Influences of internal culture and COVID-19 on healthcare innovation and procurement: a qualitative study

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ABSTRACT

Background New technologies offer great opportunities for health care systems but can also represent significant costs. Increasing the usage and development of medical technologies balancing cost and utility is a priority for many health care managers. Ensuring maximised diffusion and uptake of new technologies can be positively impacted by the degree of involvement of end-users in the purchasing and/or development of new products. While the idea that culture can promote or inhibit innovation is not new, innovation in the health care setting has only relatively recently been explored. Little information specific to university hospitals and procurement of innovation exists. The global COVID-19 pandemic has furthermore greatly influenced healthcare in the last months including medical procurement and innovation. This protocol details a planned qualitative research study to explore cultural factors influencing innovation at European university hospitals as well as the recent impact of the COVID-19 pandemic in depth.

Methods Key informant interviews will be conducted at ten European university hospitals. The semi-structured interview guide includes questions on: the perspectives and experiences of staff in relation to the procurement of innovation; examples of past or ongoing projects in this area or in the area of digital health innovation; and changes related to COVID-19. Participant characteristics will be summarised with descriptive statistics. Multi-step thematic analysis using meaning condensation will be used to analyse transcribed data. Identified concepts will be linked with existing theories and/or factors identified by literature search. Results will be presented in narrative and table formats. Historical public procurement data will be downloaded from the European Union's public procurement records portal TED. Trends from during COVID-19 will be statistically analysed in comparison to prior years.

Discussion This manuscript describes the steps of our proposed qualitative study to explore cultural factors that contribute to successful and/or unsuccessful innovation in relation to digital health procurement, and the impact of COVID-19 on this field. Results will be used to provide points for consideration when conducting procurement of innovation, an important tool that organisations can use to drive digital research and development and a policy goal for the EU.

INTRODUCTION

Medical technologies of various types are used in ever increasing ways by providers and consumers across the entire spectrum of health care. New technologies offer great opportunities for health care systems; however, they can also represent significant portions of health care costs. For this reason, it is a priority for many health care managers in strategic leadership positions to transition to the usage and development of medical technologies that balance cost and utility (1, 2). One way to do this is to ensure that the diffusion and uptake of new technologies is maximised (3), which can be positively impacted by the degree of involvement of end-users in the purchasing and/or development of new products (4, 5).

Rapid expansion of products and services has been driven from all sides, but the supply side has primarily controlled new development in a linear fashion (6, 7). A number of efforts to enhance collaboration between the supply and demand sides have been fostered; among these is the European Union's (EU) stimulation of the procurement of innovation in health care using public tools such as pre-commercial procurement (PCP) and public procurement of innovation (PPI).

Beyond formal initiatives like PCP and PPI, a multitude of additional characteristics impact innovation, procurement, and the successful diffusion of innovative technologies. These range from high-level policy factors (12), to mid-level organisational factors (5, 13, 14), to individual-level team and employee factors (15). One such characteristic is culture.

While the idea that culture can promote or inhibit innovation is not new, innovation in the health care setting has only relatively recently been explored, and very little information exists for the specific context of university hospitals or for procurement of innovation. More European research is needed as well, since the majority of previous studies have been conducted outside of Europe. Past research has largely focused on policy and organisational factors, and/or the role of leadership, leaving a gap in evidence at the individual and team levels (12, 16-18). A relevant question remains: What internal cultural factors are correlated with either successful or unsuccessful innovation, procurement, and adoption of innovative technologies?

The global COVID-19 pandemic has furthermore greatly influenced healthcare in the last months, and this includes medical procurement and innovation. Much of this is related to short-term adjustments, such as a focus on procuring personal protective equipment (19) and medical devices like ventilators (20), or efforts by the EU to streamline the formal innovation procurement process (21). However, there may be lasting changes in this area as well, such as greater focus on digital solutions (22-24). The COVID-19 global pandemic is an unprecedented situation that continues to evolve and does not appear likely to disappear within a short timeframe (25, 26). Therefore, it would be both novel and beneficial to explore the changing nature of innovation procurement in healthcare during this evolution, as well as to gather expert opinions on future considerations and trends.

We propose to perform a qualitative research study to explore cultural factors that contribute to successful and/or unsuccessful innovation in relation to digital health procurement. We will additionally explore the impact of the COVID-19 pandemic in this field. The university hospital setting has unique pressures and opportunities in comparison to other types of health care provider settings (27); factors impacting innovative capacity are likely to be unique as well and results would provide novel information in the field. Qualitative research in the form of key informant interviews is ideal in this case because it enables the collection of richly detailed information.

The first aim of this qualitative study is to explore cultural factors that may contribute to successful and/or unsuccessful innovation in relation to digital health procurement at ten university hospitals around Europe and the United Kingdom. These findings will be summarised into points for consideration when conducting procurement of innovation, an important tool that organisations can use to drive digital research and development and a policy goal for the EU. The second aim is to explore the impact of the global COVID-19 pandemic on this field: how has procurement changed as a result of the pandemic and what is the future outlook? These findings will be qualitatively analysed in combination with quantitative analysis of historical procurement trends.

METHODS

Study design and participants

An international task force composed of members of the Platform for Innovation of Procurement and Procurement of Innovation (PIPPI) project as well as members of the European University Hospital Alliance (EUHA) LIVE working group will be formed to conduct the multi-centre, multi-national, cross-sectional qualitative study. Participating institutions are located in Austria (AT), Spain (ES), Germany (DE), Belgium (BE), the United Kingdom (UK), Italy (IT), France (FR), the Netherlands (NL), Sweden (SE) and Finland (FI).

