

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

Maria João Maia<sup>1,2</sup>

Supervisors: António Moniz<sup>1,2</sup> and Michael Decker<sup>2</sup>

<sup>1</sup> Faculty of Sciences and Technology (FCT NOVA) and Interdisciplinary Centre of Social Sciences (CICS.Nova)

<sup>2</sup> 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<sup>1</sup>. Also, since "equipment purchase are an easy way for the health system to waste resources (...) strategic purchasing is desirable"(p.139)<sup>2</sup>. 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<sup>3</sup>. 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<sup>4</sup>, 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 aim** 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<sup>5</sup> If not, does it include the social and ethical aspects?

There are some **hypotheses** to consider:

H1 – The technology acquisition is being regulated by those who directly have to 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 an evidence-based decision.

<sup>1</sup>Chandra, Amitabh, and Jonathan Skinner. 2011. "Technology Growth and Expenditure Growth in Health Care." *Journal of Economic Literature* 50 (3): 645–80. <sup>2</sup>Musgrove, Philip, Andrew Creese, Alex Preker, Christian Baeza, Anders Anell, and Thomson Prentice. 2000. "The World Health Report 2000: Health Systems - Improving Performance." Geneva. <sup>3</sup>Barros, Pedro, Sara Machado, and Jorge Simões. 2011. "Portugal: Health System Review." In *Health Systems in Transition*, 131–156. WHO - European Observatory on Health Systems and Policies. <sup>4</sup>Ribeiro, Maria Margarida, João Soeiro O'Neil, and Jaime da Cruz Mauricio. 2013. "Caracterização da Tecnologia Por Ressonância Magnética Em Portugal. Lisboa. (Updated and adapted from: Maia, M.J.(2011) Decision-making Process in Radiology: The Magnetic Resonance Example in the TA Context. In: *Enterprise and Work Innovation Studies* (7) (November 22): 75–101. <sup>5</sup>Kristensen, Finn Berlum, Kristian Lampe, Claudia Wild, Marina Cerbo, Wim Goettsch, and Lidia Becla. 2017. "The HTA Core Model S – 10 Years of Developing an International Framework to Share Multidimensional Value Assessment." *Value in Health* 20 (2). Elsevier Inc.: 244–50.

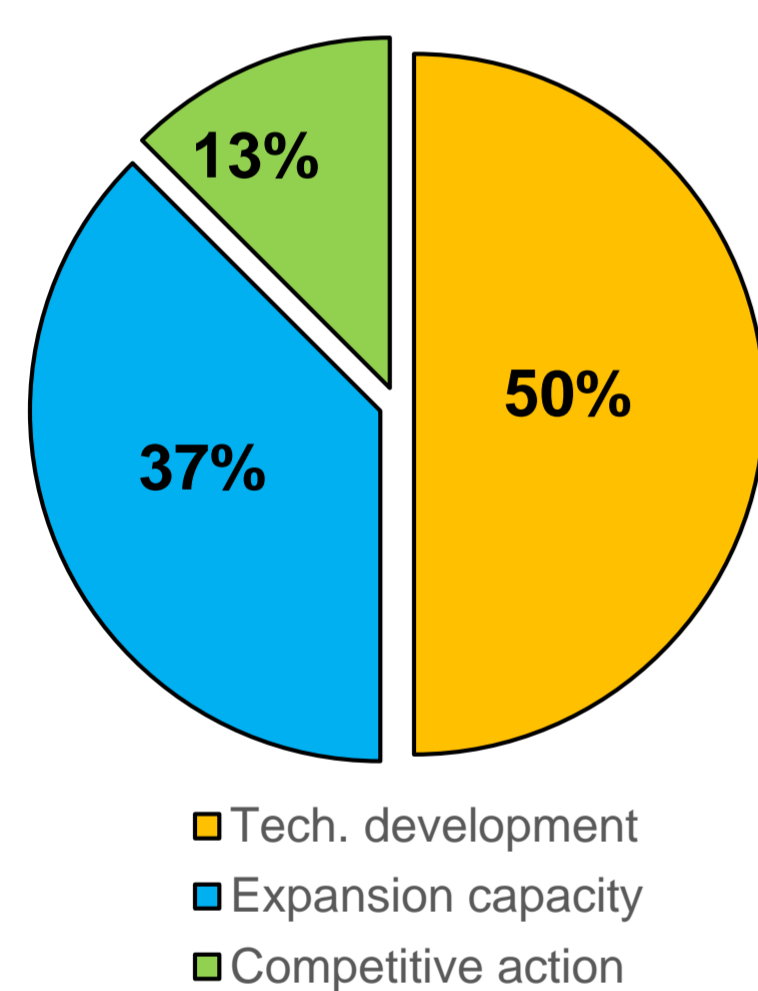
## RESEARCH DESIGN

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**.

