The Impact of IT Boundary Spanners’ Activities on Citizens’ Perception of Smart IT Services and Smart IT Projects Success

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Dr Hadi Karimikia
Maynooth University
hadi.karimikia@mu.ie

Prof Brian Donnellan
Maynooth University
brian.donnellan@mu.ie

Abstract

Delivering smart IT projects involves a great number of actors collaborating and sharing knowledge with one another to launch smart IT projects and roll out smart IT services. Thus, this makes a new social milieu of boundary-spanning activities carried out by IT functions of a city and IT firms on complementing and delivering smart IT services. While boundary-spanning activities within organizational contexts have been well-studied, few researchers have examined the activities of boundary spanners across organizations in a municipal context. We draw on the concept of boundary spanning to investigate how the actions of IT functions facilitate the delivery of smart projects. This study aims at exploring how IT functions and societal stakeholders collaborate with each other, and educate citizens on the use of smart services. Therefore, it makes more likely for citizens to engage in using smart IT services, thereby resulting in smart IT project success.

Keywords

Boundary-spanning perspective, IT functions, smart IT projects.

Introduction

A smart city is a multidisciplinary ecosystem that encompasses a broad spectrum of societal stakeholders, such as government, public-private organizations, non-profit organizations, small-medium-large-sized IT organizations, and citizens (Angelidou, 2015; Washburn & Sindhu, 2010). Smart cities use technology advancements to ideally offer benefits to all societal stakeholders in the city, which hopefully lead to improvements in the city’s environmental sustainability (e.g., reducing traffic congestion), organizational outcomes (e.g., effective managerial decision makings) and citizens’ quality of life (e.g., faster and more convenient public transportation) (Angelidou, 2015; Wang & Moriarty, 2017). Today’s IT-related opportunities are built on technologies, collectively known as “SCAMIT” including Social, Cloud, Analytics, Mobile, and the Internet of Things, which use innovative combinations of hardware, software, and network technologies to provide stakeholders with real-time IT services and improve decision-making (Ju, Liu, & Feng, 2017). To deliver these IT-enabled services, managers in smart cities undertake smart IT projects by partnering with system and technology integrators (Washburn & Sindhu, 2010). Since the smart city concept involves a range of beneficiaries of emerging computing technologies, a new social milieu of IT boundary-spanning activities has been created in which IT professionals undertake smart IT projects by collaborating with and educating a variety of societal actors (e.g., citizens) on how to use smart IT services and make advantage of them (Washburn & Sindhu, 2010). There is thus a “supply chain” of actors supporting a smart city, ranging from local government agencies and large multinational IT firms, such as IBM, Microsoft, and Oracle, to smaller IT firms that support the deployment of smart city services in municipal contexts. Delivering a successful smart city involves orchestrating these actors so that they operate harmoniously by transferring knowledge and expertise across their boundaries. While boundary-spanning activities within organizational contexts have been well-studied, few researchers have investigated the activities of boundary spanners across organizations in a municipal context. Building on the boundary-spanning perspective to overcome this lacuna, this study aims at looking into boundary-spanning roles performed by IT functions of a city and multinational and small-medium-large-sized IT
firms, and how they deal with the technical and non-technical challenges when interacting with smart IT service users and decision-makers. Boundary spanning roles are performed by internally - or externally-employed IT functions to improve integration of tasks and information sharing on the software and hardware configuration, data architecture, and legacy software systems reengineering (Gasson, 2006; Pawłowski & Robey, 2004; Valorinta, 2011). In a smart city context, IT boundary spanners span across multiple IT firms, interact with industry stakeholders, and collaborate with system and technology integrators to roll out smart city services and educate citizens on such services, so as to enhance their awareness of the available services and their potential value and increase their use. This study will build on the boundary-spanning perspective by exploring the actions that IT functions carry out between organizational levels to share their knowledge and experience when collaborating with societal actors, such as local councils, businesses and citizens, so as to enhance the likelihood of smart IT projects success. The questions this study asks are: which firms act as the IT boundary spanners in a smart city context?; what boundaries do these IT boundary spanners have to traverse in a smart city context?; what activities do IT boundary spanners in smart cities carry out?, and how do IT boundary spanners’ activities affect the benefits that citizens perceive from smart services, and the success of smart city projects?. The next section is an overview of smart cities and the role of today’s state-of-the-art technology on shaping smart cities. Following that, the boundary-spanning perspective is drawn up by reviewing the IS literature for instances of boundary-spanning roles. Finally, the last section concludes with theoretical and practical contributions of this study.

