difficult and why and what the content • Ended mismatch between different requirements • Difficult to understand the core of Crane *Bidders* • 20 applications were too much • Some of the bidder missed the core of the project • Should have had a plan B handling so many bids • Maybe it would have been easier to state that the aim is to provide access health data or activity data to citizens • The pre-evaluation of submitted bids should have been better *The documents* • Sometimes difficult to understand and what should be included and why. We should have had an overview of the deliverables and why • Sometimes difficult to understand who is doing what within the documents, i.e., who is responsible for processing what content. We were a bit lost in the beginning • Some mismatches between documents • The TD 1 and TD 2 documents is very long and maybe too long – with an improved quality review process they would be more sharp • Made to many documents. High amount of deliverables • Lack of quality control and alignment between deliverables • Andre doc was not necessarily due changing the focus *The process of developing documents* • A lot of work after the review • Not enough time for feedback. No time for reviewing deliverables • Many meetings were consortium meetings, not WP-based • Hard to find a model to get input from the other WPs • Another governance model should have been used • Difficult to understand the rolls & responsibilities of the buyer regions • Difficult to know what and when to deliver when you are not task lead – especially when you need to gather internal resources that are short of time • Lack of vision influenced the deliverables in the beginning

Methods

Context

A qualitative approach gathering data has been used in this Lessons Learned study. Data was collected in a workshop run on the 15th of April 2023 with 15 participants (Figure 1) from the CRANE partners responsible for running the CRANE PCP process. The participants were all health care representatives.

The workshop was led by the corresponding author and data collected by referees from the partners. The corresponding author is a research partner of CRANE PCP and has interest in the interpretation of data.

The data was collected in two sessions, one concerning cooperation and teamwork (Table 1) and one concerning the deliverables (Table 3). The collected data was sent to the corresponding author, and thereafter structured and processed into main topics. Subsequent input and feedback were given by some of the workshop participants based on the processed data. Improvements were based on the positive and negative factors. These are shown in Table 2 for factors concerning cooperation and teamwork and Table 4 for factors concerning the deliverables.

Results

The workshop gave important insights into potential positive- and negative factors in the phase where the five providers were to develop a design solution. The participants were all asked to bear in mind the patient and healthcare worker perspectives giving inputs.

Improvements were also identified based on the positive and negative factors. The positive and negative factors, and improvements, are listed in the table shown at the end of the paper:

- Table 1: Positive and negative factors connected to cooperation and teamwork among the partners. The inputs are structured in five main areas.

- Table 2: Improvements connected to cooperation and teamwork in the start and the first phase of the CRANE PCP process. The improvements are based on the positive and negative input and discussions among the participants in the Workshop. The improvements are structured in four main areas.

Table 4. Improvements connected to the deliverables.

Improvements
Deliverables
5) Documents • Some of the documents should have been a joint deliverable, evaluation framework + requirements + selection criteria's • Better overview of the required documents (internally) • Better alignment between different deliverables • The commission should have given more clear requirements *6) Planning* • Better planning to meet deadlines • We must stick to agree plans • The digital meetings should have been structured and implemented • All meetings should have a specific agenda, not just for general discussions. But there should be a mix! • A standard process on how a PCP process works should have been made and shared internally *7) The process of developing documents* • Meet physically more often to align results of deliveries • Secure quality and review reading • Present deliverables to the project team to ensure alignment and responsibilities • Better distribution/organization of deliverables in the WPs, and the timing • Ensure common level of understanding among the participants on what to deliver when, and who is responsible for what part of the document • For the evaluation and the development of deliverables it could have been good to have more technical experts involved • We should consider in using an external feedback team for ensuring quality control. Quality management from start – in cooperation! • Better guidelines from the Commission • Balance good enough vs. always perfect (perfection vs. pragmatic) • Focus more on quality management early on

- Table 3: Quality of the deliverables from the partners and providers. The inputs are structured in six main areas.