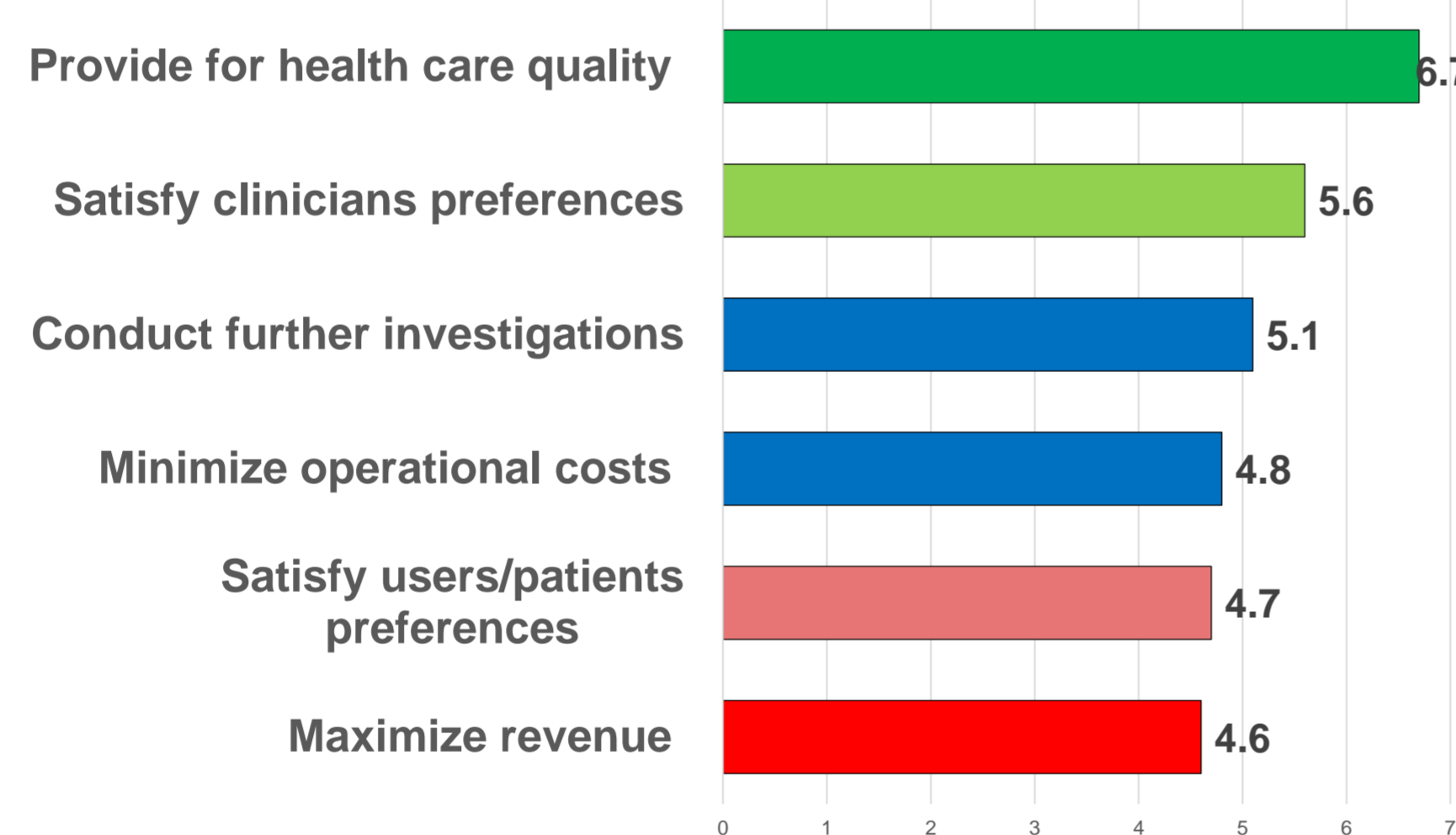
## EMPIRICAL EVIDENCE\*

The strongest reason for the purchase of a MRI device is "technology development" (47%), followed by "health organization technological expansion needs" (39%), meaning 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). Maximizing revenue was less considered as an aim affecting the decision-making process.

