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The relation between innovation sources and ICT roles in Facility Management Organizations

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The relation between innovation sources and ICT roles in Facility Management Organizations

Abstract

Purpose – The purpose of this paper is to present research findings on the relation between internal/external sources of innovation and ICT as a supporter/enabler of FM organizations as well as on the strategic orientation towards open innovation of FM organizations.

Design/methodology/approach – This study uses a qualitative research approach. The data collection includes qualitative semi-structured interviews with key facility management managers and directors and secondary material such as company brochures, reports and information provided on the participating companies' websites.

Findings – The results show that the FM organizations in the study sample are starting to develop and engage in open FM service innovations, even though they still mostly conduct closed innovation activities. The findings show that FM organizations mostly take an ambidextrous strategic orientation towards FM service innovations, while they also embrace an exploration approach. Concerning the role of ICT in FM service innovations, the study shows that in the explorative organizations ICT was mostly an enabler, while in the ambidextrous organizations ICT mostly supported and enabled the innovations in question. Only in two innovation instances was ICT identified as having a utility role.

Practical implications – The findings of this study challenge researchers and managers to rethink how and why a strategic orientation towards innovation, the sources of innovation and the role of ICT might affect service innovation in FM organizations. One important implication for FM managers and researchers is the importance that the government might have as an external source in fostering FM service innovations, especially in light of changing environmental requirements, such as energy consumption. FM managers should also consider how they could use ICT to improve and innovate FM services and service delivery and the kind of sources (external/internal) they should use to carry out this task.

Originality/value – This paper contributes to the empirical and theoretical understanding of the sources of innovation and ICT as a supporter/enabler as well the strategic orientation towards innovation in FM organizations.

Research Paper

Keywords

Facilities management, services, strategic orientation, exploration, exploitation, ambidexterity, open innovation, innovation sources, information and communication technologies, ICT

1. Introduction

Service innovation and new service development are different terms used to address the different ways in which organizations develop new service offerings (Goldstein *et al.*, 2002). Service innovations can be characterized, among others, as radical, incremental or *ad hoc* (Gallowj and Weinstein, 1997). The recent innovation literature, including the service innovation literature, recognizes the importance of external sources in the innovation process and outcome. For example, Christensen and Bower (1996) argue that innovation practices are shifting from being internal organizational activities to being activities that take place within networks of customers and business partners. The more recent open innovation literature considers how organizations can and should use external as well as internal ideas and paths to market to advance, among others, their technology, product and service offerings (e.g. Chesbrough, 2003, 2007, 2011).

It can be argued that whether a company engages in open or closed innovation is often determined by its strategic approaches to innovation (Grawe *et al.*, 2009). Such strategic approaches can be described in relation to the strategic orientation of the organization, defined in terms of exploration and exploitation (March, 1991). Information technology plays an important role in open innovation strategies by assisting and supporting the innovation process (e.g. Scupola and Nicolajsen, 2013). According to Ozdemir *et al.* (2007), it is the use of cheap and instant information flows, facilitated by information and communication technology (ICT), that places even greater emphasis on the linkages and relationships of firms and makes it easier to practice open innovation.

Based on the open innovation literature and the potential role that ICT can play in it as well as the literature on organizational strategic orientation, the purpose of this study is to investigate the strategic orientation of FM organizations towards innovation, as well the relationship between internal/external sources of innovation in FM organizations and the role of ICT as support, enabler or utility. In order to achieve this aim, the paper conducts a qualitative study on a sample of Danish FM organizations. The motivation behind this study lies in the fact that while the literature on innovation in facility management services is growing (e.g. Scupola, 2012b), the strategic orientation towards innovation and the related role of ICT in open FM service innovations has attracted less attention. The contribution of this study is twofold. First, the results of this study enhance our understanding of the strategic orientation of FM organizations towards innovation in an FM context. Second, this study provides evidence that ICT has different roles in FM service innovations. It provides evidence that FM organizations might be categorized as having an explorative approach as well as an ambidextrous (i.e. both explorative and exploitative) approach in relation to open innovation strategies. It also demonstrates that ICT mostly plays supporting and enabling roles in the FM innovation process.

