The Factors Impacting the Evolved Role of R&D as a Gatekeeper in the Open Innovation Process

Abstract

Innovation is key for organizations to maintain their competitive advantage. To accelerate innovation, organization are moving towards open innovation, which requires acquiring external knowledge through gatekeepers. Historically, gatekeepers' role stopped after they share the knowledge they acquired. In this paper, we investigate the evolved role of gatekeepers and propose that their role now has been extended, and gatekeepers participate in the knowledge implementation. We also investigate the factors influencing the new role of R&D gatekeepers. The research adopts the case study methodology investigating knowledge transfer and implementation as part of a project aiming to develop a new digitized modelling approach that would enable a significant reduction in conventional physical experimentation in the innovation process at Unilever. We used semi-structured interviews for primary data collection and this data was analyzed using thematic analysis. Our findings indicate that there are two separate stages for knowledge transfer from the university to the end user at industry. The first stage is when the knowledge is transferred from the university to the industry, specifically to R&D department. The second stage is when the knowledge is implemented within the firm, and thus transferred from R&D to the end user. Our findings have identified two different routes for knowledge implementation in stage two within the firm depending on the location of the end user where the gatekeepers get involved in one of the implementation routes, and the different factors that impact the new role of R&D gatekeepers as knowledge implementers. Our research proposes an extended role to the R&D gatekeeping role which includes implementing the acquired knowledge rather than just transferring it. The factors identified by our research to impact knowledge implementation can be used as a basis to formulate some advice to R&D managers. The findings can help R&D managers overcome the challenges they face when implementing innovations by considering the factors that impact the implementation.

1 Introduction

Innovation is key for organizations to survive the competition in today's markets (Crossan and Apaydin, 2010), as it has a big influence on its competitiveness (Mintzberg, 1994). Innovation is a major source of competitive advantage (Prajogo and Ahmed, 2006). As a result, organizations who fail to innovate usually lose their competitiveness (Ferauge, 2012). Organizations aim to innovate in their products or service offerings in order to increase their competitiveness in the market (He and Wang, 2016). In the past, organizations used to depend on their own employees for new products or service creation (Van de Vrande et al., 2009). However, many of them are moving to an open innovation model in order to accelerate innovation, which requires knowledge acquisition from external sources (Chesbrough, 2006). Gatekeepers have been found to play a major role in the acquisition of such external knowledge (Wilhelm and Dolfsma, 2018). Their role includes acquiring, translating, and disseminating knowledge internally to

other teams (Macdonald and Williams, 1994). Traditionally, this role was performed by one individual in the company, however more recently, there has been a division in labor, and this role is being performed by a number of R&D professionals (Whelan et al., 2013).

Our review of existing practitioner and academic literature has revealed that there is very little existing evidence about the role of R&D as gatekeepers after they share the knowledge they acquired, and about the factors that influence any further R&D role within the knowledge implementation process. In this paper, we investigate the evolved role of R&D as a gatekeeper. Historically, gatekeepers' role stopped after they share the knowledge they acquire. We propose that the role now has evolved, and gatekeepers participate in the knowledge implementation. We also investigate the factors influencing the new role of R&D. We answer the following two key questions: 1) Does the role of R&D as a gatekeeper stop after they share the knowledge they acquired or go beyond that? 2) What are the factors that affect the role of gatekeepers in the knowledge implementation process?

We attempt to answer the research questions through a case study investigating knowledge transfer and implementation that occurs through a collaboration between academia and industry. In our study, we focus on the role of R&D as gatekeepers in the knowledge transfer process and investigate if they participate in the implementation of the new knowledge as well. Our study makes two main contributions. First, it identifies a new evolved role of gatekeepers who now participate in the implementation of new knowledge rather than their previous role that ended by transferring this knowledge. Second, we identify the factors that affect this new evolved role.