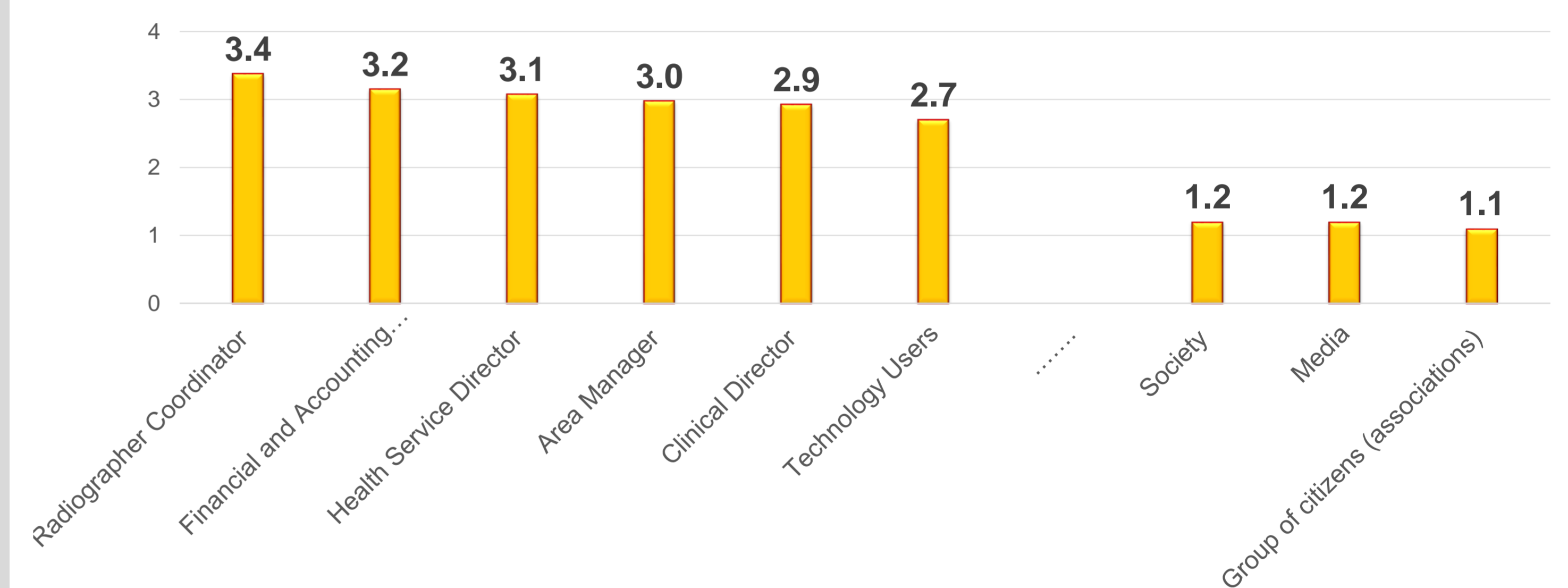


Graphic 1 - What was the strongest reason for the purchase?



Graphic 2 - Which were the main aims considered for the acquisition?

