

A Qualitative Study of Innovation Diffusion: The case of an SME and KTP

Abstract

Using the qualitative approach involving the case study of a small firm this research study aims to understand the actions required for diffusion of an innovation in a small firm. From this case study various institutional actions specific to a small firm were identified as a result of government intervention. Classic theories of adoption and use such as, TAM, TPB, TRA or DoI can quantify measures but cannot explain the impact of the actions that the applied King et al(1994) framework did. Further, although these actions are not directly evident, using the qualitative findings and analysis it can be seen that they are important for the diffusion of an innovation. It can also be learnt that these institutional actions can be vitally important for the growth and development of a future innovation. Although the role of government intervention was small in monetary terms, the mere presence of government representation was critical to ensure that the proposed plans and measures were implemented in the appropriate manner and at the appropriate time, both for the small firm and for the government. In terms of the theoretical framework's institutional actions it can be learnt that not all actions outcome are clearly visible. Some are tangible, whilst others are not. This implies that to diffuse innovation, there needs to be an understanding of monetary, human and other such resources to form a better understanding.

However, most importantly it can be concluded that the diffusion framework developed by King et al (1994) provides a clear picture of the diffusion of an innovation and is most useful for understanding not only national government interventions that pervious research identified (Choudrie et al, 2003). Previous institutional actions research has not clearly shown how a micro understanding of the impacts of the various actions can be obtained, which this study provides further evidence of. This implies that for innovation diffusion, there needs to be an understanding of monetary, human and other such resources to form a better understanding. For academics, this paper proffers a different perspective in terms of institutional actions for understanding technology diffusion. For industrial organisations a simple, but detailed analytical framework that can be utilised to understand technology diffusion is provided. For policymakers, this study illustrates the critical role that government plays within the SME, private sector, organisational and academic worlds.

Keywords: SME, KTP, diffusion, adoption, use, smartphones

1. INTRODUCTION

The United Kingdom (UK) Small to Medium Sized Enterprises (SMEs) sector, as in most countries around the globe contains many of the most dynamic firms and is arguably the life-blood of a modern economy (Ghobadian and Gallear, 1996). In Britain SMEs account for 99 per cent of all enterprises, provide 58.8 per cent of private sector employment and 48.8 per cent of private sector turnover (BIS, 2011). Recent official statistics indicate that 4.5 million SMEs exist in the UK, provide employment to an estimated 13.8 million people and yield an estimated combined annual turnover of £1,500 billion (FSB, 2011). Before delving deeper

into this study's emphasis area, an introduction to the definition of an SME is provided. This is essential due to the variations when defining SME as country and research perspectives differ. In this paper we follow the European Commission approach to categorise SMEs as follows: Micro enterprises are those with less than 10 employees and a Turnover (T/O) of less than Euros. 2M). Small enterprises have less than 50 employees, and a T/O of less than Euros. 10M. The final category, Medium sized enterprises have less than 250 employees and a T/O of less than Euros. 43M (EU, 2011).

When considering the adoption of novel technology in the area of Information and Communications Technologies (ICT), SMEs are often viewed as laggards when viewed against their larger counterparts (OECD, 2004). This is often explained by ignorance, uncertainty and associated risk, coupled with a lack of resource availability, applicability and fewer incentives (Culkin & Smith, 2000; Chanvarasuth, 2010). Of the diverse ICTs forms, mobile telephony is acknowledged as a driving force for much development and innovation around the world (UNESCO, 2002; TSB, 2009).

Mobile telephony is usually associated with the umbrella term of ICT that refers to technologies providing access to information through telecommunications. Although similar to Information Technology (IT), it includes the Internet, wireless networks, cell phones, and other communication mediums. Concisely, ICT are defined as: "ICTs, represented by the Internet, deliver "at once a worldwide broadcasting capability, a mechanism for information dissemination, a medium for interaction between individuals and a marketplace for goods and services" (Kiiski and Pohjola, 2001). The marketplace aspect is what ICT proffers in the form of electronic commerce/business and a medium for interaction using electronic government products and services. The elements of e-commerce, e-business and e-government that are associated with ICT have been viewed necessary for economic growth and productivity (OECD, 2004). To ensure that economic growth can be developed and sustained in UK, the UK Government has established a range of SME e-business and Internet use programmes in an attempt to foster appropriate business environments for e-business and ICT uptake. These include, increase broadband connectivity, enhance competition, and market failure programmes (e.g. skill formation, specialised information).

A government led initiative for the support and assistance of organisations that has been in existence from 2003 is a Knowledge Transfer Partnership (KTP) programme, formerly Teaching Company Scheme. In 2008 a KTP scheme was realised in an SME in England and one of its outcomes led to the implementation of an innovation in the form of advanced mobile phones, smartphones. This paper understands and explains the actions required to diffuse the smartphones. By doing so, clarity and understanding regarding the acceptance of a novel technology is provided. In Information Systems (IS) the diffusion of an innovation is usually associated with the diffusion of innovations theory, but in this paper a diverse perspective is provided using King et al (1994) institutional actions theory.