- Table 4: Improvements connected to the deliverables in the start and the first phase of the CRANE PCP process. The improvements are based on the positive and negative input and discussions among the participants in the Workshop. The improvements are structured in three main areas.

Discussion

This study aimed to explore and identify positive and negative factors, and factors improving the process of developing project documents, inviting providers and developing design solutions in the CRANE PCP process.

The start-up and phase 1 of the CRANE PCP process have clear elements of following an iterative process design (Ries, 2011). Some of the workshop participants have stated that the capability of change has been good. It was early in the process stated needs of strengthening the technology competence. This was addressed early and improved by including an experienced technological competence in the PCP management team. But there have been elements that could improve this capability, i.e. smoothing the process of changing the scope of work and focus.

Patients were early involved in the process of defining the CRANE solution. This has been important in defining KPI's for evaluating tenders and later solutions and ensuring a Value-Based development and procurement processes approach.

Complex projects like CRANE needs attention building common level of understanding. Partners from different countries and cultures, and with different experiences is challenging. It's especially challenging to have the same level of understanding concerning the vision, goals and deliverables. This includes common understanding of the guidelines and requirements from the commission. Attention early on these factors are important to ensure efficiency and quality in complex projects like CRANE. Physical meetings and a clearly defined role of coordination are important for improving the work of complex projects. Physical meetings were difficult at the start of CRANE because of Covid, but more frequent digital meetings and structured meetings would have improved efficiency and quality of the process and deliverables.

Conclusion

It is important to make the process flexible and agile in designing and running complex projects like the CRANE PCP project. Including the process itself, the deliverables, and the organization. Several positive and negative factors have been identified during the early phase of CRANE PCP. The results are structured and used as input for improvements. According to the workshop participants, the most important improvements connected with cooperation and teamwork are:

1. Common level of understanding. Early build a common level of understanding of the overall vision, goal, and focus of the PCP process (Table 2, no. 1). This includes having more physical meetings (Table 2, no. 2)

2. Planning and coordination. A few of the input points to the need for better planning and execution of meetings (Table 2, no. 3). Some of the participants did include the need to improve the project handbook, agreed workplans, fixed meeting series, and more efforts used on coordination (Table 2, no. 3 and Table 4, no. 6).

3. Competence. Evaluating the tenders could have been improved by involvement of an external technology-oriented feedback team (Table 4, no. 7).

The most important improvements connected with the deliverables according to the workshop participants are:

4. Documents. Clarification of requirements, better overview, better handling of documents and better alignment of documents are mentioned in different ways (Table 4, no. 6). Better guidelines from the commission are also mentioned (Table 4, no. 7).

5. Developing the documents. A better level of understanding of what to be delivered and who is responsible of what should have been improved (Table 4, no. 7).

Further research

This lesson learned paper is part of a process identifying elements improving the CRANE PCP process. Corresponding lessons learned workshops will be done throughout the PCP process, and a summary report is planned after the last phase of the process.

Limitations
The outcomes from this study should not be generalized for PCP processes without discussion of content and goal similarities. However, it may give valuable input adapting learnings from the CRANE PCP processes to running similar PCP processes.

Ethics and consent
No ethical approval was required and consent were given orally.

This study is not subject to approval from the Regional Committees for Medical and Health Research Ethics (NO), as it does not contain medical and health research on human beings, human biological material or personal health data. The collected data is not personal health data and was anonymized and transferred in a proper and secure matter to the corresponding author. No patients were participating in the workshop. They were all professionals within healthcare, and CRANE partner representatives.