The remainder of this paper is organized as follows. In the next section, we present a literature review on open innovation and the role of gatekeepers. Then we present the research context, introduce our methodology, and share our findings. After that we discuss our findings presenting the theoretical and practical contributions. Finally, we conclude the paper by stating the study limitations and future direction for research.

2 Open Innovation

In the past, firms used to depend on their research and development departments for innovation and creation of new products (Van de Vrande et al., 2009). This process to develop everything internally was labelled as the closed innovation model, where interaction with the external environment was limited (Chesbrough, 2003). However, this approach started to change as firms were acquiring external technologies and knowledge - which is transferred to the firm by gatekeepers - to complement their internal knowledge (Beamish and Lupton, 2009), which led to the idea of open innovation. Chesbrough (2003) was among the first to capture this new concept, explaining that other than the internal ideas that firms use to advance their technology, they should also use external ideas and paths to the market (Chesbrough, 2003). In a closed innovation approach, firms internally generate their innovation ideas, while in an open innovation approach, firms also use external sources making the innovation process more open (Huizingh, 2010). The open innovation approach considers the firm's innovation process

as an open system compared to the traditional vertically integrated model (West et al., 2014). It has been proposed as a new paradigm for innovation management (Gassmann, 2006). Chesbrough (2003) initially explained that open innovation "means that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well. This approach places external ideas and external paths to market on the same level of importance as that reserved for internal ideas and paths." His definition evolved, and three years later he (and his colleagues) defined open innovation as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively" (Chesbrough et al., 2006). The inflows refer to the innovation activities related to acquiring knowledge from external sources, while the outflows refer to the innovation activities that leverage external technological capabilities (Lichtenthaler, 2008). The responsibility of acquiring knowledge from external sources is usually the role of gatekeepers, who acquire, translate, and disseminate this external knowledge (Whelan et al., 2013).

3 Role of Gatekeepers

Gatekeepers play an important role in transferring knowledge to their organizations. Allen and Cohen (1969) introduced the term of gatekeepers, defined as individuals who have a wide network outside the group or organization and who are also chosen as internal references by their colleagues. Gatekeepers are those key individual technologists who are strongly connected to both internal colleagues and external sources of information and who possess the ability to translate between the two systems (Allen & Cohen, 1969; Allen, 1977; Tushman & Scanlan, 1981). The gatekeeper of an R&D team serves as an important communication channel and discriminates R&D performance (Hung et al., 2013).

Early studies (Allen and Cohen, 1969; Allen, 1971; Allen, 1977) that proposed the "gatekeeper" term suggested that the gatekeeper is a highly competent technical performer who is likely to be a first-line supervisor. The gatekeeper in an R&D team correctly guides the researchers to external information sources and thus reduces their sourcing efforts (Allen, 1977). The profile for the R&D gatekeeper has evolved away from primary dependence on first-line supervisors. This role is now more broadly shared across several positions (Ettlie and Elsenbach, 2007). The gatekeeper role has undergone a division of labor. A small number of R&D professionals identify and gather potentially valuable information (such as emerging technologies, trends and ideas) from the world outside. By and large, these individuals are different to those who translate and disseminate that information throughout the internal R&D network (Whelan et al., 2013). The responsibilities of a gatekeeper is not on the shoulders of one person anymore, the role is being done by more than one individual, it is being done by a group of people within the R&D division, or sometimes by the whole R&D division (depending on the size of the organization and its R&D).

In addition to the change of responsibilities and the division of labor, the overall role of gatekeepers is evolving with time given the changes in how information can be now accessed through different channels. The current literature mentions three roles for gatekeepers

(Whelan et al., 2013): 1)they perform the task of external information acquisition acting as the firm's antennae, scanning the outside world for emerging scientific and technological developments relevant to the work of their R&D group; 2)they perform the task of external information translation, as they have the ability to understand external information and deliver it in a way that ensures its use by others (Macdonald & Williams, 1993); 3) they perform the task of internal information dissemination, as they are also keenly interested in passing that information on to others in the organization for their use (Macdonald & Williams, 1994). In current literature, the role of R&D as a gatekeeper stops after they share the information they acquired. In this study, we propose that the role of gatekeepers is evolving and doesn't stop anymore at the stage of disseminating knowledge; gatekeepers are becoming involved in the implementation of knowledge which could be in different forms such as new digital technologies.