Information Systems innovations adoption and diffusion research in SMEs seems to be still understudied (Ramdani and Kawalek, 2007). According to Parker and Castleman (2007) much SME-e-business research focus primarily on the SME with limited research looking at supply-side innovation diffusion and those that have typically focus on the demand side of innovation at the expense of supply side issues. This paper considers the supply side with a view to highlighting the roles and possible responsibilities of the players within the supply side of innovation diffusion. Bearing these issues in mind, the research question guiding this paper is: *What can be learnt about the role of government intervention for the future adoption of innovation that is represented by an advanced form of mobile phones, smartphones.* This led to the aim of this paper: *To understand the actions required for the diffusion of an innovation in an SME.*

For academics, the contribution of this paper is viewed to be a different perspective in terms of institutional actions to understand technology diffusion. Previously, Lee and Choudrie (2002), Choudrie et al (2003) used such a theoretically based conceptual framework and understanding for broadband diffusion in South Korea. A similar approach has also been used by Papazafeiropoulou and Pouloudi (2000) and Oni and Papazafeiropoulou (2008), but with an emphasis upon the diffusion process. Here, the technology is smartphones, which is a device that also offers broadband and is a form of ICT; which is why the authors consider this a suitable conceptual framework. For industrial organisations this paper provides a simple, but detailed analytical framework that can be utilised to understand technology diffusion. For policymakers, this conceptual theoretical framework and understanding begins to explore the

role that government could make within the SME, private sector, organisational and academic worlds.

This paper comprises six sections. The following section presents the supporting theoretical framework of our analysis, and literature review relating to SMEs and the KTP scheme. This is followed by an explanation of the research approach used in this research study. Section four then acquires the findings and analyses them using the conceptual framework. Section five provides a discussion to the paper and proffers implications of this research study. The paper is then drawn to a close in section six and provides future direction of this research.

2. THEORETICAL BACKGROUND

The theoretical framework applied in this study is the institutional actions theory. The actions of the theory are applicable in practice due to the support of a KTP scheme, which is explained in the first sub-section. This study's context is an SME; therefore the nature and issues related with decision making is provided. Decision making is important as it is the decisions made by various institutions that made this project possible. Finally, the theoretical framework of King et al (1994) that conceptualises institutional actions and guided this research study is given along with the reasoning for applying the actions provided by the framework.

2.1 THE KNOWLEDGE TRANSFER PARTNERSHIP SCHEME

In the UK the government assists businesses to improve their competitiveness and productivity in the form of the Knowledge Transfer Partnership (KTP) programme, formerly known as a Teaching company scheme. The reason for introducing the scheme is that the government believed that for an innovation to be effective, which it interpreted as the successful commercial exploitation of new ideas involves knowledge, technology, skills and adaptability to implement it. This it was felt is not always embodied in equipment or codified in an easily transferable form. It was also recognised that people embody the skills and often the real know-how to introduce, develop and implement innovative change in businesses. For the knowledge to be developed or improved in academic institutions (knowledge base) there is a need for extensive or intensive adaptation to particular business applications that was viewed to be proffered by a qualified person with a direct link to the academic source.

For this scheme to work, a core strategic need and identification of innovative solutions that assist in business growth is required. This is identified initially by the organisation and then in collaboration with a partner organisation, which is usually a Higher Education Institution (HEI). Following completion of a KTP, there is usually significant increased profitability for the business partners. This is possible due to improved quality and operations, increased sales and access to new markets. The KTP scheme has identified that a KTP project usually contains **3 main players:** 1) A company partner: This is usually a company (including not-for-profit) but in some cases it can be a health or education organisation or Local Authority. 2) A knowledge-based partner: This is a higher education institution (e.g. university), college or research organisation (public or privately funded). 3) KTP Associates: Each partnership employs one or more high calibre Associates (recently qualified people), transferring the knowledge the company is seeking into the business via a strategic project.

The importance of the KTP scheme for various reasons including economic and research is recognised such that there are over 1,000 Partnerships running at any one time and over 1,100 Associate projects. When evaluated in monetary and non-monetary terms, for an organisation for every £1m of government spend the average benefits to the company amounted to an £4.25m annual increase in profit before tax, £3.25m investment in plant and machinery with 112 new jobs created and 214 company staff trained as a direct result of the project. For mainly the HEI, on average, each KTP Associate project produces 3.6 new research projects and 2 research papers. For the associate 60% are offered and accept a post in their host company on completion of their KTP project; 41% register for a higher degree and 67% of these were awarded a higher degree. As at 30/06/12 there were 744 KTP projects. Table 1 below identifies the types of organisations using the KTP scheme. It can be seen that small organisations followed by medium sized organisations are the main users of the scheme. It can also be noted that from 2011 onwards larger and smaller organisations are both employing the scheme and are almost on par in terms of numbers of projects.

