**TECHNOLOGY DECISION-MAKING PROCESS: THE CASE OF MRI PURCHASE IN PORTUGUESE HEALTHCARE SYSTEM**

Maria João Maia\(^1,2\)

Supervisors: António Moniz\(^1,2\) and Michael Decker\(^2\)

\(^1\)Faculty of Sciences and Technology (FCT NOVA) and Interdisciplinary Centre of Social Sciences (CICS-Nova)
\(^2\)Institute for Technology Assessment and System Analysis (ITAS) of Karlsruhe Institute of Technology (KIT)

**INTRODUCTION**

It is expected that decisions made in the context of the health system, are evidence-based and therefore supported by reliable studies, fulfilling population needs. Medical devices continue playing a role of unquestionable importance in healthcare, therefore the introduction, use and dissemination of these technologies should be based on technology assessment (TA) studies. However, these existing studies always seek a more economic orientation. The lack of studies encompassing a more holistic approach is notable. This reality was indeed the driving factor behind this research. Magnetic Resonance Imaging (MRI) is a very expensive and recent medical device with a promising future. Making a decision on its purchase should be a sensitive issue, especially when it is claimed that it is not the technology itself that is driving up health expenditures, but rather the way they are (inefficiently) adopted and used. Also, since “technology purchase is an easy way for the health system to waste resources (…) strategic purchasing is desirable”(p.139). Since 1988, the Ministry of Health has authorized the procurement and installation of expensive medical technologies in the public and private sector. However, there are currently no effective methods for regulating the distribution of health equipment in the private sector\(^2\). Neither is there empirical evidence that can shed light on how the decision-making process concerning the purchase of such expensive technology is being done. In Portugal there are 150 MRI\(^3\), located mainly in the private sector and concentrated in the west side of the country. Geographically, there is an unbalanced installed capacity of MRI scanners in Portugal.

This research aims to contribute to a deeper understanding of the decision-making process characterization, namely regarding the purchase of medical devices, taking MRI as its object of study. The research question addressed is: Is the decision-making process based on the described HTA model\(^4\)? If not, does it include the social and ethical aspects?

There are some hypotheses to consider:

- **H1** – The technology acquisition is regulated by those who directly have interact with it (Radiologists and Radiographers as a work tool and patients as a means to obtain a medical exam). These are usually the last ones to decide.
- **H2** - There is a patient-oriented rationality present in the decision process of MRI acquisition.
- **H3** – All HTA domains are considered in the decision-making process.
- **H4** - The decision is based on different sources of evidence. Here, TA plays a role on the decision-making process, since it can aid on an evidence-based decision.

**RESEARCH DESIGN**

In order to collect data, a mixed-method was used. A questionnaire was applied to 38 decision-makers, from public and private institutions. It was possible to complement 21 questionnaires with semi-structured interviews.

**EMPIRICAL EVIDENCE**

The strongest reason for the purchase of a MRI device is “technology development” (47%), followed by “health organization technological expansion needs” (39%), meaning that there is a market-oriented rationality in the decision-making process (Graphics 1). The strategic aim for the purchase decision, relies on the opportunity to provide for health care quality, but users (patients) preferences are not taken into account in the decision process (Graphic 2). Maximising revenue was less considered as an aim affecting the decision-making process.

In terms of stakeholders, Policy-Makers and Users (patients), are considered to have an irrelevant role when it comes to participate in the technology decision process (Graphic 5). On the contrary, Radiographer Coordinators, Financial/Accounting Responsible and Clinical Directors/Imagiology Dep. Directors are considered to have the most relevant position. In fact, these are the decision-makers who strongly support the technology acquisition and, in a way, regulate it.

84% of the interviewees were not the last decision-maker in the process (Graphic 3), indicating the “Administration Board” (65,6%) and the “Imagiology Dep. Director” (15,6%) as the last ones (Graphic 4).

Decision-makers who are strongly involved in the process, usually are not the last ones to decide.

