Improving knowledge-based management in a higher education organisation

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Abstract
As knowledge intensive organisations, higher education (HE) organisations also face a challenge of creating value from data and utilising knowledge in decision-making. However, in many HE organisations, knowledge management practices and culture are not very evolved. Overall, knowledge-based management is not yet widely recognised in HE-context. The aim of this research was to study knowledge-based management in HE context through a case study of a Finnish technical university. This research was conducted as a qualitative single case study and research material was collected by 19 thematic interviews consisting mostly of upper and middle management personnel. The results are analysed through a Framework of information and knowledge management. Based on a vast analysis, some suggestions were made of how the knowledge-based management could be improved in the organisation.

Keywords – knowledge-based management, higher education, case study

Paper type – Academic Research Paper

1 Introduction

The mission of higher education (HE) organisations is to provide high quality education and research, and to serve the society. Even though the goals of a HE organisation differ from many other organisations', they also create a vast amount of data and information in their operations. HE organisations are knowledge intensive environments by creating knowledge through research, by transferring knowledge with businesses and other parties and by offering higher education to students (Fullwood et al., 2013). However, currently many HE organisations do not take full advantage of the information available. For example, Fullwood et al. (2013) say that universities knowledge strategies tend to be passive or inconsistent even though as knowledge intensive organisations that should not be the case.

There is a growing demand to better utilise data to support decision-making in HE-sector (Aljawarneh 2016; McNaughton et al. 2017). Like other organisations, HE organisations need to distinguish what data is relevant, how to refine it, how to share it within the organisation and if needed, to other stakeholders, and how to use it in decision-making (Choo, 1998; Kaivo-oja et al., 2015), and furthermore, in creating value for themselves and/or other stakeholders. In addition to developing their own operations, HE organisations face the challenges of globally increasing competition (Pucciareli and Kaplan, 2016; Scholtz et al., 2018).

Using data and information is necessary for organisations to understand the dynamic operational environment and to be able to develop their own operations and so on to create value for the organisation. Organisations need efficient ways and practices to manage data and information from various sources to gain understanding about organisations' environment and main partners to support decisions that are met for achieving the objectives of an organisation. In this paper, we refer this knowledge-based management. It is viewed as an approach to collect, refine and use information to support decision-making and strategic development of an organisation. Organisation's culture and attitudes towards knowledge-based management are also an important factor to be considered.

Since knowledge-based decision-making has been found to be highly beneficial in HE-context (McNaughton et al., 2017), the purpose of this research is to study knowledge-based management in a HE organisation in Finland. Our study illustrates practical challenges in relation to research literature from knowledge management literature. The study points out beneficial issues for the development of knowledge-based management in

the case organisation. In addition, the findings contribute to research in the HE sections where knowledge-based management is not very widely studied.

The structure of the paper is the following. At first, the theoretical premises of the study are presented, focusing on knowledge-based management and the process model of information management (Choo, 1998) in the context of higher education. In the empirical part of the study, we discuss the methodological choices and the research setting. We have interviewed the management personnel of a Finnish university and have analysed the results using Choo's process model as analytical lenses for the empirical study. Conclusions and future research end our study.

2 Theoretical setting

2.1 Knowledge-based management

The amount of data is growing at exponential rate and there is a need to distinguish what data is relevant to organisations and how to use it (Hellsten and Myllärniemi, 2019). In literature, this phenomenon has been approached by using concepts like business intelligence (Shollo and Galliers, 2016), data-based value creation (Xie et al., 2016) and knowledge-based value creation (Laihonen and Lönnqvist 2010). Common for all is the way they refine data and information to form and use that are more meaningful.

This paper focuses on knowledge-based management, i.e. knowledge and knowledge processes. Knowledge-based approaches, like the concepts listed above, aim to understand and explain how organisations internal and external knowledge resources contribute to organisations' competitive advantage (e.g. Grant, 1996; Myllärniemi et al., 2012; Salonius and Käpylä, 2013; Myllärniemi et al., 2019). Knowledge-based management may be seen as synonymous for the concepts mentioned above. It is an approach to collect, refine and use data and information to support the decision-making and strategic development of an organisation. In our research, we stress knowledge-based development aspects as well as cultural and strategical issues which are not emphasised, for example, in the concept of business intelligence.