[Insert Table 1]

2.2 SMES, TECHNOLOGIES AND INNOVATION

SMEs are an important and integral part of every nation's economy and have been long recognized as different to large businesses (Hambrick & Crozier 1985). In the UK SMEs together accounted for more than half of private sector employment (58.8%) and slightly less

than half of business turnover (48.8%) (BIS, 2011). For Europe, SMEs with less than 50 employees and less than €10 million annual turnover are considered to be a significant sector that contributes to a country's economy (European Commission, 2011). In the UK, there are 4.8 million registered organisations in the UK, of which approximately 99.3% are small enterprises (BIS, 2010). An Intel report on SMEs found that UK SMEs are still slow to adapt to new technology such as tablets and cloud computing. Moreover, UK SMEs are using Fax machines more than smartphones (IntelUKNewsroom, 2011). The report also suggested that CEOs of SMEs who have an important role for making decisions when investing and implementing ICTs in their organisations, fall behind and advancing technology trend (IntelUKNewsroom, 2011).

In order to grow, SMEs must evolve their organisation, incorporating changes to management structure, operational planning, control and communication processes (Hanks 1990; Steinmetz 1969). As in most countries, the UK's Small to Medium Sized Enterprises (SMEs)¹ sector contains many dynamic firms and is arguably the life-blood of a modern economy (Ghobadian and Gallear, 1996).

To encourage SMEs to adopt and use innovative IS solutions incentives are provided by governments, but small businesses are traditionally viewed to be reluctant to invest in IS/ICTs that are usually associated with innovation (Lees and Lees, 1987). However, the trend is changing with evidence over the past decade showing an increase in the awareness and management of IS in SMEs by owners and managers (e.g., Ballantine et al. 1998; Bergeron et al. 2001; Hussin et al. 2002). Despite SMEs facing challenges, such as "their small size, centralised management, lack of organisational specialisation, intuitive strategic planning and relatively unsophisticated deployment of ISs" (Bidan et al, 2012: page 287), they still face the same competitive challenges and reasons for investing in IT and IS as large organisations do (Bidan et al, 2012).

A decade has passed since ICTs proliferated and permeated organisations and societies alike. In response to the perceived opportunities afforded by ICTs the UK Government has established a range of SME e-business and Internet use programmes in an attempt to foster appropriate business environments for e-business and ICT uptake. These include, increasing

¹ In this paper we follow the European Commission approach to categorise SMEs. Micro (< 10 employees, with a Turnover (T/O) of less than Euros. 2M). Small (< 50 employees, with a T/O of less than Euros. 10M) and Medium (< 250 employees, with a T/O of less than Euros. 43M).

broadband connectivity, enhancing competition, and market failure programmes (e.g. skill formation, specialised information).

Of the diverse ICTs forms, mobile telephony is acknowledged as a driving force for much development and innovation around the world (UNESCO, 2002; TSB, 2009). When considering the acceptance and adoption of ICTs, larger organisations rapidly do so, with SMEs often viewed as laggards (OECD, 2004). This is often explained by ignorance, uncertainty and associated risk, coupled with a lack of resource availability, applicability and fewer incentives (Culkin & Smith, 2000; Chanvarasuth, 2010). An added reason for laggards is attributed to the CEO/owner and decision making (Speier and Venkatesh, 2002; Waarts et al, 2002; Peltier et al, 2012).

In SMEs owners of small firms incorporate the characteristics of both managers of large organizations and as individual consumers; thereby having a multi-dimensional influence on the adoption process (Stewart et al., 1999). Within SMES owner-managers play a dominant role in terms of strategy, decision making, and the psychological climate within their organization (Miller, et al, 1982). They are viewed to be less inclined to sharing information and delegating decision-making (Kets, de Vries, 1977). When considering innovation, an SME CEOs/owners attitude that should be favourable and encouraging of adoption, could be discouraging and negative; thereby inhibiting and preventing innovation (Bharadwaj and Menon, 2000; Wu et al, 2003). It has been suggested that CEOs of SMEs displaying more favourable attitudes towards change is positively related to seeking and accepting new ideas, communicating with others, being creative and having a better understanding of the technology (Thompson et al, 1991; Stewart, 2003; Peltier et al, 2012). Therefore, in SMEs with proactive CEOs innovations are more likely to be adopted (Brychan, 2000; Oviatt and McDougall, 2005; Bhaskaran, 2006; Kozan et al, 2006).