Participation in the workshops was voluntary, and the collected data was based on an informed consent allowing use for improvements and research purposes. The consent was given orally when the coordinators recruited the participants, and at the start of the workshops. No reservations were made. The consent was given orally because the benefit of collecting and storing signed consent forms was assessed against privacy considerations, and oral consent through conclusive behavior (clear affirmative action) was deemed sufficient pursuit to GDPR Art. 4 i.e. Art. 4 GDPR – Definitions - General Data Protection Regulation (GDPR):

- Oral consent is more appropriate in this workshop setting allowed for easy reservation/opt-out. Oral consent is faster, simpler, less intrusive, improves user experience, and is more suitable when the risk level is low.
- A written consent form may create a higher threshold for participation, signal unnecessary risk, introduce administrative burden, and give an impression of formality disproportionate to the nature of the project.
- Proportionality principle: Measures must be proportionate to the level of risk. A low-risk questionnaire and workshop participation do not require the same level of formality as research involving health data or vulnerable groups. Oral consent was assessed as proportionate and professionally sound.
- Storage limitation principle, cf. GDPR Art. 5 (1)(e) and (c), was upheld since no signed consent forms were stored.

Data availability
All the data collected from the workshop, including the follow-up feedback, are accessible by clicking on the following link: https://doi.org/10.5281/zenodo.18787892 (Ørjasæter, 2026). This project contains the collected and processed data from the workshop, i.e. Tables 1, 2, 3 and 4 in this article.

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

Acknowledgments
This study has been possible thanks to the help and participation from the CRANE partners. Special thanks to the coordinators from region Västerbotten in Sweden, Extremadura in Spain, and Agder in Norway for their insights and help in administrating the process of data collection.

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Reference Source

Open Peer Review

Current Peer Review Status: ? ? ? ? ✗

Version 2

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Claire F. Lindsay
Heriot-Watt University, Edinburgh, UK

Thank you for inviting me to review this article presenting the early phases of the CRANE Pre-Commercial Procurement (PCP) process within a Horizon 2020 project in considering lessons learned. The project context is on digital health solutions for patients in rural areas.

The document is clearly written in an accessible manner and will have wider interest amongst procurement practitioners and academics working in healthcare. Healthcare procurement suffers from a lack of focus, despite the challenges facing it. The relevance here relates to current policy agendas in seeking improved solutions to monitor patients at home/in the community, rather than in hospital settings.

There is some detail about the project but there could be more connecting PCP, value-based procurement and the context of a digital solution and at home care for why this project?

Value based procurement challenges have been identified by other authors in healthcare. Currently the literature is very limited, and I would suggest improved strengthening of the literature review to help with this framing, through engagement with relevant papers, including:

[Ref 1]
[Ref 2]

For the methods discussion, there needs to be much greater scope for demonstration of robustness of approach. A focus group approach in digital format is suggested but how did the authors overcome non-participating respondents. Was the session recorded as note taking would not capture everything. Coding – is this thematic? Is there a framework underpinning this, e.g. Braun and Clarke as coding appears early stage, rather than full cycle. How did eHTA methodology, referred to at the outset, inform/influence coding framework?

Good to see references to respondents' feedback on initial findings from the workshop, but would expect that academically, coding would be taken further, beyond the identification of what is in

tables, especially for wider academic impact.

I can see references to patient involvement, suggesting good practice in public patient involvement and engagement in healthcare, but the stakeholders and diversity of roles was not clear. The reader is directed to Figure 1 but that does not shed light on the numbers/balance of participants across stakeholders.

With an improved literature review and coding to inform analysis then there is an opportunity for a more robust discussion. For example, further engagement with HTA literature beyond the paper cited, but also that on technology procurement may aid you in better joining up issues found in the data as part of lessons learned.

For indexing/academic use as a case study, more detail would be required.

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Is the background of the case's history and progression described in sufficient detail?
No

Is the work clearly and accurately presented and does it cite the current literature?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Partly

Is the case presented with sufficient detail to be useful for teaching or other practitioners?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My areas of expertise include healthcare procurement and supply chain activities, as well as qualitative methodologies for research. I serve as a reviewer and guest editor for scientific journals in the areas of public administration, healthcare, procurement and supply chain management. This experience is directly relevant to review research such as that published

through Open EU.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Reviewer Report 11 August 2026

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Crossman Mayavo
Midlands State University, Gweru, Midlands Province, Zimbabwe