We refer to knowledge as the outcome of human action that takes place in decision-making situations. It is based on information, know-how and experiences. It is refined from information and data and therefore it is more valuable for decision-makers. Information, on the other hand, is data in the structured form. Data is unstructured facts that have the least

impact for managers. (Thierauf, 2001). Knowledge management considers the processes and activities supporting the utilisation of knowledge resources (Wiig, 1997), and further, information and data. One common way to structure knowledge processing and related activities is the process model of information management (Choo, 2002). Choo's model, presented in figure 1, is widely used in knowledge management research. We used it as a theoretical framework when studying the case organisation's knowledge-based management.

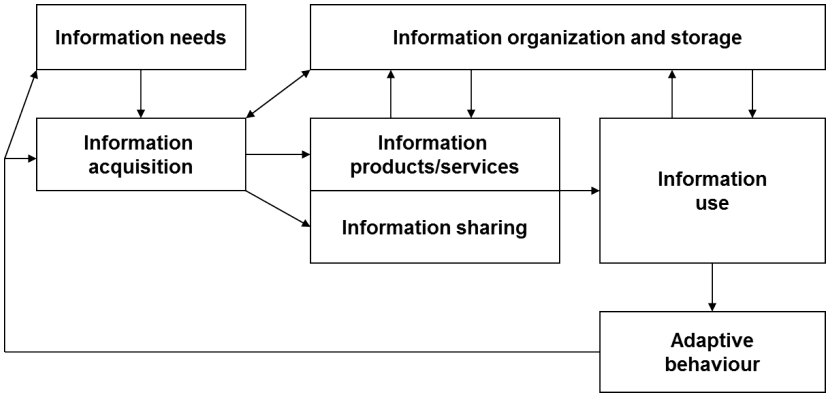

Figure 1. Process model of information management (Choo, 2002)

The model includes six stages. First, information needs are defined so that they can be later satisfied as well and efficiently as possible. Based on this, information is then acquired and gathered both from external sources, such as competitors and other partners, and from internal sources, such as operational databases and personnel. This is followed by the phase of information organisation and storage where the aim is the creation and build-up of an organisational memory. This facilitates not only latter phases such as information analysis for systematic and advanced information products/services, but also the phases of information sharing and information use. Information gets its final meaning when it is utilised for instance in decision-making, and changes in the organisational activities take place. By utilising and adjusting organisational operations, the cycle starts over.

Like said, HE organisations do not take full advantage of the information available. In order to do so, the broad understanding about knowledge utilisation is necessary. This means that knowledge-based management must be studied also from broader organisational perspective including cultural and strategical aspects. Therefore, we used the approach of Jääskeläinen et al. (2019) to cover these aspects. Jääskeläinen et al.'s (2019) framework of

information and knowledge management leverage Choo's model by the aspects of governance and organisation, measures, and strategy and vision. In doing so, we could take into consideration the softer side of humans related to knowledge and the viewpoints of the employees and the organisation.

2.2 Higher education organisations and knowledge-based management

HE organisations have been acknowledged as knowledge intensive organisations for a long time (Fullwood et al., 2013; Sharimillah et al., 2013). New knowledge is created constantly through research, teaching and learning. Through these operations, also a vast amount of data is created which could be utilised to develop the organisation and support decision-making. Based on Gartner's (2017) research, the state of digitalisation in higher education organisations is lower than in other industries. It is widely recognised that the data is not utilised to support decision-making at least in the scale that it could be done (Aljawarneh, 2016; McNaughton, Rao and Mansingh, 2017; Scholtz et al., 2018).

In the HE sector, organisational structures can be either an enabling or restricting factor when it comes to knowledge-based management (Veer Ramjaewon and Rowley, 2017). HE organisations are often quite hierarchical and HE organisations tend to have challenges adapting to rapid changes, for example, due to inflexible organisational structures (Pucciareli and Kaplan, 2016). In knowledge-based management perspective, the stiffness of organisational structures can also cause a major barrier for knowledge sharing for HE organisations (Fullwood et al., 2013). Besides structural challenges, also strategic management (knowledge strategies tend to be passive or inconsistent), leadership in general and funding related issues have been mentioned as reasons behind challenges HE organisations come across.