A literature review of IS innovations encompassing mobile products and services in SMEs also suggests that IS and SMEs research appears to be still understudied (Ramdani and Kawalek, 2007). According to Parker and Castleman (2007) much SME-e-business research focuses primarily on an SME with limited research examining supply-side innovation diffusion. Such studies typically focus on the demand side of innovation at the expense of supply side issues. The diffusion literature provides insights in understanding new product adoption, but factors influencing the adoption of technology (especially among SMEs) are still not well understood. The diffusion process culminates with the decision of whether or not

to adopt an innovation (Kitchell, 1995; Mahajan et al., 1990). Although there is strong evidence suggesting that IS/Information Technology (IT) offer avenues for increased productivity and competitive advantage, adapting to rapidly changing markets, enhancing business operations, retailers tend to underutilize available state-of-the-art IT (Im et al., 2007; Kim and Pae, 2007). Entrepreneurs and SMEs have been especially reticent to incorporate IT into their daily operations (Sullivan and Kang, 1999). The ever increasing competitive pressures facing entrepreneurs make it critical for small retail firms to utilize advancing technologies, especially those that will allow them to be more customer-oriented and that will help establish greater operational efficiencies (Mohr et al, 2009).

As SMEs employ individuals as staff members, their views could also impact decision making within the SMEs; however, SME and IS decision making studies still find the role of a CEO, owner-manager emphasised as important (Street & Meister, 2004; Winston and Dologite, 2002; Hussin et al, 2002). With mobile devices offering several benefits and being devices that can be used in various ways and by diverse users, it might be that *product class knowledge* could be an important and influencing factor when considering the adoption and diffusion of ICTs (Speier and Venkatesh, 2002). By having limited or no product class knowledge, the cognitive ability to understand technical issues, identify appropriate solutions, or development of effective strategies for coping with the innovations is limited to nil (Shih and Venkatesh, 2004). In such instances the CEO/owner, manager may seek to include the views and opinions provided by someone with product class knowledge when making the final, ultimate decision.

2.3 INNOVATION DIFFUSION

For more than 4 decades the topic of diffusion has received immense significant interest in a wide range of disciplines including, management, economics, marketing, and sociology. Most research in the diffusion area emphasises the cumulative adoption of an innovation that follows a general S-shaped curve composed of: An initiation and implementation phase with slow growth; an adoption phase with fast growth; and a saturation phase with decelerating growth (Mahajan et al. 1990). In such studies, innovation is treated as a ‘black box’ with the inner intricacies being virtually ignored (Layton, 1977).

In IS diffusion has been extensively studied with Rogers (1983; 1995) DoI theory. In DoI diffusion is defined as ‘the process by which an innovation is communicated through certain channels over time among members of a social system’. When examining diffusion a close

association with innovation is made as it is in the context of innovation that diffusion is mentioned. Innovation is 'an idea, practice or object that is perceived as new by an individual or other unit of adoption' (Rogers 1995, p.11). An innovation is not an invention, it is 'doing something which did not exist before in a particular territory or technical area' (Vuarin & Rodriguez 1994, p.15). In other words, 'innovation' is a process term. It describes how a new technique or mode of organization is (or can be) introduced progressively into practice, whether the source of the technique or mode is research or experience, in-house or out.

The views of Layton (1977) in terms of DoI have also been reinforced in IS. The theory is criticised for portraying diffusion as a simple linear process (Kautz and Pries-Heje 1996). It is also suggested that Rogers (1983; 1995) failed to sufficiently consider the relationship between suppliers and adopters and the active participation of potential adopters in the diffusion process (King et al, 1994). Beynon-Davies and Williams (2003) highlighted technological diffusion as usually portrayed as a rational process but postulate that diffusion processes are similar to broader social movements. Finally, Lytinen and Damsgaard (2001) found complex technologies not necessarily diffusing in a specific order.

When considering Rogers (1995) research it was found that it mainly focused upon society and individuals. As this research is focused upon organisations (SMEs) and their associated work force, Rogers (1995) DoI approach was not appropriate, which is similar to Vega et al (2008) reasoning: "DOI is a general theory, and does not directly address the specific context of e-business applications and SMEs" (Vega et al, 2008; p.111). As an example, DOI theory is one that does not address issues such as, the nature and size of an organisation, the influence of important stakeholders, in the case of SMEs, the CEO/owner and other users of the innovation (Papazafeiropoulou et al, 2005).

To overcome some of the associated difficulties associated with diffusion in IS, which is the identification and quantifying of certain factors, and also to provide a more holistic approach that encompasses the government and not only society's role, the theory of institutional actions by King et al (1994) has been viewed as most suitable. King et al (1994) observed that, although the objectives of IT-related programmatic statements issued by various government agents are clear, the mechanisms used for the mobilisation of government leadership appear to be inefficient. They argued that difficulties in the application of IT diffusion actions are related to inefficient analysis of the role of institutions involved in the IT diffusion process.