The study is exciting and relevant; however, the authors should improve their study in the following areas:
1. The background: the background of the study is not sufficient to understand the study itself. The author should have given enough background of the study showing how it is flowing, probably using the FUNNEL approach (international, regional and local perspectives). Additionally, it does show the flow of other studies, and which gap it is filling missing in the body of knowledge.
2. Basis of the study: This is also true when it comes to this section, and I think the authors should provide more information and what informed the study. This has affected literature review itself, as it is not provided.
3. Data Analysis: The methodology section does not provide an understanding of how the data was analysed and how they came up with the themes.
4. Data sources: The data sources used were primary data, however, no ethical clearance was provided.
5. Practitioners and teaching: The study is a very good one, provided it is improved to support the practitioners.

Is the background of the case's history and progression described in sufficient detail?
No

Is the work clearly and accurately presented and does it cite the current literature?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
No

Are the conclusions drawn adequately supported by the results?

Yes

Is the case presented with sufficient detail to be useful for teaching or other practitioners?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Procurement, strategic management, corporate governance, logistics, business management.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 21 July 2026

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Anke-Peggy Holtorf
Health Outcomes Strategies GmbH, Basel, Switzerland

The manuscript describes the interaction with participants in a so-called CRANE Pre-Commercial Procurement project, and it aims to report on the learnings based on the feedback of the participants during phase 1 of the project in order to help other project managers to better design subsequent similar projects.

Overall comments:
Pre-Commercial Procurement (PCP), i.e. guiding and working with developers to design solutions in areas of unmet need, can be complex and requires much coordination and guidance from the organizers. Therefore, structured reporting of learnings from previous PCP-projects can help to improve efficiency.

However, in order to increase the informative value of the manuscript, I would suggest the following changes and amendments:

1. Title: Eliminate Abbreviations from the title and make it more reflective of the content. E.g. Lessons Learned from Early Participant Feedback in Pre-Commercial Procurement
2. Background: The background should give the complete story of the project and not assume that the readers know the project. For example, on the CRANE website is some basic information about the project that would be very helpful to have. This includes the definition and purpose of PCP, the incentives to the participants in the process, and in general, definitions and consistency of the words used. For example, ‘providers’ may mean different types of players depending on the context
3. Structure: As it is written the manuscripts is not clearly structured as results are already

reported during the result section and parts of the processed results are reported in the conclusions section instead of the discussion. As mentioned earlier by other reviewers, the methodology is unclear and would need more background information on data collection, (n), and methods of processing the data through qualitative analysis and reflexional discussion.
Ideally, the paper should clearly separate the elements of the manuscript into
(1) Background: The base information that is needed to understand what the paper is about and why this important to who.
(2) Objective: The aim of the research reported here
(3) Methods: Methods used for the research including data collection, who supplied the data how and when, data work up and analysis
(4) Results: Reporting of the findings (e.g. all data tables)
(5) Discussion: Interpretation of the data and extraction of key information to readers
(6) Limitations: What are the limitations in this research that need to be acknowledged (e.g. data only drawn from one case, data drawn from participants during an early phase of the project – so without knowing the further development and success of the project; Patients not involved as partners throughout the project)
(6) Conclusion: Short extraction of the essence of the paper

4. In order to help readers to avoid the mistakes and improve their future project processes it would be helpful to develop clear criteria or guidance. The conclusion that something needs to be 'improved' or 'better' is nearly impossible to implement without having the intimate knowledge of what was done in the reported project. For example, by defining – from the feedback – facilitating elements and inhibiting elements (or barriers), can help to inform checklists in relation to "must-do" or "must-avoid" independent from the starting project. Instead of saying, something must be done 'better' in future, the discussion should propose concrete actions of what that means.
5. Tables: while the tables with the participant comments could be submitted as 'original data', for the core manuscript, it would be good to extract through qualitative analysis the facilitators and inhibitors and to report these in a more concise format. The current tables are repetitive (e.g. Table 3: "Lack of tech skills were a clear challenge. Lack of technical skills" and to contain sometimes incomprehensible elements (e.g. Table 3: "Difficult and why and what the content" or "Ended mismatch between different requirements")
6. Abbreviations: Use full expression at first mention followed by the abbreviation in brackets, and then use always the abbreviation, thereafter. Same in abstract and manuscript body. Expressions: define what is meant with important expressions and then use that expression consistently.