Finnish HE organisations face these same challenges. The Ministry of Education and Culture of Finland coordinates the activities of higher education organisations and acts as their main financial source, so the organisations are performance guided (The Ministry of Education and Culture, 2020). These set a pressure for management, as well as, for example, for functional information systems, reporting capabilities and knowledge utilisation. Even though strategic management is a rather new concept in Finnish HE organisations, there is the willingness to have a larger emphasis on strategic development in systematic manner (Juppo, 2011, p. 25; Ranki, 2016). When it comes to strategic

knowledge management and knowledge-based management, it is not common for HE organisations to have a strategic approach to it (Veer Ramjaewon and Rowley, 2017).

Finnish HE organisations, as well as other HE organisations globally, have noticed the need for knowledge-based management. Like organisations from other industries, HE organisations are eager to develop their knowledge-based management practices but at the same time they are facing several challenges concerning knowledge-based management that were not evident or visible beforehand (cf. Ransbotham et al., 2016). In this study we point out these challenges and increase the understanding of knowledge-based management in HE organisations.

3 Research methods and empirical setting

This research was conducted as a qualitative single case study (Yin 2002). The case organisation was the Tampere University of Technology (TUT). TUT merged with University of Tampere and Tampere University of Applied Science at the beginning of 2019 forming Tampere Universities community. In this study, we focus on time before the merge and solely on TUT organisation. The university was founded in 1965 and at the time of the study it consisted of 8300 members of personnel and students. The upper management included a rector, two vice rectors (for education and research), and five deans. These together formed an executive team of the university. In each faculty, there were two vice deans (for education and for research). Each faculty consisted of different amounts of units which were managed by a head of a unit. In total there were 19 units in the university. To support all university functions there were teaching and research related services and financial services departments.

The study was carried out during 2017 and 2018, with a focus on university's knowledge-based management. Empirical data consists of 19 theme interviews which were conducted in late 2017. Interviewees were members of upper management, middle management and personnel of support services as can be seen from table 1. Interviews covered all members of the steering group. Interviewees of vice deans, members of administrative services and heads of units were chosen so that all faculties would have similar proportions of interviewees.

Table 1. Introduction of the interviewees.

Number of interviewees	Title
1	*Rector*
2	*Vice rectors: head of education and head of research*
5	*Deans (of all faculties in TUT)*
3	*Vice deans*
3	*Members of administrative services: Teaching services, financial services, research services*
3	*Heads of a unit*

The aim of the interviews was to find out different views of organisation's knowledge-based management and to investigate general attitudes and culture towards knowledge-based management. Interviews were thematic interviews which were conducted face-to-face on university premises and lasted for 30 to 60 minutes. Interviews were formed following Choo's information management process model (2002) which includes the following phases: defining information needs, acquiring information, processing and analysing information, sharing information, information use in decision-making and feedback. In addition to Choo's model, we studied governance and organisation, measures, and strategy and vision.

Through the interviews we were able to get a vast empirical material for the analysis. The material was analysed in a qualitative manner. The findings were categorised by interview themes and interviewees' title. Firstly, the state of knowledge-based management was outlined for each interviewee group. After that, an overall view of the organisation's knowledge-based management was outlined. In this paper, we summarize the findings and propositions made during the research.

4 Discussion and findings

Valkokari and Helander (2007) point out that by examining organisations' activities through Choo's model the challenges related to knowledge management could be recognised and hence development proposals can be made. Like said before, we expanded Choo's model to enable broader examination of knowledge-based management. The analysis is summarized above.

Information needs. Information needs of different user groups are mostly undefined. In many cases, the shared information does not fulfil the information needs of upper and middle management personnel. Especially information about finances was most often mentioned being lacking. All interviewee groups recognised the same challenge despite differences in their roles in the organisation. Another major information gap was recognised as lack of predicative information. Most interviewees in a leading position mentioned that they could not get enough data or information to support predictive decision-making. It is vital for HE organisations to better utilise predicative information in order to stay competitive in the future (Pucciareli and Kaplan, 2016).