The paper is structured as follows. After this introductory section, a literature review on service innovations, the role of ICT as well as strategic approaches to innovation is presented. This is followed by the empirical study and the findings. The paper then closes with a discussion of the findings and conclusions.

2. Theoretical background

2.1 Services and open innovation

A number of classifications of service innovations can be found in the literature. Avlonitis *et al.* (2001) categorize them as new-to-the-market, new-to-the-company, new delivery process, service modification, service line extension and service repositioning types of service innovations. The marketing literature distinguishes between radical and incremental innovations. Radical innovations initiate new directions in technology, while incremental innovations progress along established paths (Christensen and Rosenbloom, 1995). Service innovations can be expected either to improve services' productivity or to develop new service models. In addition, service innovations could be viewed in terms of the type of benefit offered and the degree of service "separability" (Berry *et al.*, 2006). The type of benefit offered refers to the fact that businesses can innovate by offering an important new core benefit or a new delivery benefit that revolutionizes customers' access to the core benefit. The degree of service "separability", instead, addresses the question of whether the services must be produced and consumed simultaneously (Berry *et al.*, 2006). Regardless of the categories into which innovations are classified (e.g. type, degree, impact), a common element in most classifications is the element of novelty that adds commercial value (Narvekar and Jain, 2006).

The earlier innovation literature largely focuses on the organizational factors influencing innovation development, which mainly constitute a closed process in the sense that innovation activities are initiated and conducted internally to the organization. For example, Rogers (2003) points out the important role of the top management and employees in the innovation process. However, while in the past companies developed their innovation competences and processes internally, today organizations need to enrich their innovation activities with external knowledge as well (Bröring and Herzog, 2008). Accordingly, companies are increasingly collaborating with external parties, including suppliers, customers, consultants and sometimes even competitors, in the innovation process (Chesbrough, 2007).

Open innovations have been found to create benefits, particularly in terms of providing an organization with access to a vastly greater pool of ideas. However, there are also considerable costs and practical challenges related to, for instance, resolving intellectual property ownership issues, lack of trust and the operational costs involved in building open innovation capability. Specifically, the role of the customer, for example, changes from purely consuming services to possibly helping to generate innovation through specific service demands or even becoming a partner in the innovation process. However, involving the customer in the service innovation process might be a demanding task. For example, Nambisan (2002), Jeppesen and Molin (2003) and Magnusson *et al.* (2003) emphasize the importance of the organization and its employees in playing an active role in motivating users and converting the inputs provided by the users into usable innovations. Nevertheless, according to a recent study, only a few corporations have institutionalized open innovation practices in ways that have enabled substantial growth or industry leadership (Rufat-Later *et al.*, 2010).

2.2. The role of ICT in service innovations

The convergence of computation and telecommunications is seen as the central enabling technology, production platform and market opportunity for the evolution and growth of the modern service economy (Potts and Mandeville, 2007). The previous literature also shows the important role of information and communication technology (ICT) in service innovation (e.g. Barras, 1986; Scupola *et al.*, 2009). Drawing on the previous literature (Broadbent and Weill, 1997; Mele *et al.*, 2010), three main roles for ICT in relation to service innovations are distinguished here. The first role relates to ICT as an enabler of a service innovation. Service innovations are often technology-based, comprising either the introduction of new technology or a different use of existing technology (Barras, 1986). Examples of this role are e-banking and different e-government services (e.g. Scupola *et al.*, 2009). The

second role refers to ICT as a support infrastructure for a service innovation. Examples of this can be an online help desk or the use of the Web to collect ideas about new service offerings (e.g. Prandelli *et al.*, 2008). The third role relates to ICT as a utility for a service innovation. This implies the use of ICT mainly to reduce costs, such as the adoption of many FM systems at the operational level to increase the coordination of activities internally and externally to the organization. Service innovation is thus often based on investments in ICT, the adoption of new ICT platforms and their subsequent adaptation in order to produce new products and services or improve business processes (Potts and Mandeville, 2007). However, although the role of ICT in facilitating service innovation is paramount, ICT is neither a sufficient nor a necessary condition.