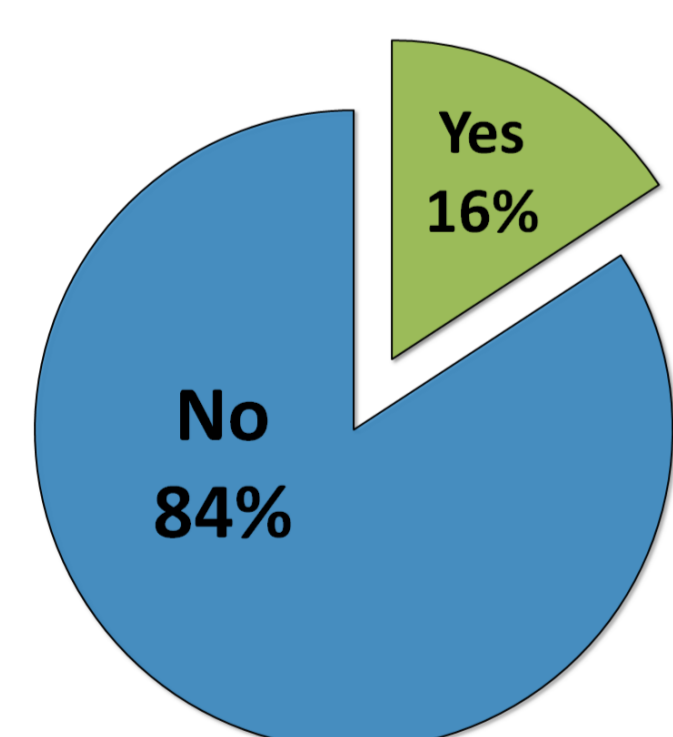
In terms of stakeholders, Policy-Makers and Users (patients), are considered to have an irrelevant role when it comes to participate in the technology decision process (Graphic 5). On the contrary, Radiographer Coordinators, Financial/Accounting Responsible and Clinical Directors/Imagiology Dep. Directors 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.



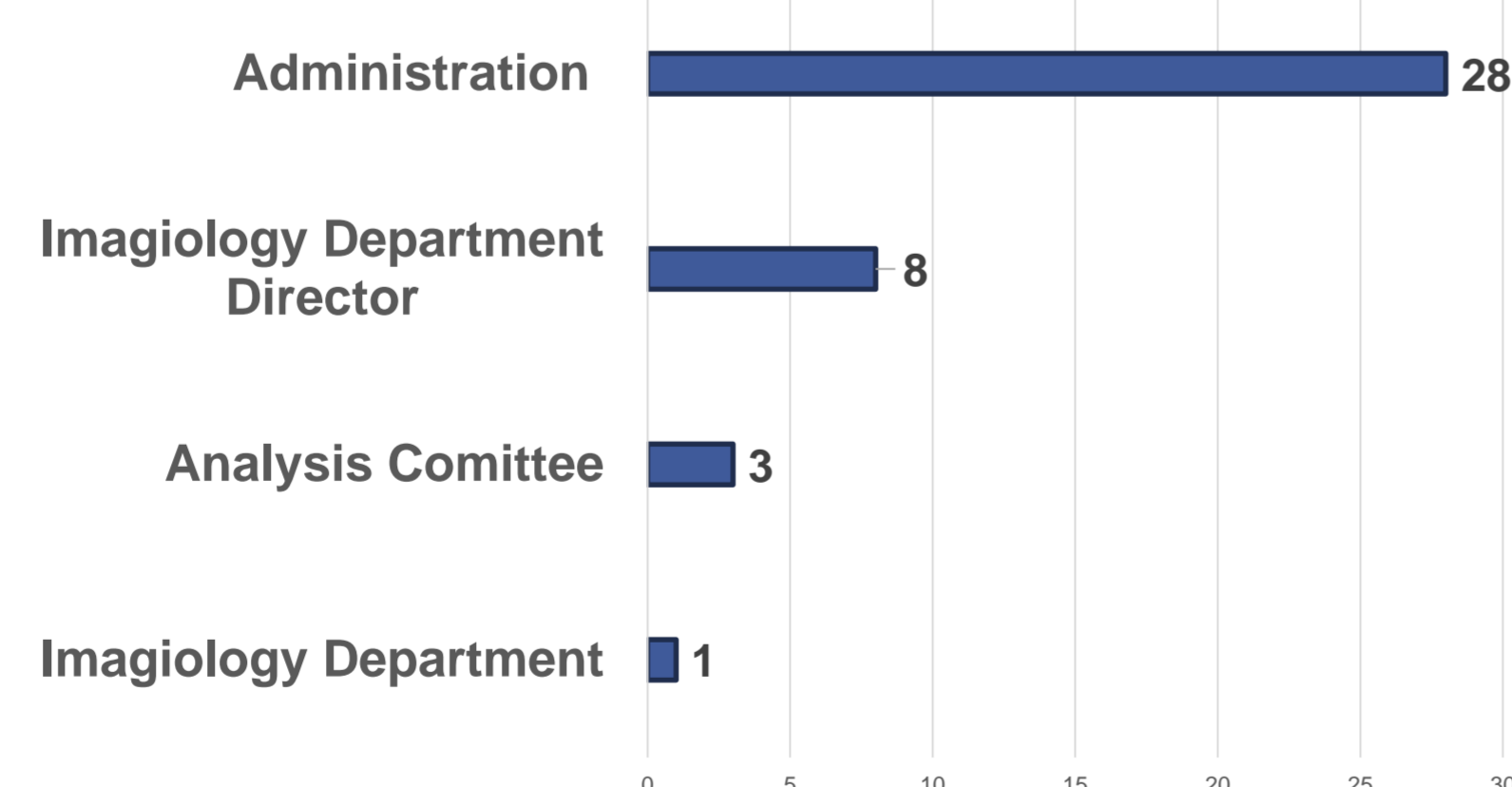
Graphic 5 – What is the importance of the different decision-makers?