The motivation for using this framework for this research is that this research study involved an organisation implementing and introducing an innovation with institutional actions, which other theories closely associated with or used with diffusion, such as, Technology Acceptance Model would not allow. By applying this framework, more information and understanding of the actions required for diffusion of an innovation in an SME is provided. This is because the framework uses the perspectives of the demand-pull and supply-push forces that involve views and opinions of several stakeholders to form. That is, supply push forces emerge from the production of the innovative product or process, whilst the demand pull forces occur as a result of the willingness of potential users to use the innovation.

King et al (1994) also argued that governments can either be influential or regulatory. Influence is the persuasive power that an institution exerts over the practices, rules and belief systems of those under its sway. Regulation is the direct or indirect intervention in behaviour of those under the institution's influence. Combining the two modes of intervention with the two types of driving forces, they then defined six main institutional actions: knowledge building, knowledge deployment, subsidy, mobilisation, standard setting and innovation directive. These actions are associated with research in innovation research as discussed hereafter; hence viewed as suitable for this research.

In innovation studies the role of knowledge has been identified as pertinent, more so in metropolitan regions where universities, higher education institutions and public as well as private sector organisations are found (Simmie, 2003; Todtling and Tripp, 2009). This finding further supported the presence of the theme of knowledge in this research study. Botazzi and Peri (2003) and Baptista (2003) found that knowledge spill overs can be observed in industrial clusters and agglomerations and they are spatially bound to certain geographical distance from these centres. Further support for the presence of the action of knowledge emerged in terms of the mobilisation of innovation where knowledge mobilisation (the how) was viewed to be the way of enabling social innovation (the what) (Phipps and Shapson, 2009). Innovations are associated with high upfront costs, which in turn, hamper diffusion (Cantano and Silverberg, 2008). To overcome the diffusion of an innovation from occurring, a subsidy policy is viewed to be necessary (Cantano and Silverberg, 2008) that also led to consideration of this theme within this research study. Finally, standards are also associated with innovation where in a positive stance standards are viewed to spur innovation by increasing global

competitiveness. However, standards can also inhibit innovation by identifying obsolete or inefficient technology (Allen and Sriram, 2000).

3. RESEARCH APPROACH

3.1 Design

In order to obtain a holistic picture that would be rich in understanding, a qualitative approach that is based upon words rather than numbers was pursued (Miles and Huberman, 1994). To obtain an in-depth investigation and rich description a single case study approach was pursued (Darke et al, 1998). The single case study and main context of this research is an SME in the UK where a KTP was undertaken for 2 years from 2009 until 2011. Darke and Shanks (1997) suggest that single case studies are suitable when cases are unique or extreme. Yin (2003, p. 41) stresses, “one rationale for using a single case approach is the importance of the case”. Further, as Benbasat et al (1987) found, a case study allows the study of a phenomenon of interest in its natural setting. In this case, the diffusion of mobile technologies in an SME was not generalised or understood using results from a survey, but rather explored and understood in the natural environment of an SME. Case study research was also undertaken since (a) research and theory on the subject of SMEs, KTPs, diffusion and mobile technologies are still emerging, and unique in UK academic institutions applied research; therefore at a formative stage (b) the aim of the research is to understand actions and not to count pursued actions (c) problems studied are very practice-based and (d) the diverse stakeholders’ actions and behaviours are important (Yin 1994; Klein and Myers 1999).

3.2 Data Collection

The data collection process involved collecting and analysing both primary and secondary resources over a period of 2 years. The secondary resources were government reports, web sites, academic text books and journals as well as trade magazines. Primary data emerged from the face-to-face, semi-structured interviews that allowed more understanding to emerge rather than relying solely upon a survey instrument that could result in a quantitative result. By using both the secondary and primary data triangulation and a means of verifying and validating the data; thereby reducing the bias that can arise from only one source of evidence was reduced. This is in line with Miles and Huberman (1994) and Yin (1994) views that evidence should come from at least six sources of evidence (eg. Documentation, archival records, interviews, direct observations, participant observation and physical artefacts) and

rigour can be obtained by using multiple sources of evidence. 8 face-to-face interviews and 2 face-to-face workshops were held to ascertain whether the entire organisation understood the reasoning for the innovation, for the main users' familiarisation of the SME to the innovation to be determined and also allowed observations of the expressions and feelings of the participants, which surveys would not have allowed. The participants were selected based upon their roles in the project and were categorised according to the organisation that they represented. This also allowed a better understanding to form when analysing the findings.

[Insert Table 2]

The face-to-face, semi-structured interviews lasted for mainly an hour; however, some exceeded one hour and lasted for one and a half hours. Semi structured interviews were selected as they are used more often in qualitative studies that are more interpretivist in nature. Structured interviews are usually associated with positivist studies (DiCicco-Bloom and Crabtree, 2006); hence discounted from this research study. The workshops also contained a semi-structured format and were of an hour each. The workshops did not exceed the stated time as they were held during the staff lunch break. This measure was taken to ensure that the practices and operations of the organisation were not interrupted for the benefit of the research study. Since the context of this research was a real life organisation that had wages to pay, earn profits, the research team was very conscious of ensuring that all stakeholders' interests and not only the researchers' interests were met. The interviews were all hand written and in the instance of face-to-face interviews, recordings were made using a Dictaphone or mobile phone. The secondary data was pertinent in that it offered a starting point to understand the organisation's culture and background. The documents and web sites also informed the research team of the government funding agency's requirements, milestones and expectations.