2.3 Strategic approaches to innovation

Strategic approaches to innovation can be described in relation to the strategic orientation of the organization in relation to the organization's innovation activities, defined in terms of exploration and exploitation (March, 1991). Menguc and Auh (2005) define strategic orientation as "strategic directions implemented by a firm to create the proper behaviors for the continuous superior performance of the business" (p. 5). The essence of exploitation is the refinement and extension of existing competences, technologies and paradigms and its returns are usually proximate and predictable; the essence of exploration, in turn, is experimentation with new alternatives and its returns are uncertain (March, 1991). According to March (1991), the exploitation strategy focuses mainly on cost reduction and standardization, and includes the concepts of refinement, choice, efficiency, selection, implementation and execution. Exploration, in turn, focuses on revenue expansion and customization, and is captured by terms such as search, variation, risk taking, experimentation, flexibility and discovery of new opportunities. However, some authors (Tushman and O'Reilly, 1996; Bröring and Herzog, 2008; Grawe *et al.*, 2009) argue that organizations need to be ambidextrous and maintain a good balance between exploration and exploitation in order to succeed in relation to innovation activities.

For example, Tushman and O'Reilly (1996) suggest that innovation should not always be open or closed, but that firms should rely on internal and external sources or knowledge flows for different problems with a balanced approach. In fact, ambidextrous organizations excel both at exploiting existing products or services to enable incremental innovation and at exploring new opportunities to foster more radical innovation (Andriopoulos and Lewis, 2009).

Based on the literature review on open service innovations and the role of ICT in them, as well as the theories of strategic orientation in the innovation management literature, we propose that in explorative organizations the role of ICT in service innovations is that of an enabler and in exploitative organizations the role of ICT is mainly one of support and utility, whereas ambidextrous organizations are characterized by their presentation of all three roles of ICT in service innovations. This is in line with the literature on organizational adaptation and organizational learning, which suggests that the explorative strategy focuses on revenue expansion and customer satisfaction (instead of cost reduction) and exploitative strategies focus more on cost savings, while ambidextrous organizations in turn would be expected to focus on both costs and benefits (Tushman and O'Reilly, 1996).

3. Empirical study

The business services investigated in this study are facility management services. In the last three decades, FM has established itself as a key service sector, with a diverse and highly competitive market of FM contractors, in-house FM teams, FM suppliers, FM consultants and professional FM institutions (Cardellino and Finch, 2006), which form very complex FM supply chains (Nutt, 2000). Facilities

management (FM) can be defined as the integration and alignment of the organizational non-core services required to operate and maintain a business to support the core objectives of the organization fully (Pitt and Tucker, 2008). Jensen (2009) defines the facilities management supply chain as a network of connected and interdependent organizations mutually and cooperatively working together to control, manage and improve the flow of facilities management materials and information from suppliers to end users. Nowadays, the dedication of FM organizations to new service developments and continuous innovation processes seems to be the way to stay in business (Mudrak *et al.*, 2004), by constantly trying to exceed customers' expectations and add value to the core business of the client organization (Pitt and Tucker, 2008).

In the empirical study, the strategic orientation of Danish facilities management (FM) organizations towards service innovations was investigated mainly in terms of the outcome or purpose of the innovation (seeking to decrease costs or increase revenues). In addition, the role of ICT in the FM service innovations in the organizations in the sample was examined and related to the strategic orientation of the organization and the sources of innovation (internal vs. external).

3.1 Data collection

The empirical data for this study were gathered from interviews in 12 Danish organizations (FM service providers, FM customers and FM consultants), as well as from conferences and workshops on FM-related topics (partnerships in FM, innovation in FM and IT systems in facilities management) and archival sources such as company reports and company websites. The participant lists of the seminars and conferences attended by the author, the website of the Danish Network for Facilities Management (www.dcfm.dk) as well as discussions with industry experts were used to identify relevant companies to interview. Companies were contacted by e-mail by the author to explain the research project and ask for an interview and to identify the appropriate contact within the company to interview in relation to the research objective. Only two companies among all those contacted refused to participate in the study due to their company policy. The participant companies can be distinguished in three main groups: FM service providers, FM customers and FM consultants (see Table 1 for details). This choice was made as it was believed that such a mix would provide a more nuanced picture of innovation sources and strategic orientation towards innovation in the FM sector. The respondents were all high-level managers and directors and the main selection criterion was that they had to have a good knowledge of innovation and innovation activities in their company. FM consultants were selected as they usually have a good insight into innovation activities both in the FM service providers and in the customers (see also Scupola, 2012b).