4   Research Context

Our research is part of the Centre in Advanced Fluid Engineering for Digital Manufacturing (CAFE4DM) project. CAFE4DM is a 5-year project aiming to develop a new digitized modelling approach that would enable a significant reduction in conventional physical experimentation in the innovation process (James et al., 2018). CAFE4DM is funded by the UK Engineering and Physical Sciences Research Council, Unilever and the University of Manchester under the EPSRC Prosperity Partnership program. Unilever is one of the leading fast-moving consumer goods (FMCG) companies, with more than 400 brands in 190 countries.

One of the objectives of CAFE4DM is to investigate how to transfer and implement knowledge from research to Unilever better and faster. CAFE4DM is made of four different work packages. Each work package has a one lead from the university, and one lead from Unilever. The objective of work package one is to develop computational tools and methods to allow Unilever to replace as far as possible physical experimentation with numerical simulation from the microstructural rheology all the way up through to the process elements themselves. Work package two aims to do experimental and theoretical modelling of the structure and property relationships for surfactants looking at their rheology and correlating that with structured property relationships that can be developed on a theoretical basis to give a predictive tool to relate structure with the final property. For work package three, the objective is to develop tools both for validating some of the models which are being produced in work packages one and two, and also to develop sensor systems and analyzers to go directly into the factories via the pilot plants. The last work package, work package four, looks at behavioral and organizational issues which were influencing the adoption of digital technologies in Unilever.

5   Methodology

The research adopts the case study methodology to help understand and explore the factors that affect knowledge transfer and implementation and the role of R&D within that process at Unilever. This qualitative methodology has been widely used in social science fields like sociology, industrial relations and innovation studies. Our research project used semi-structured interviews for primary data collection and this data was analyzed using thematic

analysis. We conducted semi-structured interviews with all the leads from both the university and Unilever, in addition to one employee at Unilever who works closely within one of the work packages. In total, we had 9 interviews. The interviews were conducted by a professional researcher using interview protocols that were designed for interviews with industry leads and academic leads. The questions aimed to understand the objectives and outcome of each work package, as well as the research outcome knowledge transfer and implementation process.

6 Data Analysis and Findings

The data collected via semi-structured interviews was analyzed and coded using thematic analysis method (Braun and Clarke, 2006), which helped with focusing on the examining of themes, and identifying, analyzing and reporting patterns based on data from all the interviews. We identified two main themes within the data. The first theme is about the knowledge transfer stages, which highlights the evolved role of R&D as a gatekeeper by confirming its involvement in the implementation of knowledge. The second theme highlights the factors that affect this evolved role.

6.1 Knowledge Transfer Stages

Our findings indicate that there are two separate stages for knowledge transfer from the university to the end user at industry. The first stage is when the knowledge is transferred from the university to the industry, specifically to R&D department. The second stage is when the knowledge is implemented within the firm, and thus transferred from R&D to the end user. Our findings have identified two different routes for knowledge implementation within the firm depending on the location of the end user: if the end user sits within R&D department, R&D implements the innovation; while if the end user sits in a department outside R&D, knowledge is first transferred to the supply chain division who will then implement the innovation. Based on that, we found that the role of R&D as a gatekeeper is not limited to acquiring, translating, and transferring knowledge; the role is extended to implementing this knowledge in certain cases as well. Below are the categories identified in this theme, including some quotations of what the interviewees said.