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.

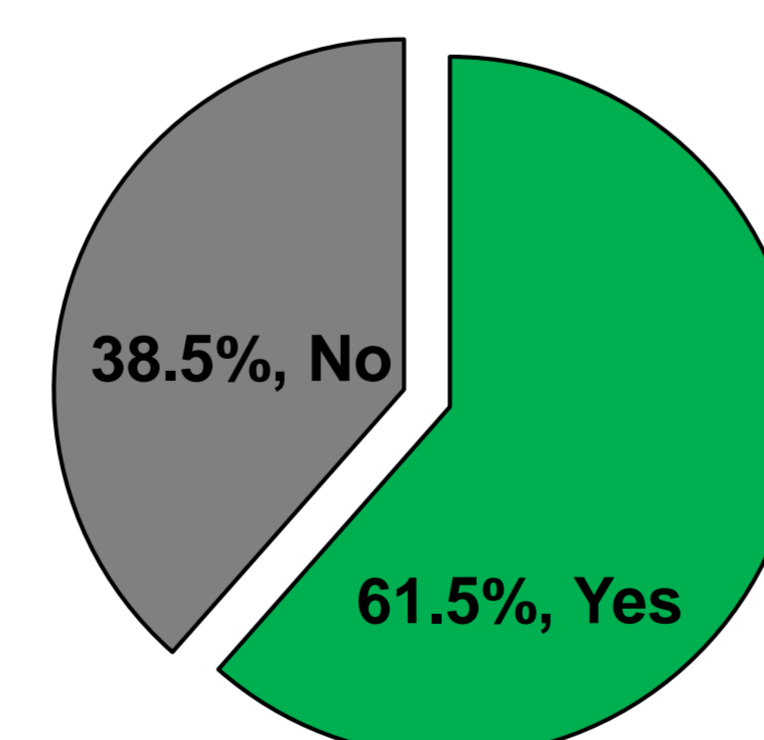


Graphic 3 - Where you the last decision-maker in the process?