Company Type	ID	Person Interviewed	Number of Employees
Big FM Provider	A1	Senior Manager	250 in Denmark 4000 in Scandinavia
IT System Provider	A2	Senior Manager	25
Big Consulting Company in the Building and Facilities Management Market	A3	Director of the Facilities Management Department	45 in the FM Department
Big FM Provider	A4	Director of the Development Department	(Size Undisclosed)
Big Parma Company	A5	Director of the Facilities Management Department	90 Employees in the FM Department (Size Undisclosed)
Consulting Institution	A6	Construction Consultant	850
FM Public Organization	A7	Senior Manager	170
Big Public Organization	A8	Manager of the Facilities	45,000 Employees in Total

		Management Department	15 in the FM Department
Big State/Private Organization in Experience Services	A9	Senior Manager of the Facilities Management Department	Approximately 1100
ICT System Provider for FM	A10	Director of the Danish Subsidiary	6 in Denmark Approximately 12 in the Main Office Abroad
Big Financial Service Firm	A11	Senior Manager of the Facilities Management Department	FM is Organized as an Intern Function with 160 Employees
Provider of FM Services Mostly to Big Corporations	A12	Senior Manager Also in Charge of the FM IT Systems	Approximately 145 Full-Time Managers Approximately 430 FM workers

Table 1. Characteristics of the companies participating in the study

The main body of data was collected using a semi-structured interview guide (Yin, 2008), which was first piloted to establish the functionality of the instrument and then amended where necessary. All the interviews were conducted in 2010, lasted about 1.5 to 2 hours each and were tape-recorded and transcribed. Notes were also taken during the interviews. To increase the reliability, an interview protocol was used and a database was developed (Yin, 2008). The interviews specifically aimed to elicit data about the following themes, which were deductively derived from the theoretical background: the identification of examples of innovations within the organization and relative organizational purposes (that is, exploitation mainly in terms of cost reduction, exploration mainly in terms of revenue extension or both in the case of ambidexterity); sources of innovations; and the role of ICT in the FM innovation processes of the identified innovation instances. In addition, background information about the organization and the respondents was gathered.

The research design was based on Miles and Huberman's (2014) suggestion to create a provisional "start list" of codes prior to the fieldwork to guide the analysis. The coding was manual. This "start list" was based on the theoretical background above and the purpose of the study and included themes such as the identification of specific innovation instances; the purposes or outcome of the innovation; the sources of innovations; and the relative role of ICT. After the interview process had been completed and the interviews had been transcribed, the authors conducted the final analysis of the data by reading through the transcripts several times to identify instances or statements that could support the existing codes or act as the basis for new ones. Following Miles and Huberman (1994), the data analysis process of this study can be described as comprising the following processes: data reduction, data display and conclusion drawing/verification. Finally, partial results relating, for example, to the sources of innovation or the role of ICT were sent to the study participants for feedback to ensure external validity.

4. Research findings

In this study, we examine organizations' strategic orientation towards FM innovations in terms of the stated role of FM innovation in the organization (cost reduction vs. revenue expansion) as well as the sources of innovation in each identified innovation instance. In this analysis, we distinguish closed and open innovation approaches, depending on whether the main source of the innovation is internal or external to the organization. In addition, while the closed innovations and related issues are briefly touched upon here, the main focus is on the strategic orientation of the studied organizations in relation to open innovation strategies and the related role of ICT. In the analysis, examples of both internal and external sources of innovation were found. A total of 31 FM service innovations were identified in the study, most of which were initiated and developed internally by the management or the employees and

could accordingly be categorized as closed innovations. These are exemplified by an FM manager of a big public organization (A8), who stated the following:

In this [FM] department, [...] innovation happens as an interaction between employees and the upper management. (FM Manager, Big Public Organization, A8)

For the purposes of this study, a total of eight innovations in seven different organizations were identified that could be categorized as open (i.e. mainly driven by external sources) or open/closed (i.e. driven both by external and by internal sources) (see Table 2). All of these eight innovations were incremental, even though there were a number of radical innovations among the closed, internally developed innovations.