Selected specific suggestions:
Abstract / Conclusion / 1. Sentence: suggestion: "Complex projects like CRANE require flexible and agile designs and management processes."
Abstract / Conclusion / 1. Sentence: this is not a complete sentence – something is missing.
Body / Introduction / 1. Sentence: Suggestion "CRANE is a digital and internet-based healthcare Pre-Commercial Procurement (PCP) project funded by Horizon 2020 (reference)."
Body / Introduction / The basis for this study: Delete "Consortium | CRANE" or put in brackets as reference at first use of the project name CRANE in the introduction.
Page 6 / Table 2 Title: delete "toed"
Page 8 / Methods / Paragraph 2: delete "and has interest in the interpretation of data" – this is not a measurable 'qualification'
Page 8 Results / The participants were all asked to bear in mind the patient and healthcare worker

perspectives giving inputs: This is a bigger limitation, in my opinion. Only patients know the patient perspective, and only healthcare workers know the healthcare worker perspective.
Page 9 / Conclusion / Point 2: Suggest "A few participants felt that planning and execution of the meetings should be improved."

Is the background of the case's history and progression described in sufficient detail?
No

Is the work clearly and accurately presented and does it cite the current literature?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Partly

Is the case presented with sufficient detail to be useful for teaching or other practitioners?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: HTA, Health economics, Patient Involvement / Participation, Value in healthcare

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 12 May 2026

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Patricia Julia García Sanz
AETSA-FPS, Andalusian Agency for Health Technology Assessment, Sevilla, Spain

The article presents a lessons learned case study describing the early phases of the CRANE Pre-Commercial Procurement (PCP) process within a Horizon 2020 project focused on digital health solutions for chronic patients in rural areas. The manuscript explores factors related to

cooperation, governance, teamwork, and deliverables during the initial stages of the CRANE PCP process. The study is based on a workshop involving consortium partners and aims to identify improvements that may support future PCP projects.

The topic is particularly relevant, given the limited literature on the operational and organisational challenges associated with PCP implementation in healthcare innovation and digital health. The paper provides practical insights for organisations involved in innovation procurement and HTA-related activities. The manuscript is well-structured and clearly written. The description of the CRANE project, the PCP phases, and the rationale for conducting a lessons learned exercise are sufficiently detailed to provide context for the case. The tables summarising positive and negative factors and proposed improvements are useful for practitioners working in similar environments. The article is also transparent regarding workshop participants, funding, ethics, and data availability. The underlying workshop data are publicly accessible, which supports reproducibility. However, some aspects should be strengthened to improve the methodological robustness of the manuscript and better align the conclusions with the presented findings.

The methodological approach remains mainly descriptive. The article is appropriately categorised as a Case Study according to the journal typology and provides useful operational insights for practitioners involved in PCP processes. However, the methodological description would benefit from a clearer explanation of how workshop data were synthesised and whether any thematic analysis or coding approach was applied. In addition, a more explicit discussion of potential interpretative bias and reflexivity would strengthen the paper. At present, the results are mainly presented as aggregated observations from workshop participants, with limited detail regarding the analytical process used to derive the main themes and conclusions.

The integration of HTA methodology within the analysis also remains somewhat limited. Although the manuscript refers to early HTA (eHTA), Value-Based Procurement, KPIs, and value-oriented procurement approaches, these concepts are only partially operationalised throughout the study. The paper would benefit from a clearer explanation of how the eHTA framework informed decision-making during the PCP process, how KPIs were selected and prioritised, and how HTA dimensions, including organisational, economic, ethical, implementation, and patient-related aspects, influenced procurement decisions and provider selection. Currently, HTA appears more as a conceptual reference than as a structured methodological component embedded within the procurement pathway. This is particularly relevant given the growing literature on integrating HTA into innovation procurement, early dialogue, implementation assessment, and evidence-generation processes. The discussion could also be strengthened by including more recent literature on the role of HTA in procurement decision-making, institutional capabilities for innovation procurement, and governance challenges in technology-driven procurement systems.