3.3 Analysis

Semi-structured interviews were employed to seek answers from the participants. For the interview, 8 open-ended random questions were asked, which were: 1) 'What has having X here in your organisation meant to you? 2) How much has this project cost you? 3) What have the benefits of the project been? 4) What did you have to do for this project? 5) Did you have to provide any directives to those leading the project? 6) How would you set the standard of this project? 7) After all, this is a new project. What measures will be used to measure and understand the standards? 8) Have you provided any education (teaching and learning) from

this project?' These questions were formed and tailored according to the emergent theoretical themes (categories) that King et al (1994) provided. Once the questions were formed, the expert opinions of 3 other academic experts and the SME CEO were sought. This was to gauge the depth and clarity of expression. Following data acquisition and transcription the researchers attempted to become familiar with the data by reading and re-reading the data and forming ideas and views according to the emergent themes formed from the earlier formed literature understanding; a step in line with thematic analysis (Braun and Clarke, 2006). This then led to codes that were sectioned into the themes identified in the earlier theoretical section. For instance, there were the emergent themes of knowledge deployment and mobilisation from the literature. An examination of the findings was undertaken in order to identify what data fitted with a particular theme, eg. Knowledge and then placed into a specific category, a strategy similar to some of the processes related to grounded theory (Strauss and Corbin, 1997).

Once the coding was done it was noted that the research approach ran the risk of being biased by the coder (the researcher). This was resolved earlier by forming codes that a research assistant and the researcher both formed. Therefore, once the researcher coded the data, verification and validation that the correct codes and understanding had been formed was ensured by the two meeting and confirming the data interpretation. To prevent only an academic perspective, a solution was sought that involved holding informal interviews with members of the government-local enterprise network and local authority (2 members who made decisions directly related to the broadband area), an SME entrepreneur located in a rural area of England. This person was selected as the person had experiences of broadband challenges facing rural and urban areas and was also an SME owner. Opinions were also sought from leading academic experts (4, of which 2 research the broadband area and 2 others the telecommunications area) and 1 leading figure employed within the broadband sector of the incumbent monopolist organisation (BT) (a managerial holding position holder). This strategy was pursued in order to compare and contrast this research's findings with their opinions and views and provided the process of investigator triangulation. Various individuals' views allowed a comparison of the primary and secondary data; thereby validating the data and published material and once again allowed theory triangulation. It can be noted that the participants were selected based upon their influence over the decision making process and also the influence of the innovation.

4. Findings

When examining for the various codes and themes initially reference was made to the emergent themes from the institutional actions (King et al, 1994) literature. It was also known that the actions were defined by King et al (1994), which are identified and explained in Table 3. DoI was applied when understanding whether an innovation was being diffused by comparing the research understanding of innovation and DoI's definition of an innovation.

[Insert Table 3 here]

The transcribed data was re-read, understood and then compared to the emergent themes and the literature regarding innovation that led to the codes for this research to be formed. The codes then led to the formation of themes that are also referred to as categories in this paper. The categories are similar to King et al (1994) except for the knowledge deployment and building actions that were placed in the one category of knowledge.

1) Knowledge and Innovation Diffusion

When examining for knowledge, the government and academic representatives as well as secondary data provided the utmost understanding of this action. It was found that innovation had led to the provision of funding that allowed an understanding of the prevailing problem within the system and ICT to be formed. In turn, improvements to the organisation could be provided. This was summarised best by the statement made by the AS and AL. *“The funding that this project is providing should lead to improvements in the organisation and allow it to understand how to use ERP with the new mobiles”*.

The provided funding had led to an understanding of the problem, which in turn allowed the academics to enhance and build their existing knowledge in the area of IS (namely, ERPs) and smartphone adoption and usage. This assisted with the development of resource material that could be used for teaching and learning purposes. As an example, when introducing blackberries, engineers' requirements had to be determined. Literature from software engineering and software development and implementation emphasises users' requirements being essential for developing software systems. By visiting the SME and engineering sites, the AS learnt of specific engineers requirements such as: *“I do not like blackberries because the model has a keyboard that will not allow my stubby fingers to work fast. Why then should I use the blackberry? Can I not just provide the quote upon my return to the office as I did*

before?” This assisted in providing teaching and learning to the postgraduate students when for instance, explaining the role of requirements in the implementation of new technologies. For example, during a lecture in week 3 the students needed to understand systems development and the role of requirements and elicitation. The AS drew upon and made reference to the reflective note and comments made during visits to the SME.