6.1.1 Stage 1: University to R&D

In this stage, the main work is done by the PhD students and Post-Doctoral Research Associates at the University of Manchester (UoM). The collaboration with Unilever team members within the R&D is dependent on the ongoing project. The research outcome is presented to Unilever as one interviewee explains:

> "So, that was the purpose of her PhD, and then, as a consequence, well, this work was presented to many stakeholders, to stakeholders in the processing community mostly, which is the advance manufacturing centre in Port Sunlight."
> (7)

Interviewees explained how the work done by researchers at the UoM is transferred to R&D:

> "Yes, so that model which [PDRA1] developed and also the work that [PDRA2] has been doing, I've been bringing those in-house and using that to apply to the data... So, that is certainly an example of how we're using what's come out of CAFÉ, taking those models and generally, they are given in the form of code." (4)

> "I think, in Work Package Two, the output of Work Package Two, is really an output for R&D, okay, more than anything." (6)

6.1.2 Stage 2: R&D to End User

Within stage two, our findings reveal two different routes for knowledge transfer depending on the end user location. If the end user sits within R&D, R&D implements the research outcome. If the end user sits outside R&D, knowledge is first transferred to the supply chain division, who then implements the outcome for the end users.

One interviewee indicated that when an outcome is to be used in R&D, R&D will implement it:

> "that's an R&D deployment because the tool is mainly used within R&D as a development tool for R&D." (3)

However, when the research outcome is to be implemented outside R&D, it is the supply chain division who would be responsible for the implementation. When asked who would be responsible for the implementation of any findings, one interviewee (7) answered: "the supply chain would be". Other interviewees also provided similar views:

> "And I, kind of, touch all of those products, so from an innovation point of view I'm the, kind of, interface that sits between the R&D teams, whether it's research development, and out factories. So, I work very very closely with R&D and the factories to deploy a lot of these technologies." (1)

> "So, our role was to prove the concept then prove the principle, do some pilot studies, produce recommendations, communicate the results to the GDC and the supply chain, and then they take it from there." (7)

One of the interviewees explained that members from both R&D and supply chain are involved in the process, where R&D would provide the recommendation about implementing a research outcome, and supply chain would implement it:

> "It will be supply chain and it will also be R&D as well. Yeah, so it depends on the type of the project. Both of the projects that I've just talked about so far, there has to be a recommendation, okay. And that recommendation needs to come

from R&D, and it's a recommendation that, you know, this type of arrangement will do the job it needs to do, in terms of making the product, yeah. Supply chain of course, then have to implement it, and a whole series of other things, you know, become important to them, okay." (6)

6.2   Factors Influencing the Evolved Gatekeeper Role

Our findings also identified different factors that impact the new role of R&D gatekeepers as knowledge implementers. These factors include decision making authority, implementation cost, and involving users early.

6.2.1   Decision Making

Once a research is concluded and the outcome is ready, a decision is made by a group of senior managers to implement it or not. It is not clear how this decision is made and on what basis the research outcome is evaluated. What we noticed is that there are different teams responsible of making the decision depending on where the outcome is to be implemented. Interviewees explained that once an outcome is ready, it could be accepted or rejected:

> "But at the end of the day, it's their decision what they choose to build. What we're providing is, a recommendation for the best solution… the hope is that they will build what we recommend, okay, and that's really the test, yeah. If they don't build it, then why, after we've put all this effort in, doing the simulations, why don't they believe the results of the simulations, that would be my question." (6)

Interviewees explained that the group of people responsible for the decision for some of the projects are not only within R&D:

> "I think the only thing is some of the decision-makers may not be R&D people. So the deployment is within R&D, but some of the outcomes from the model will be shared with business leaders. Because in some cases, they are the decision-makers as to whether a new product is to be launched in the marketplace." (3)

> "And in the end, it's a business decision that needs to drive it, if it doesn't make business sense, then it's hard to do." (1)

6.2.2   Implementation Cost

One for the factors that would affect the implementation of a research outcome is cost of that implementation. What is understood that there are certain budget constraints, and the decision to implement an outcome can be dependent on the cost of that implementation:

"So I wouldn't expect it all to happen at once because some of those changes may be quite fundamental changes to the front end, to the user interface, which might cost quite a lot of money, so we may be constrained by budget." (3)

One interviewee provided one example where the research outcome was tested and approved, however it was not implemented due to its cost:

"I think, we could have installed it, but it was purely down to the investment, so for £[xxxxxx] of investment plus all the operational support to get it operational, it ultimately came down to, what is the real benefit…So, this tool would have fitted in quite nicely but ultimately it wasn't the technology that stopped it, it was purely the business case and the investment." (1)

6.2.3 Involving Users Early

Involving end users at an early stage of the research is one factor that can have an impact on the implementation of that research outcome, as it would have a higher potential to prove its usefulness and acceptance among users given that they were involved in it. There were some differences on when users should be involved with the research as interviewees explained:

"I think the current stage that we are at, it's probably too early for that, because the models are still being developed and we are still trying to choose between models that we want to use. I think once we've got to a point where we've chosen the model and it seems to work and we've increased the complexity and tested it a little bit more, then an understanding about how somebody might then utilise that model and what confidence limits we need, etc., on the model by the users themselves, that would be very, very handy to do that and help them or help us to develop our modelling capability in a better way." (5)

"I think it would have given us a greater sense of what was valued by Unilever, what the problem was, what the use context was for the knowledge, and that might have helped shape what we're doing." (2)

7   Discussion

Our findings indicated that there are two stages for knowledge transfer between academia and industry. The first stage is when the knowledge goes from the university to R&D, while the second stage is when this knowledge is transferred within the company internally through R&D, who represents the gatekeeper of the company. Our findings support what current literature indicates, that gatekeepers' role includes to three things: acquiring, translating, and disseminating knowledge (Whelan et al., 2013). However, in addition to these three elements of the role, we found that the role of gatekeepers have evolved and doesn't end anymore after

disseminating knowledge. We found that gatekeepers now take a further step, and participate in the implementation of the acquired knowledge in certain cases, specifically when the end user is located within R&D. Our research also identified different factors that can influence the evolved role of gatekeepers. These factors include decision making, implementation cost, and involving users early.

Our paper makes significant theoretical and practical contributions. Our main theoretical contribution is proposing an evolved role of gatekeepers which extends to the implementation of knowledge rather than stopping after disseminating that knowledge. R&D, as a gatekeeper, now plays a role in implementing the external knowledge that they acquire. Previously, gatekeepers' role would end after they disseminate knowledge, where they didn't participate in the implementation of that knowledge. Second, our research identifies the factors that affect the evolved role of gatekeepers during the implementation process. These factors are important as they can result in a successful transfer and implementation of knowledge or it failure; thus, in the success of the role of the gatekeeper or its failure.

Our research also provides some contributions to practice. The factors identified by our research to impact knowledge implementation can be used as a basis to formulate some advice to R&D managers. The findings can help R&D managers overcome the challenges they face when implementing acquired knowledge by considering the factors that impact the implementation. Our findings highlight the role of decision makers in the transfer process. It shows how crucial it is to involve decision makers and end users at an early stage of the research, in order to persuade them to support the implementation of research outcome.

8   Conclusion

Organizations look to open innovation in order to remain competitive. To do that, they heavily rely on their gatekeepers. Previously, the role of gatekeepers was limited to acquiring, translating, and disseminating knowledge. In this research, we looked into how this role of gatekeepers has evolved to include a fourth step related to implementing knowledge. We also identified different factors that affect implementation step. To do so, we interviewed nine project leads from both academia and industry.
There were some limitations that are fully acknowledged by the researchers. We collected data through one case study in one industry (FMCG). As a result, our findings can't be generalized. Future research can consider a different methodology to validate our results. Future research can also look to the role of gatekeepers within other industries.

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