Information acquisition, organisation and storage. Even though most of the time there was enough information available, finding the needed information in due course caused problems. However, there was a clear difference between members of the executive team and other interviewees. The members of executive team felt that the amount of information provided for them was sufficient while other interviewees felt the opposite. That has to do with their role in the organisation since the information is mostly provided for the members of executive team. Even though this resolves the issue of availability it brings up another dilemma: the members of the executive team were highly dependent on the provided information.

Despite required amount of information being available, many interviewees had experienced challenges with finding or receiving information in a timely manner. Information is scattered to multiple information systems and channels. Inability to access information, lack of know-how of using the different information systems, and even unawareness of existing information systems were the main reasons. In addition to concerns raised before, the channels used for information gathering were mostly internal. Most interviewees used merely the sources available within the organisation. Only a few mentioned that they actively seek outer information sources to collect adequate knowledge to support their decision-making.

Information products/services. Above mentioned challenges affected information providers' workload; most of their time is currently spent on basic level reporting for executive team. Therefore, other interviewees felt that they do not get enough support from specialist providing and analysing information. Also, the commensurability on information perceived to be a challenge. As people gather data from the systems as they wish and maybe

even form some reports of it by themselves, the results do not tend to be comparable due to different choices made in the data collection and combination.

The case organisation has a business intelligence system in use. Currently, it is only used for creating monthly reports for the executive team. The reports are sent via email and therefore information is converted to a static form. The system would allow investigating reports from multiple point of views and levels and so on enable more thorough understanding about the issues. According to Peters et al. (2016) the use of information system tools correlates positively with the competitiveness of the organisation due to wider information utilisation potential. However, currently the executive team do not find IS usage to be part of their job. Overall, there has not been a ruling of how the business intelligence system should and could be used to better support decision-making.

Information sharing. Information sharing was mostly mentioned in positive context. The interviewees thought that the amount of information shared is good via information systems. Also, they had good communication with colleagues and mostly the exchange of information was seen to work well. Unscheduled conversations were considered one of the most important sources of information. This causes a problem by since the level of uncertainty of information sharing is quite high.

Currently, information sharing is not very targeted and the strategy seems to focus on pushing all information out there for people to find. A challenge occurring from information system-based information sharing is that finding information is quite dependent on how actively one seeks it. This combined with lack of know-how in information system utilisation can cause problems in the organisation.

The interviewees also recognised prevailing willingness to use information to share information openly in the organisation. Currently, the situation is not quite there yet. The hierarchical structure of the organisation is vertically rather high, and information flows mostly from top to bottom. Personnel found it hard to share information the other way around.

Information use. According to the interviewees, decision-making is mostly knowledge-based. Information is used when it is available in timely matter. However, middle management did not always have enough information to support decision-making. Especially financial information was considered being lacking. On the other hand, upper management rely heavily on the information provided for them. The people preparing reports for management emphasised that they do not get to participate in decision-making

situations even though their presence would be beneficial to open up the reports verbally so that the context and all matters effecting on the background will be noticed.

Governance and organisation. Based on the interviews, it is evident that there is willingness to use information to support decision-making. As implied earlier, this willingness does not always translate to action due to a couple of different reasons. The most important barriers are finding the needed information and the knowledge utilisation culture of the university and the attitudes towards it. The lack of transparency in decision-making undermines the culture of knowledge-based management.

The organisation already had a data warehouse in use which is an important step towards better data utilisation. However, not all interviewees knew how to access it nor had rights to access it if necessary. Those who had access thought that searching for relevant data from the warehouse was challenging. Also, some operational data was not yet connected to the warehouse. The IT infrastructure was considered too complex and non-transparent.

According to interviews, one reason for above mentioned challenges is changed organisational structures which have varied multiple times due to many organisational changes made during past years. Current structure allows all faculties to develop their own data and information utilisation practices. Interviewees felt that there are big differences depending on from which previous structure faculties and units originate.

Measures. At the university, the finances guide strongly of what is measured since TUT needs to fill certain targets set by the ministry of education to receive adequate funding. Most interviewees said that measurement is purely quantitative, and it does not support developing teaching and research. Measurements was seen as a guiding factor action instead of a tool for developing operations. Since almost all measuring was finances based, measurement did not provide extensive enough information for all strategic and operational planning.