Suggested literature: (Ibargoyen-Roteta N et al, 2022), (Cangelosi M et al, 2023), (Stek K et al,2025) and (Saeed G et al, 2022)

Although implementation outcomes are not the primary focus of the manuscript, the discussion would benefit from briefly addressing how the proposed improvements could be assessed in later phases of the PCP process in terms of implementation success, organisational impact, technology adoption, or value generation. Current HTA and innovation governance frameworks increasingly emphasise lifecycle evaluation and continuous reassessment during technology development and implementation. Even if these aspects fall outside the direct scope of the present study,

acknowledging their relevance would strengthen the connection between the lessons learned identified in the early phases of CRANE and the longer-term challenges associated with HTA-informed innovation procurement.

The conclusions generally reflect the workshop findings; however, some recommendations are presented as broadly applicable best practices, despite being derived from a single workshop involving a relatively small number of participants, all of whom were part of the consortium. The conclusions would therefore benefit from being framed more explicitly as context-dependent lessons learned from the CRANE experience rather than as generalisable recommendations transferable to all PCP/CPI settings.

Minor comments:
Terminology should be standardised throughout the manuscript. Terms such as “partners,” “stakeholders,” and “providers” are sometimes used ambiguously.
Patient involvement is mentioned in relation to KPI development, but is not sufficiently reflected in the lessons learned analysis.
The discussion could better integrate recent European literature on HTA-informed PCP/CPI methodologies.

Overall, the article addresses a relevant and increasingly important area at the intersection of PCP, digital health innovation, and early HTA. The manuscript offers useful practical insights for teams involved in innovation procurement projects. A clearer methodological positioning and stronger integration of HTA-related approaches would improve the overall robustness and applicability of the work.

References

1. Ibargoyen-Roteta N, Galnares-Cordero L, Benguria-Arrate G, Chacón-Acevedo K, et al.: A systematic review of the early dialogue frameworks used within health technology assessment and their actual adoption from HTA agencies. *Frontiers in Public Health*. 2022; **10**. Publisher Full Text
2. Cangelosi M, Chahar A, Eggington S: Evolving Use of Health Technology Assessment in Medical Device Procurement—Global Systematic Review: An ISPOR Special Interest Group Report. *Value in Health*. 2023; **26** (11): 1581-1589 Publisher Full Text
3. Stek K, Lefers L, Belotti Pedroso C: Strengthening innovation capacity in health and care workforce: A role-based framework for the procurement professionals. *Health Policy*. 2025; **161**. Publisher Full Text
4. Saeed G, Kohler J, Cuomo R, Mackey T: A systematic review of digital technology and innovation and its potential to address anti-corruption, transparency, and accountability in the pharmaceutical supply chain. *Expert Opinion on Drug Safety*. 2022; **21** (8): 1061-1088 Publisher Full Text

Is the background of the case’s history and progression described in sufficient detail?

Yes

Is the work clearly and accurately presented and does it cite the current literature?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Not applicable

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Partly

Is the case presented with sufficient detail to be useful for teaching or other practitioners?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My areas of expertise include Health Technology Assessment (HTA), early HTA, healthcare innovation procurement (PCP/PPI/CPI), digital health, and implementation and impact evaluation of emerging health technologies. I have experience as evaluator and reviewer for the Spanish State Research Agency (AEI), Fundación Progreso y Salud (FPS), and Instituto de Salud Carlos III (ISCIII), assessing research and innovation projects related to digital health, personalised medicine, translational research, and healthcare innovation. I have also served as a reviewer and editor for scientific journals. In addition, I have participated in Public Procurement of Innovation (PPI/CPI) initiatives focused on the assessment and implementation of innovative health technologies, including evaluation of clinical relevance, implementation feasibility, healthcare impact, and procurement-related decision-making processes. This experience is directly relevant to the evaluation of manuscripts addressing PCP/CPI governance, innovation pathways, and HTA-informed procurement processes.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 26 May 2026

Nils-Otto Ørjasæter

I thank Patricia Julia Garcia Sanz for her valuable input. I will use these inputs to improve the Lessons Learned publications throughout the PCP process.