CONCEPTUAL BACKGROUND

SMART CITY

A smart city is a multidisciplinary ecosystem that encompasses a broad spectrum of stakeholders, such as government, public-private organizations, and citizens and shapes new possibilities of digital interaction between them and city services on transport, energy, healthcare, water and waste, security, businesses generation and standard of living (Angelidou, 2015; Wang & Moriarty, 2017). The smart city is shaped by new Information and Communication Technology (ICT) solutions and products directed by technology vendors and consultancies using technological advancements, such as Internet of Things (IoT), mobile Internet, and social media. A high volume of data resulting from sensors, RFIDs, mobile applications, social websites, and back-end systems are organized and categorized through analytics to improve smart city initiatives (Mergel et al., 2016). The managers of smart cities benefit from these data as real-time insights into citizens’ behaviors and opinions to make a more intelligent decision making, providing more transparent and effective services for citizens based on their preferences and prompting them to engage in using the provided smart services (Jun & Chung, 2016; Ju et al., 2017). The literature of smart cities has considerably discussed the effects of smart services through citizen-technology interactions (Jun & Chung, 2016; Meena et al., 2017; Odendaal, 2003), but there has been no research to explore interactions that IT functions, including CIOs and their IT professionals, have with businesses of distinct industries and disparate IT firms to make citizens aware of available smart IT services and encourage them to use these services. Washburn & Sindhu (2010) suggest the levels of involvement of IT functions, for example CIOs of a city and their IT teams, IT functions of a critical city infrastructure or services, and IT functions as consumers of critical city infrastructure or services, in planning, implementing, and delivering smart services to citizens. Therefore, IT functions span across boundaries to provide IT services for citizens for a host of reasons: 1) IT skills needed to integrate disparate systems, for instance building management systems, smart meters, and heating ventilation and air conditioning (HVAC); 2) implementing security and risk best practices of systems; 3) adopting standards consistent with industry to shape a compliant environment; and 4) planning, implementing, and delivering smart projects. This research draws on boundary spanning perspective to examine how CIOs and their IT professionals span across boundaries to deliver smart IT services and share technical knowledge with citizens.

IT BOUNDARY SPANNING PERSPECTIVE

Boundary spanners are members of an organization who coordinate the work among interdependent organizational units and monitor the activities in the external environment (Schwab et al., 1985; Carlile, 2004). Boundary spanners disseminate information inside and between organizations and act as liaison officers across organizational boundaries. The objective of their work is to link isolated sources of
information, and facilitate and integrate interrelated tasks and processes in an organization. Boundary spanning roles discussed in the literature are ambassador, coordinator, scout, and guards (Ancona & Caldwell, 1990, 1992). IT professionals acting as IT boundary spanners facilitate the flow of knowledge about IT and business practices across organizations. IT boundary-spanning roles across IT-business units reconcile divergent perceptions and circulate the existing IT-related knowledge between IT and business units (Valorinta, 2011). While, IT boundary-spanning activities have been sufficiently discussed in organizational contexts, IS scholars have overlooked studying these activities in city contexts. These activities have sporadically appeared at inter-organizational level in various IS contexts. For example, boundary spanning activities are developed between vendor and client when their relationship revolves around knowledge integration, the flow of information, and expertise sharing, resulting in software project performance (Gopal & Gosain, 2010); or a consulting firm builds up a unique set of relationships with clients to develop an interest in relating practices on website settings, thus resulting in the adoption of a new website (Levina & Vaast, 2005). Furthermore, these activities are also identified between software Multinational Corporation (MNC) and its subsidiaries. The MNC focuses on making connections across boundaries and overcoming differences in viewpoints, enabling subsidiaries to interact effectively. So, the results of these activities improve the effectiveness of the internal and external network between the MNC and its subsidiaries (Birkinshaw et al., 2017). So far, deliberate attention has not been paid to explore these activities and their impacts on the outcomes of smart IT projects in smart city contexts.