Indicators are “several times” (79%) used before decision takes place. The most used indicators are “(Graphic 7): costs (28%), suppliers (23%) and technical characteristics of the technology (16%). In terms of evidence-based process, decision-makers adopt a more important role (58%) than indicators do (Graphic 6) when it comes to make decisions.

**CONCLUSIONS**

Being technology based, Imagiology departments are filled with complex medical devices. Their aim is to provide patients with the best health care possible. For this reason one could expect that the decision-making process to purchase a MRI device is particularly complex. However, the lack of studies encompasses a more holistic approach is notable. This reality was indeed the driving factor behind this research. Magnetic Resonance Imaging (MRI) is a very expensive and recent medical device with a promising future. Making a decision on its purchase should be a sensitive issue, especially when it is claimed that it is not the technology itself that is driving up health expenditures, but rather the way they are (inefficiently) adopted and used. Also, since “technology purchase is an easy way for the health system to waste resources (…) strategic purchasing is desirable”(p.139). Since 1988, the Ministry of Health has authorized the procurement and installation of expensive medical technologies in the public and private sector. However, there are currently no effective methods for regulating the distribution of health equipment in the private sector\(^2\). Neither is there empirical evidence that can shed light on how the decision-making process concerning the purchase of such expensive technology is being done. In Portugal there are 150 MRI\(^3\), located mainly in the private sector and concentrated in the west side of the country. Geographically, there is an unbalanced installed capacity of MRI scanners in Portugal.

This research aims to contribute to a deeper understanding of the decision-making process characterization, namely regarding the purchase of medical devices, taking MRI as its object of study. The research question addressed is: Is the decision-making process based on the described HTA model\(^4\)? If not, does it include the social and ethical aspects?

There are some hypotheses to consider:

- **H1** – The technology acquisition is regulated by those who directly have interact with it (Radiologists and Radiographers as a work tool and patients as a means to obtain a medical exam). These are usually the last ones to decide.
- **H2** - There is a patient-oriented rationality present in the decision process of MRI acquisition.
- **H3** – All HTA domains are considered in the decision-making process.
- **H4** - The decision is based on different sources of evidence. Here, TA plays a role on the decision-making process, since it can aid on an evidence-based decision.

In order to collect data, a mixed-method was used. A questionnaire was applied to 38 decision-makers, from public and private institutions. It was possible to complement 21 questionnaires with semi-structured interviews.

The strongest reason for the purchase of a MRI device is “technology development” (47%), followed by “health organization technological expansion needs” (39%), meaning that there is a market-oriented rationality in the decision-making process (Graphics 1). The strategic aim for the purchase decision, relies on the opportunity to provide for health care quality, but users (patients) preferences are not taken into account in the decision process (Graphic 2). Maximising revenue was less considered as an aim affecting the decision-making process.

In terms of stakeholders, Policy-Makers and Users (patients), are considered to have an irrelevant role when it comes to participate in the technology decision process (Graphic 5). On the contrary, Radiographer Coordinators, Financial/Accounting Responsible and Clinical Directors/Imagiology Dep. Directors are considered to have the most relevant position. In fact, these are the decision-makers who strongly support the technology acquisition and, in a way, regulate it.

84% of the interviewees were not the last decision-maker in the process (Graphic 3), indicating the “Administration Board” (65,6%) and the “Imagiology Dep. Director” (15,6%) as the last ones (Graphic 4).

Decision-makers who are strongly involved in the process, usually are not the last ones to decide.

Indicators are “several times” (79%) used before decision takes place. The most used indicators are “(Graphic 7): costs (28%), suppliers (23%) and technical characteristics of the technology (16%). In terms of evidence-based process, decision-makers adopt a more important role (58%) than indicators do (Graphic 6) when it comes to make decisions.

Disclosure: No relevant financial or nonfinancial relationships to disclose.

Contact: mj.maias@campus.fct.unl.pt | maria.maias@kit.edu