Competing Interests: No competing interests were disclosed.

Version 1

Reviewer Report 26 March 2026

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Maximilian Otte
EuroScan International Network, Cologne, Germany

The manuscript reports a qualitative lessons learned study from the first phase of the CRANE Horizon 2020 Pre-Commercial Procurement (PCP) project, which aims to develop an integrated, flexible self-management system for chronic patients in rural areas. The authors conducted a structured workshop with 15 CRANE partners to identify positive and negative factors related to cooperation/teamwork and deliverables, and to derive suggestions for improving subsequent PCP phases. Findings are presented as tables of factors and improvement proposals, and the conclusions highlight the importance of shared vision, agile and well-planned processes, strong coordination, and early physical meetings to build trust and common understanding.

Major comments:
Current literature:
The concept of early health technology assessment requires the existence of an intended purpose or indication. Referring to 'early examination', the concept of Early Awareness might be more appropriate in this regard.

Support for conclusions (Partly)
The tables provide practice-based insights into perceived positive and negative factors and into proposed improvements, and the Discussion section appropriately links these patterns back to the iterative, agile logic of the project and to the importance of technology competence and patient involvement.

At the same time, the conclusions occasionally read as relatively general best-practice recommendations (e.g. “more physical meetings,” “improved project handbook,” “stronger coordination”) that go somewhat beyond what is explicitly grounded in the workshop data as presented. To better align conclusions and results, I suggest:

- Explicitly framing the conclusions as perceptions of the workshop participants, rather than as generally validated success factors (e.g. “According to the workshop participants, the most important improvements are…”).
- Drawing a tighter link between key conclusion points and the specific themes in Tables 1–4 (e.g. referencing how recurrent comments on coordination, unclear roles, and fragmented communication justify the emphasis on a stronger project handbook and governance).
- Briefly reiterating the limitations directly in the Conclusion (small, self-selected sample of insiders, single workshop, early phase only) and stating that the lessons should be adapted rather than directly generalized to other PCP contexts.

Minor comments

- Methods detail: The description of data collection could briefly elaborate on how notes from different referees were consolidated (e.g. whether there was any coding, theming, or triangulation) to further support the trustworthiness of the qualitative synthesis.
- Reflexivity and bias: A short paragraph reflecting on the positionality of the facilitator and note-takers (all from the project) and potential social desirability or hierarchy effects during

the workshop would strengthen the methodological transparency.
- Consistency of terminology: Sometimes the paper alternates between “partners,” “stakeholders,” “providers,” and “Group of Collaborators” without always clarifying which group is meant; a brief clarification early on, and consistent usage, would help readers unfamiliar with CRANE.
- Patient involvement: Patients are mentioned as being involved early in defining the CRANE solution and KPIs, but this does not feature in the lessons learned tables or conclusions. It would be useful either to clarify that patient perspectives were not part of this workshop, or to reflect on how patient involvement did (or did not) influence the early PCP process and what lessons emerged for co-creation.

Is the background of the case’s history and progression described in sufficient detail?
Yes

Is the work clearly and accurately presented and does it cite the current literature?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Partly

Is the case presented with sufficient detail to be useful for teaching or other practitioners?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Health Technology Assessment, Early Awareness, Horizon Scanning, Value-based Health Care, Value-based implementation support of innovation

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 26 Mar 2026

Nils-Otto Ørjasæter

Hi, thank you for your constructive input. I have now made a new version of the article. I have answered your comments to the best of my ability.

Competing Interests: No competing interests were disclosed.