Conceptual Framework

The delivery of smart IT projects has involved distinct IT functions of a city, IT firms, and industry stakeholders (Washburn & Sindhu, 2010). IT functions of a city initiate smart IT projects to develop solutions to a city’s problems and citizens’ needs. This can be only achieved through collaborative efforts of key stakeholders, such as the city, IT firms, businesses, and citizens (Ojasalo & Kauppinen, 2016). Doing so, they create partnerships with multinational (e.g., IBM) and small - and medium-sized IT firms (e.g., technology and system integrators, or IT consulting firms), and industry peers, in order to plan, implement, and deliver smart IT services. Since partners may lack a common understanding about the development aspects of smart projects, IT functions frequently contact them to provide an integrated insight into smart projects vision, road map, and regulatory framework (Washburn & Sindhu, 2010). For example, IT functions engage with partners to overcome differences in their viewpoints on smart IT projects portfolio and implementation. However, IT functions of a city are not the only IT players involved in the processes of smart IT project implementation and delivery. Different types of IT firms, including multinational and smaller IT firms (or local IT firms, such as tech start-ups), work together and effectively communicate with IT functions of a city to develop and complement smart IT projects. Multinational IT firms establish partnerships with external actors, such as city governments, SMEs, research centers, and local IT firms. The purpose of these partnerships is to acquire external knowledge and share internal knowledge on how to formulate a strategy based on city infrastructure initiatives, and how to implement and maintain smart IT projects (Scuotto, Ferraris, & Bresciani, 2016). Thus, one of the most important activities in implementing smart projects is creating quality interaction and clear understanding on requirements for smart projects among city, businesses, multinational and local IT firms, and citizens. This makes a new social milieu of IT boundary-spanning activities in which IT functions of IT firms and a city build up relationships, and encourage different actors to engage in collaborative networks to deliver smart services to citizens. They act as intermediary layers and perform ancillary roles to span across multiple IT firms to streamline the delivery of smart IT services and improve citizens’ engagement. However, so far, less attention has been paid to look into boundary-spanning activities at inter-organizational level in a smart city context. Thus, this study draws on the boundary-spanning perspective by examining the actions that IT functions carry out at an inter organizational level to share their knowledge and experience through collaboration with corresponding IT functions and societal actors, such as local councils, businesses and citizens. For example, one of the challenges IBM managers always present is to create relationships with city government and its IT functions, as well as with local IT firms (Scuotto, et al., 2016). Another example of these activities is that local IT firms mediate services among different types of IT firms, or facilitate the flow of information between multinational IT firms and other actors (e.g., city managers or citizens). As citizens are no longer IS users, but co-creators of smart IT services, their involvement leads to delivering more accurate smart IT services through citizens-centric data (Baesens et al., 2014). So, IT functions of a city or a critical city infrastructure or service carry out boundary-spanning activities to educate citizens on smart IT services, so
as to enhance their awareness of the available services and their potential value, and increase their use (Washburn & Sindhu, 2010). Altogether, these activities prompt citizens to perceive that smart IT services are useful and easy to use, encouraging more citizens’ participation in using smart IT services. The significance of boundary-spanning activities across organizational boundaries is that they contribute to valued outcomes, such as the adoption of applications and software systems (Levina & Vaast, 2005), the effectiveness of the internal and external networks (Birkinshaw et al., 2017), knowledge diffusion (Pawłowski & Robey, 2004), and firm performance (Liebeskind et al., 1996). Therefore, this study attempts to investigate boundary-spanning activities carried out by IT functions across city boundaries to enhance the likelihood of smart IT projects success through citizens’ perception of the delivered smart IT services.

Research Design

A mixed qualitative–quantitative method is proposed for this study. First, a series of semi-structured interviews will be conducted from IT functions of a city, and multinational and local IT firms in the seven critical city infrastructure components and services, such as city administration, healthcare, education, public safety, public estate, transportation, and utilities. The purpose of interviews is to see how and for what purpose IT boundary spanners perform boundary-spanning roles within the city contexts. Other data sources will be annual reports, meeting minutes of the formal meetings between city managers and IT managers of IT firms, training and user manuals, and IT professionals’ and managers’ job descriptions. Then, the results of data collected from interviews will be analyzed using thematic coding to create core constructs representing boundary-spanning activities. Then, this study will use a survey method to subjectively collect information on citizens’ perception and opinions shaped through interaction with IT boundary spanners to explore the extent to which smart IT services (e.g., mobile apps) are used. A survey method will be used to collect data from IT professionals on IT boundary-spanning activities and from citizens on the success of smart IT projects.

Implications for Theory and Practice

Theoretically, a broader context of boundary-spanning activities can be highlighted by looking into the actions of IT functions in a municipal context when making connections between different societal actors and spanning across various organizations to bring them together into a common understanding of the overall project portfolio. Since the current IS literature does not elaborate on how innovation networks are built up and promoted in the smart city context, this study extends the IS literature on the values of IT boundary spanners’ activities and roles across city boundaries that bring up solutions for innovation networks (Ojasalo, 2016), and the successful utilization of IT artefacts (Levina & Vaast, 2005). This study also points out how IT functions as IT boundary spanners can facilitate the processes of citizen empowerment and participation by helping citizens perceive the benefits of IT smart services and encouraging them to use such services. Furthermore, their activities and roles suggest a strategic approach in coordinating actors, and attracting and facilitating their innovation to develop and implement successful smart IT projects. Since citizens are no longer customers but co-producers, they can take a part in citizen affairs as well as collaborative networks by producing, delivering, and monitoring services (Anand, 2011; Meijer, 2015; Rossel & Finger, 2007). Prior studies have explicated the benefits of new generation of smart computing technologies, for example, faster and more convenient public transportation alternatives, quick responses to emergency situations (e.g., fire), or more available healthcare services through more integrated patient information systems (Ju et al., 2017; Washburn & Sindhu, 2010). These outcomes are not likely to be achieved without citizens’ participation and empowerment. The potential of citizen-centered big data analysis plays an important role in improving smart IT services and supporting management decision-making (Hienerth et al., 2011). Such analysis provides city managers with an insight into accurate, precise, and personalised services and allow city managers to formulate incentive measures encouraging citizens’ participation (Baesens et al., 2014).

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References