By discussing within the research team and from the secondary data it was understood that the KTP allowed the KTPA to acquire additional qualifications and the engineers’ additional training. For instance, in the final report it was stated that: *“The operational and administrative staffs have all been given the opportunity to learn using the computer software package (ERP) synonymously with the Blackberries. The knowledge acquired has been essential.... the reporting function enables Senior Managers in client performance reviews to qualify the Company’s performance in meeting client driven KPI’s. Staff has also developed their knowledge and ability to use more confidently mobile communication devices..... The KTP has created a learning environment where all personnel are now capable of using the software and mobile communications devices to enhance their own work role (Partnership Team).”* Therefore, from the institutional actions of knowledge building and deployment it was understood that the actions allowed the acquisition of new forms of support, qualifications and training for the organisation. In turn, this also led to confidence within the staff members and improvements to their use of the innovation. For the academic environment it led to an enhancement to teaching and learning in the form of content development in the academic institution.

2) Subsidy and Innovation Diffusion

This was an action that more the government representative and academic institution representatives were aware of. However, confirmation was provided by the secondary data. Participating in a KTP leads to a subsidy for participating organisations: *“Government contributes towards the knowledge base partners’ cost of participation, whilst the company makes up the balance of the project cost”* (KTP, 2008). From this it was confirmed that a subsidy is provided by the government to cover mainly, the academic supervisor’s time as the supervisor is expected to spend half a day at the premises of the organisation. A payment is

also made for the academic lead to attend the meetings or to provide any additional expertise to the project when the academic lead could not. In terms of understanding a subsidy action is pertinent to allow degrees of freedom to the academic team and KTPA. However, the subsidy is not entirely provided externally and entirely by the government. It requires a vested interest from the organisation when diffusing an innovation. Therefore, for a monetary aspect to the KTP the risk is borne externally and internally. In this case, the risk was shared between the academic institution, the government funding agency and the SME.

3) Mobilisation and Innovation Diffusion

The staff members were the main participants of these activities. Several replies conveyed the message that there was confusion about the position of the KTPA in the organisation. A large number of the replies in the workshops were of the form: *'Oh! Is that what X is doing and not a university project? I thought that she was doing a university project and not really helping us. This is really good'*. This assisted the research team to understand that the action of mobilisation provided clarity (oh! Is that what X is doing?) and awareness (I thought that she was doing a university project) when diffusing the innovation within the organisation. Prior to mobilisation there was a misperception that led the staff members and KTPA to be divided. However, following mobilisation in the form of the workshops, the staff members were more forthcoming in seeking the assistance of the KTPA and AS and displayed an air of friendliness. Further probing and questioning revealed that after attending the workshops, the staff members realised that the presence of the academics and KTPA was beneficial for the organisation and its staff members and not only the academic institution and environment. This again allowed confidence to build in the staff members and the KTPA.

4) Innovation directives and Innovation Diffusion

The staff members, specifically the engineers mentioned in their interviews how policies were implemented for them to use the smartphones and that they had no choice or role in the decision making; hence this was a top-down approach. They also mentioned how they had to return their old mobiles and use the new smartphones. Based upon Rogers (1983) definition of innovation the new smartphones were viewed as an innovation. The management committee members that included the government representative referred to directives from the European Commission about the provision of funds to SMEs. Other directives were TSB

and KTP agency directives that emerged as guidelines during workshops or KTP officers relaying policies and novel financial programmes information to HEIs and KTP teams within HEIs. What also became apparent is that the SME CEO's role was pertinent in diffusing instructions to the entire organisation as he promoted collaboration and unity in the directives used to diffuse the innovation. For example, when the KTPA was placed in the organisation, the CEO addressed the organisation by stating the purpose of the project and its benefits and ended by saying: *"I am looking forward to **everyone** working on this project and making it a success."* This we identified as an innovation directive. Therefore, for the innovation directive, it can be learnt that the CEO is the stakeholder who has the most vested interest and requires a united organisation in order to achieve success.

5) Standard setting and Innovation Diffusion

From interviews held with the management committee, it was apparent that initially, there was little comprehension regarding standard setting. An assumption was made by the research team and also confirmed by the independent evaluators at the end of the project that the comprehensive plans that were provided in the initial documentation submitted to TSB could be identified as established standards of the project. Therefore, for instance, within a certain duration X activities that were measured from other successful projects and previous academic applied research were used and identified as standards of the project. From the replies provided to standards we identified that for the organisation, the academic institution, AS and KTPA as well as SME KTP KAM efficiency and effectiveness resulted from standard setting.