Furthermore, whereas the role of the top management as a source of innovation was apparent in the instances of closed innovations, in the open FM innovations it was mostly the employees who acted as co-creators with the external sources. In fact, some, if not many, innovations were generated through co-creation among a number of different actors, as the following example shows:

This [new technology] was developed when we got the idea from some clients wanting to document that we had done the inspection right. This was developed by Company X [the name undisclosed] because they got the knowledge of PDA and Bluetooth technology, so they were our partners in finding out what we needed in order to develop this. (Development Director, Big FM Provider, A4)

Customer-driven service innovations seem to be facing strong barriers created by the additional costs, a great deal of extra time, increased risks of failure, uncertainty of profit and the risk that other competitors will take over the business solutions if their offering is more attractive to the business partner.

4.1 Strategic orientation towards innovation

As already stated, in this study, the organizations' strategic orientation towards FM innovations is viewed in terms of the stated role of FM innovation in the organization and the sources of innovation in each identified innovation instance. The five companies in the sample conducting closed innovation are categorized here as being exploitative in relation to the identified innovation instances.

For three of the seven organizations in our sub-sample of companies engaging in open innovation activities, innovation is a strategic activity and is conducted as a planned and systematic process. These organizations each have a clear innovation strategy and innovation is a strategic priority. In these companies, open innovation is, for example, conducted through formal means, such as benchmarking. These three organizations are categorized as taking an explorative approach in the innovation instances studied.

The remaining four organizations also see innovation as a strategic priority, but they engage in ad hoc innovations driven by customers or other external partners as well. In these companies, it is argued that the innovation instances studied are a result of ambidextrous approaches to innovation, that is, both an exploitative and an explorative strategic approach.

4.2 External sources of innovation

Important sources of innovation in all the open innovation instances identified were the customers. We found that customers contribute to the generation of FM service innovations mostly in an indirect way, through expressing their needs and wishes. For example, a department manager of a software provider states that FM service innovations are mostly small improvements of the existing products and services, but sometimes more radical changes take place. These changes are usually associated with the development of ICT systems or with their use:

You need to develop new products and new projects and also improve the existing ones for customers by adding some minor improvements. (Department Manager, IT System Provider, A2)

The need for close collaboration between the FM service provider's employees and its customers was clearly recognized in our case companies. Indeed, partnerships between the customers and the providers are becoming a frame for innovation of FM services in several of the companies interviewed. For example, when asked about the most important external sources of innovation, a Senior Manager in a big FM provider stated:

It is mostly our partners, that is 70%. The rest can come from our network. (Senior Manager, Big FM Provider, A1)

This is further reinforced by a director of the Facilities Management Department in a consulting company:

Here we are also sharing risks and gains, so we have a common goal: we are partners with the maintenance companies and if we do well, then we share. (FM Director, Big Consulting Company, A3)

Another critical source of innovations for the public organizations in our sample was the government and its requirements. In two out of three instances, government-initiated open innovations also involved a network of external contracts or partners in the innovation process. This is illustrated for example by a senior manager of a public FM company as follows:

The government is suddenly very interested in measuring energy. We have a network [...] that we ask and see how you have been doing it. It's up to our service providers for the system; we discussed different approaches to measuring their number of different ways for doing it. (Senior Manager, Public FM Company, A7)

Company	Role of innovation in the organization	Description of the innovation instance	ICT Role	Source of innovation	Internal/external	Strategic orientation
Big Public FM Organization	Strategic activity with planned and systematic processes	3D modelling of buildings and FM services in relation to digital construction	Enabler	Government requirements + network of external contacts/partners	External	Explorative
Big Public FM Organization	Strategic activity with planned and systematic processes	GSM unit to measure energy consumption in buildings	Enabler/utility	Government requirements + network of external contacts/partners	External	Explorative Ambidextrous