Semi-structured interviews will be conducted by the first author in English by phone and/or video call, recorded and transcribed verbatim. After initial data coding and analysis, preliminary results will be discussed with the task force and concepts finalised and ordered into higher- and lower-level categories. Per qualitative research standards, analysis will be conducted simultaneously with interviews in order to identify the number of emergent concepts (28).

Historical public procurement data will be downloaded from TED (Tenders Electronic Daily; https://ted.europa.eu), the EU's public procurement records portal. Trends from during COVID-19 will be statistically analysed in comparison to prior years.

A purposive sample will be used wherein key informants will be identified by the hospitals themselves or by the research team. To be included in the study, participants will need to be employed by the hospital and have experience with at least one major topic: healthcare

innovation, digital health adoption, procurement of innovation or innovation of procurement. Exclusion criteria are: no oral or written informed consent, not able to conduct the interview in English.

Following identification, individuals will be invited to participate, and remote interview appointments arranged. Key informants will then be asked to identify additional participants according to a snowball sampling strategy and interviews with this second tier of participants likewise arranged. Based on the content of the interviews, extreme cases may be identified, and additional participants asked to participate. Within this key informant/snowball strategy, maximum variation regarding gender, age, educational level and other socio-demographic characteristics will be applied when applicable.

The first step will be to consult the task force members, PIPPI project partners and EUHA partners for relevant contacts. Next, participant nominees will be contacted by Margaret Andrews (MA) by email or telephone. Individuals will be invited to participate and if they are interested will receive study information, informed consent form, and contact information by email. Participants can return a signed informed consent by email. The interview will then be scheduled; interviews will be conducted either by WebEx video call or by telephone, based on the preference of the participant.

The theoretical underpinning of this study will be inductive thematic analysis, which is commonly conducted using sample sizes of 1-30 participants (29). The target will be to interview two participants at each of the ten hospitals.

Data Collection

The task force will be consulted for assistance in piloting and finalising a semi-structured interview guide (30). The guide will include questions on: the perspectives and experiences of university hospital staff in relation to the procurement of innovation; examples of past or ongoing projects in this area or in the area of digital health innovation; and changes related to COVID-19. Interview questions will be as general as possible so as not to influence responses in any specific manner, however the aims are to identify potential cultural factors related to successful/unsuccessful innovation procurement and acceptance, and to explore the COVID-19 impact. Preliminary questions are presented in supplementary table 1.

Data analysis

The aim of this research is to identify and describe rich information on the topic (cultural factors influencing procurement and acceptance of innovation, especially digital solutions). Data analysis will be based on a modified form of 'meaning condensation' (30).

Participant characteristics will be summarised with descriptive statistics; all calculations will be done in R (https://www.r-project.org/). Thematic analysis using meaning condensation will comprise multiple steps based on prior studies (31); analysis will be done using ATLAS.ti software (32). Transcribed data will be categorised into meaning units and assigned codes, which will be organised first into lower-level themes before these are classified into higher-

level themes. Concepts (higher-level themes) identified through the thematic analysis will be linked with existing theories and/or factors identified in a search of relevant literature. Results will be presented in narrative and table formats.

Rigour and accuracy of the study

Several strategies will be used to ensure rigour and accuracy and to enhance trustworthiness of the data (31, 33). Semi-structured interviews will be conducted based on a guide by the same investigator at each site. The investigator will record debriefing notes in a study diary. After transcription, texts will be checked against the recordings before being sent to participants for review and verification. Analysis will begin as soon as the first data are available, in parallel with ongoing interviews; a second investigator will analyse at least 10% of the data to ensure accuracy. After analysis, results will be discussed with the task force in order to reach consensus on meaning units and concepts. The proposed scheme of concepts will be sent to the task force for evaluation and feedback before the final scheme is determined. Finally, the consolidated criteria for reporting qualitative research (COREQ) Checklist (34) will be used to ensure high quality reporting of the results.

Ethical Considerations

The interviews will be conducted only with expert employees who opt in to participation. Signed informed consents will be collected for all participants; participants will be able to withdraw from the study at any time.

Data Protection

All data will be pseudonymised. Results will be presented aggregated by thematic concept. Any direct quotations published and/or presented will not be attributable to individuals.

Although there are no direct personal benefits from participation, the results may be of-interest to the participating organisations and benefit derived at the organisation level. Participation is also low risk.

This study, including Informed Consent documentation, was submitted to and approved by the Data Protection Commission of the Medical University of Vienna, Vienna, Austria.

Conflicts of interest

The authors have no conflicts of interest related to this research to declare.

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Supplementary Table 1

Introductory – open ended question

      How would you define innovation?

Semi-structured key questions

1. What is your role at your hospital?
2. Has your hospital / have you been involved in a pre-commercial procurement or public procurement of innovation process? (*only for public hospitals)
3. How does your hospital purchase digital technology?
4. Tell me about a successful procurement process or the successful adoption of a new digital tool at your hospital.
5. What aspects of this project were most important for its success?
6. Do you think that culture can influence innovation?
7. What do you think is necessary for successful innovation?
8. What role do you think innovation has in healthcare?

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9. Has innovation procurement changed at your hospital as a result of the COVID-19 pandemic?
10. Has COVID-19 changed any of your hospital's current practice or plans for the future in relation to digital innovations?
11. What do you believe is the future outlook?

Final questions

      We are coming to the end of the interview now. Is there anything else that you would like to clarify or mention? Is there anything else important that I have not asked?

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