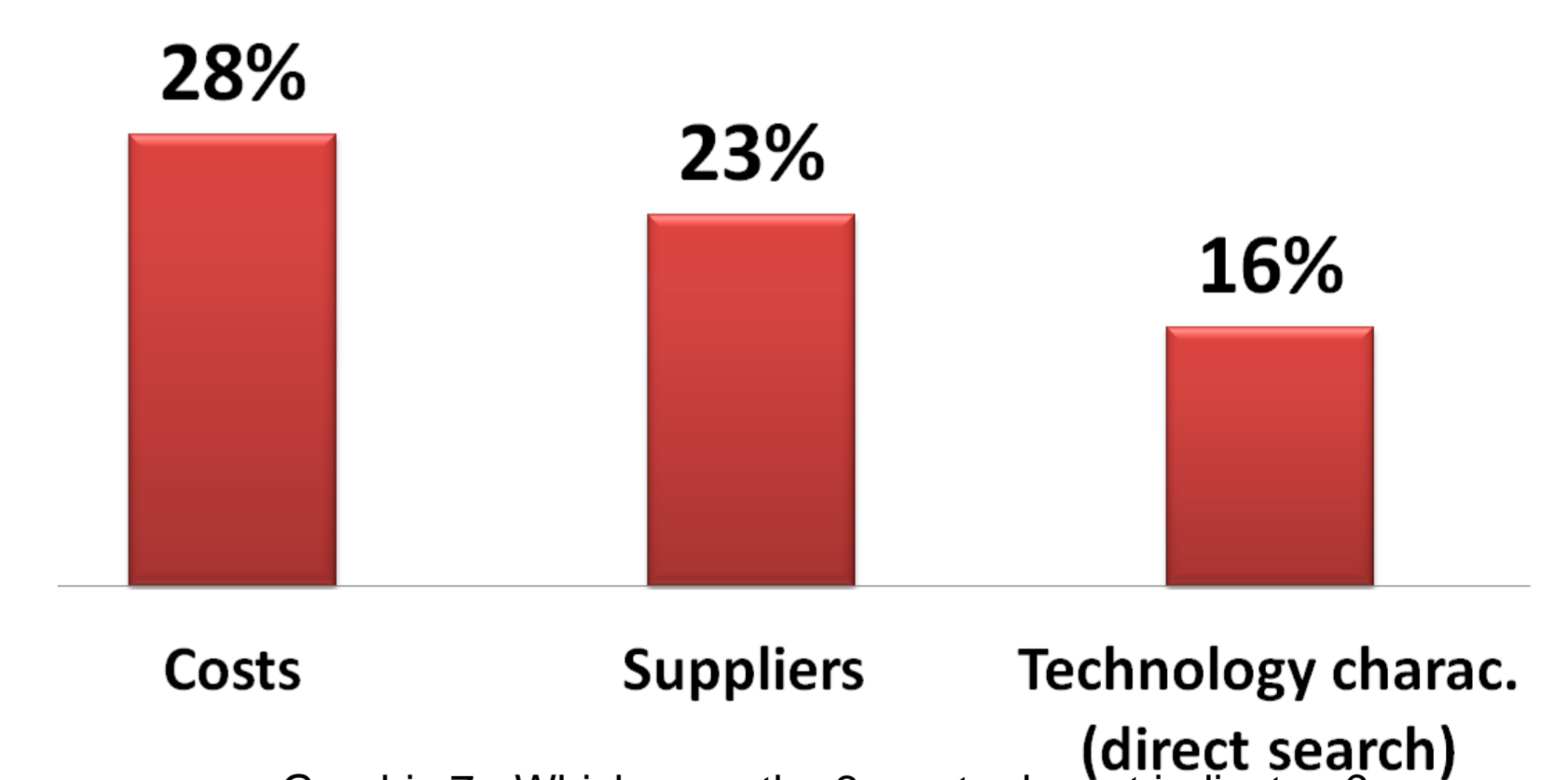


Graphic 4 - Who was the last decision-maker in the process?

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.



Graphic 6 – Were the indicators more important than people, during the decision process?



Graphic 7 - Which were the 3 most relevant indicators?

\*Questionnaire applied to 38 decision-makers in Radiology Departments, from the public (n=15) and private sector (n=23), with the following distribution in terms of position held: Radiographer Coordinator (n=21), Radiology Depart. Director (n=8), Financial Accounting (n=1), Entity Directors (n=7) and Expert (Hospital Physician, n=1)

## 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 patient-driven. Decisions about the purchase of expensive medical devices, such as MRI, would benefit from a greater input of civil representation, since providers and patients do not use, perceive nor value technology in the same way. However, **patient's opinions** (or its representatives) **are not taken into consideration during the decision process**.

**Radiographer Coordinators, Financial/Accounting Responsible and Clinical Directors/Imagiology Dep. Directors** are considered to have the most relevant position in the decision-making process. In fact, these are the stakeholders who strongly support the technology acquisition and in a way, regulate it. Results show there is a tendency for a **market-driven rationality** behind the decision-making process.

As such, industry probably manipulates the **demands for technology** by creating un-assessed stakeholder's needs.

Imagiology Departments tend to be reactive when it comes to the decision of MRI purchase, meaning that an **investment planning is not considered** rather **triggered** by Radiologist/Radiographers requests or as an answer to increase competition. Decision-makers tend to use indicator on their decisions, but not as often as expected. Main indicators used are: a) cost, b) suppliers and c) technology characteristics. However, there are **more issues** to consider to **evaluate health technologies, under a HTA approach, such as accessibility to health services, demographic characteristics of the region, ethical studies** (driving forces (and valued interests) to perform the assessment), etc. **No TA study was mentioned** as being used as an evidence-based information source. There are **no guidelines** for assisting decision-makers in their purchase decision.

Decisions taken today, will affect society tomorrow. With so many financial constraints, making informed decisions as never been so critical.