Big Financial Service Firm	Strategic activity with planned and systematic processes	Using 3D instead of 2D in FM modelling	Enabler	Consultants	External	Explorative
Big State/Private Organization Delivering Experience Services	Strategic activity with planned and systematic processes	Adoption of a digital FM system to record all the FM data in relation to the construction of a new building	Enabler	Government requirements	External	Explorative
Big FM Provider	Strategic activity with planned and systematic processes	Development of PDA and Bluetooth technology to improve documentation in relation to services delivered	Enabler/utility	Customers (+ employees)	External (+ internal)	Ambidextro us (exploitative and explorative)
IT System Provider for FM	Innovation both as a strategic priority and as ad hoc innovation driven by the customer	Customization of the software to specific customers	Support	Customers (+ employees)	External (+ internal)	Ambidextro us (exploitative and explorative)
IT System Provider	Innovation both as a strategic priority and as ad hoc innovation driven by the customer	Ongoing customization of the software to specific customers	Support/utility	Customers (+ employees)	External (+ internal)	Ambidextro us (exploitative and explorative)
Big Consulting Company in the Building and FM Market	Innovation both as a strategic priority and as ad hoc innovation driven by the customer	Customization of the software to specific customers (e.g. in relation to energy consumption)	Support	Customers (+ employees)	External (+ internal)	Ambidextro us (exploitative and explorative)

Table 2. Summary of the findings

4.3 The role of ICT

The case organizations investigated in this study utilize different kinds of ICT in relation to FM service innovations. The role of ICT in facilitating service innovation is seen in all of the case organizations as paramount, both in innovation driven by internal sources and when interfacing with users and clients. ICT in the case organizations is mainly used to collect, store, analyse and process data to gain access to information used to assist facility services provision and innovation, as for instance the following statement demonstrates:

One of the advantages that [the FM ICT system] has is that our employees out at the customer site can log into the system and quickly get an overview of their business and be able to serve the customer better. (Senior Manager, Big FM Provider, A1)

All three roles of ICT (support, utility and enabler) were found in our study in relation to FM service innovations. ICT can be used to create new services or to improve existing ones, thus functioning as an enabler of service innovation. This is, for example, the case of switching from 2D to 3D in modelling maintenance and more general FM tasks or the use of GSM systems to monitor the use of energy in buildings from long distance.

Some applications of ICT are of more general use, such as intranet applications for the communication and dissemination of information clearly having a support role, while others are more FM-specific. Examples of the latter include the EAM – an international asset management system with a main focus on maintenance – or COREFM (the Danish computer-aided FM system with a main focus on space management), both of which have a utility and support role (Scupola and Jensen, 2009). In addition,

systems and services such as help desks, supply chain management (SCM) systems and increasingly other types of web-based applications, including social media services, were found to be useful and to have a support and utility role (Prandelli *et al.* 2008; Scupola and Jensen, 2009; Scupola, 2012a). The following statement illustrates the importance of SCM and help desk systems in interfacing with customers and collecting information that can lead to open, incremental service innovations:

The clients that have the FM ICT system send seventy per cent [of question and inquiries related to FM service operations] through the system. The rest comes through the help desk that people can access via e-mails. (Senior Manager, Big FM Provider, A1)

In our study, however, most of the respondents pointed out that the possibility of controlling costs is the main justification for investing in ICT-based FM systems, thus implying that ICT has mainly a utility or a support role in FM services. This was seen as relevant especially in scheduling maintenance tasks for a large number of individual facilities. Overall, the planning and controlling functions were perceived as the most valuable functions of the ICT-based FM systems.

4.4 The strategic orientation towards innovation and the role of ICT

Based on the theoretical background, we expected that in explorative organizations, the role of ICT in service innovations would be that of an enabler and in exploitative organizations it would be that of support and utility. For ambidextrous organizations, we anticipated all three roles to be relevant to service innovations. This would be in line with the literature on organizational adaptation and organizational learning (e.g. (March, 1991), which suggests that instead of cost reduction, the explorative strategy focuses on revenue expansion and customer satisfaction, in which ICT acts as an enabler creating improvements.