Strategy and vision. Currently, systematic knowledge-based management has not been a clear strategical target for TUT which seems to be common in other universities also (Veer Ramjaewon and Rowley, 2017). The interviewees said that the organisation does not have a strategy for knowledge-based management or if there was, they did not know of it. Also, all faculties, units and even personnel seemed to have different views and modes of action of knowledge-based management. However, it would be important to invest in strategical planning from this point of view. To derive value from organisational data and

information in HE context it is necessary to have a clear strategy and managers full support to implement it (Pucciareli and Kaplan, 2016; Sharimillah et al., 2013). In addition to lack of strategy and systematic approach interviewees felt that upper management does not lead by example in this matter currently at least at the level the interviewees would hope they would.

The organisation is willing to develop a culture that support knowledge-based management. The organisation could, for example, improve the manner of how they communicate of decisions made. Even though a decision would be made based on a vast set of information, it is not communicated forwards clearly at the moment. Communicating of knowledge-based decision-making would have a positive effect on the knowledge and information culture of the organisation. According to Pucciareli and Kaplan (2016) academic managers should have a central role in guiding the quality and reputation of decision-making culture. It seems that the decision-making is currently more reactive than proactive though organisation vision seems to be towards a more proactive one.

Based on our study we recognised a few main challenges the organisation faces: 1) knowledge-management is not an organisation-wide practice, 2) scattered information systems cause challenges in information finding and sharing and 3) information needs have not been clarified among personnel and information needs are not met at the moment.

5 Conclusions

In this paper, we studied the knowledge-based management of a Finnish higher education organisation. We analysed the level of knowledge-based management by utilising Choo's (2002) model complemented with Jääskeläinen et al. (2019) framework. By combining these models, we were able to expand the analysis beyond using information to support decision-making by investigation and also the organisational strategy, governmental practices and measurement.

As a result, we recognised three main areas which need attention in order to improve knowledge-based management. Firstly, since the organisation has acknowledged the importance of knowledge-based management but there is no organisation wide strategy or common methods yet, it would be important to begin the knowledge driven strategic development. There is a need for a strong support from upper management in this process to establish a culture and practices for knowledge-based management (Pucciareli and Kaplan, 2016; Sharimillah et al., 2013). The management should communicate more

transparently of decisions been made and the data and knowledge on which those decisions are based on.

Secondly, to resolve challenges in information finding and sharing, information system infrastructure should be revisited to find out ways to uncomplicate it. At least it should be clearer from where different pieces of information are located. Also, it would be beneficial to improve knowledge sharing practices in the university. The stiff structure of the organisation is one cause for challenges at least with information sharing at horizontal level. Overall knowledge sharing practices should be clarified. Lack of knowledge sharing culture is recognised as a barrier to knowledge sharing in HE organisations (Veer Ramjaewon and Rowley, 2017) and therefore this leads back to establishing a culture of knowledge-based management as well.

Finally, there was a challenge of unrecognised information needs which effects negatively on knowledge-based decision-making due to lack of relevant information. The information needs should be identified in order to be able to provide necessary information at the right time for the right people. Also, information sharing could be more targeted to avoid information overflow and so on inability to find the information needed. After all, the development of knowledge practices and processes should be started by focusing on the decision-makers' and the organisations' knowledge needs (cf. Choo, 2002).

The case organisation has challenges related to its knowledge-based management. The challenges are comparable with Myllärniemi et al. (2019) research that studied data-based value creation from a globally operating manufacturing company point of view. Their data was also scattered into multiple information systems, and they had problems with knowledge sharing. Both organisations lacked of understanding of importance of data and information. The results indicate that both organisations need a systematic approach in knowledge-based management. Knowledge-based management is about management and leadership.

This analysis provided a wide understanding about the organisation's knowledge-based management practices and culture and enabled forming proposal for development. In addition, the findings contribute to research in the HE sections where knowledge-based management is not very widely studied. The research material was comprehensive, but it also had some limitations. As the interviewees were mostly members of upper and middle management, and information service personnel, the analysis does not fully cover all organisation, especially research and teaching personnel. It would be beneficial to study the

views of other personnel since knowledge-based management is also about a common attitude and culture towards knowledge utilisation in the organisation. After this research was conducted, there has been an organisation merger. Therefore, studying knowledge-based management in the new organisation and comparing the levels before and after the merger would be an interesting research topic.

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