The assumptions seem to have been reasonable regarding the relationship between the strategic orientation and the role of ICT. We found weak support for ambidextrous organizations presenting all three types of ICT roles, while we found strong support for explorative organizations utilizing ICT in service innovations in the role of an enabler. In fact, in all the organizations categorized as explorative, the role of ICT was that of an enabler, while in the ambidextrous organizations the role was mainly of support and enabler. Three instances of open innovations in the ambidextrous organizations were related to the customization of the service provider's software to record the FM data in relation to the maintenance and construction of buildings. ICT in these instances clearly has a supportive role. In two instances, the role of ICT was that of enabler and utility. One of them was related to the development of a PDA and Bluetooth technology to improve documentation in relation to FM services. This instance was also one of the examples of co-created innovations, as the process involved the customers and another company expert in RFID technology developing this system together with this specific service provider.

5. Discussion

The findings of this study support the previous research on service innovations in general and FM innovations in particular by showing that FM organizations are engaging in FM innovation activities (e.g. Mudrak *et al.*, 2004). The results of this study also confirm the previous research on open service innovation by showing that FM organizations are starting to develop and engage in open FM service innovation (Chesbrough, 2011), even though they still mostly conduct closed innovation activities (e.g. Rogers, 2003). In addition, the role of the customer in the open service innovation found in this study was very important, as also shown by previous research (e.g. Nicolajsen and Scupola, 2011). The

findings show that in the eight open innovation instances analysed, the organizations mostly take an ambidextrous strategic orientation towards the innovations in question, thus being in line with Tushman and O'Reilly (1996), who state that ambidexterity is the best strategic approach because it balances exploitation and exploration strategies. For example, a big public FM organization had to innovate its way of measuring energy consumption at its customer premises due to new energy requirements from the government. To innovate such services, the FM organization collaborated with a couple of companies and knowledge institutions (external sources) to develop a remote GSM monitoring system that instantly monitors and adjusts energy consumption in a very efficient way. In this way, the FM organization innovated its services. The organization in question had an ambidextrous strategic orientation towards the innovation in question, since the innovation had the purpose of improving efficiency, improving customer satisfaction as well as improving the FM service of energy consumption measurement. The sources of innovation were clearly external and ICT had the role of an enabler, but to a lesser extent of utility.

6. Conclusions

The aim of this study was to understand the strategic orientation towards innovation of FM service organizations, the sources of innovation and the relative role of ICT. The study investigated both open and closed innovation instances, but mainly focused on analysing the open innovation instances. In the empirical setting of twelve Danish facility service organizations, most of the thirty-one innovation instances mentioned by the respondents were characterized as closed since they were mainly initiated and developed by internal sources. Eight instances of open and mixed (open/closed) innovations were found. We categorized three organizations as having an explorative orientation in the studied innovation instances. In all these organizations, a critical source of innovations was the government and its requirements. In two out of three instances, government-initiated open innovations also involved a network of external contracts or partners in the innovation process. Concerning the role of ICT in explorative organizations, the study found that ICT was mostly an enabler, while in ambidextrous organizations the role of ICT was mostly one of support and enabler. Only in two innovation instances was ICT identified as having the role of utility.

The results of this study thus contribute to furthering our understanding of the strategic orientation towards innovation as well as its relation to the role of ICT and internal/external sources of innovation in the specific context of FM services. These results support the expectations that in explorative organizations, the role of ICT in service innovations is that of an enabler, and for ambidextrous organizations it is any or all of the roles of enabler, support and utility, even though most of the instances fall into the support category.

It can be concluded that, even though it is based on a limited number of interviews, this study presents some interesting results that can be useful to managers and researchers alike. These findings especially challenge researchers and managers to rethink how and why the strategic orientation towards innovation, the sources of innovation and the role of ICT might affect service innovation in FM organizations. One important implication for FM managers and researchers is the importance that the government might have as external source in fostering FM service innovations, especially in light of the changing environmental requirements such as energy use, especially in public buildings. In addition, managers should consider how they could use ICT to improve and innovate FM services and service delivery and the kind of sources (external/internal) they should use for this.

Future research is required to look more deeply into the strategic orientations towards innovation, the sources of innovation and the role of ICT in FM organizations in order to draw stronger conclusions on

this relationship. In addition, it could be interesting to investigate in greater depth the co-creation processes of open innovation instances.

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