5. Discussion

In innovation studies the role of knowledge has been identified as pertinent, more so in metropolitan regions where universities, higher education institutions and public as well as private sector organisations are found (Simmie, 2003; Todtling and Tripp, 2009). From the findings it was found that the action of knowledge is important for the diffusion of an innovation; however, this case study has also understood the forms that knowledge can emerge in. For instance, it was found that knowledge in the form of an enhanced content provided for teaching and learning is obtained. Further the acquired knowledge led to a new

qualification for the KTPA and training for the engineers that meant an enhancement to these individuals' skills and career.

Peri (2003) and Baptista (2003) found that knowledge spill overs can be observed in industrial clusters and agglomerations and they are spatially bound to certain geographical distance from these centres. Our study understood the form that knowledge spill overs can occur, which in this case is the engineers' families becoming new clients for the mobile and internet service providers and the mobile and internet service providers themselves. The more positive aspects of the mobiles were displayed to the families, the attractive the innovation became. In turn, this led to new clients for mobile and internet providing companies, an unanticipated spill over of this innovation.

Literature also found that although there is strong evidence suggesting that IS/Information Technology (IT) offer avenues for increased productivity and competitive advantage, adapting to rapidly changing markets, enhancing business operations, retailers tend to underutilize available state-of-the-art IT (Im et al., 2007; Kim and Pae, 2007). In this case, we have also understood that having the actions of mobilisation, innovation directives and subsidies allows the SME and CEO who is the ultimate decision maker to understand that efficiency and effectiveness can be achieved using the innovation. Prior to the KTP, such knowledge and information was not evident and could have led to the organisation to miss an opportunity of adapting to the rapidly changing market and changing customer demands and requirements.

What also become apparent from this case study is that two groups of stakeholders unlike the 3 players that the KTP literature suggests emerge. These are classified as, management committee and staff members. Thereafter, sub-categories in the form of engineers or administrators can emerge. By having a case study approach it can also be seen that the CEO is involved in promoting directives that are followed within the organisation and is the main decision maker and very important for promoting innovation directives. Although not directly evident, it can be learnt that the SME's CEO was responsible for the main decision making regarding the implementation of the KTP. However, in some instances, such as, determining the impact of the innovation the role of other players such as, administrators or engineers is important. Also emerging from the findings is that an evaluation of the actions in tangible and intangible terms can be undertaken. For instance, knowledge building and deployment,

standard setting, innovation directives and mobilisation can and are evaluated in intangible terms. Comparatively, subsidy is determined in monetary and tangible terms.

Finally, it is apparent from the findings that the role of government intervention was important in ensuring the KTP implementation. However, the main beneficiaries are more the operational and administrative teams rather than the academic team. That is, the engineers and administrators realised more benefits by having a KTPA located within their vicinity as did the engineers. Of the management team the AS benefited the most by having real life experiences to draw upon and provide better teaching and learning. This is particularly evident from the institutional actions findings provided by knowledge and mobilisation where the AS reflected upon and drew upon the experiences provided by the KTP outcomes, the KTPA acquired more qualifications leading to better career prospects and the staff members being able to tap into expert knowledge provided by the AS and KTPA.

5.1 Implications for Academia

By conducting a qualitative study, it can be learnt that institutional actions are required for the diffusion of an innovation. Using the thematic analysis approach, the nature of the actions could be understood in a clear and transparent manner, which would not have been possible using a quantitative approach. Also proffered by this approach is the development of a familiarity to the context of research, which a quantitative study cannot.

5.2 Implications for Practice

For practitioners this study explains and understands that the role of various individuals is important for an SME and should be included in the decision making process of an SME as well as when opinions or views impacting an entire organisation are made. A sole view could lead to weaknesses in the organisation, which was very clearly evident from the engineers replies when asked about mobilisation.

5.3 Implications for Policymakers

This study explored the roles of various policymakers when a KTP is implemented, including the government. However, this is only one case study that involved a government funding agency that promoted the diffusion of an innovation. It cannot be conclusively confirmed that the role of government will and can be the same to every KTP as the stakeholders associated

with various projects change. Therefore, the implications of the role of government cannot be generalised to every KTP and SME, but it can be understood that the action involving government intervention allowed expertise and further development to the project and associated individuals.

6. CONCLUSIONS

From this case study it can be learnt that various institutional actions are important for the diffusion of a future innovation. As the research question driving this research sought to understand the role of government intervention, it can be understood that government intervention is pertinent to diffuse innovation. The intervention is highly evident in the provision of transferable skills and understanding, which is displayed to a larger extent in knowledge building and awareness and a briefer one in terms of financial benefits.

In terms of the theoretical framework's institutional actions it can be learnt that not all actions outcomes are clearly visible. Some are tangible, whilst others are not. This implies that to diffuse innovation, there needs to be an understanding of monetary, human and other such resources to form a better understanding. However, most importantly it can be concluded that the diffusion framework developed by King et al (1994) provides a holistic picture of the diffusion of an innovation and is most useful for understanding not only national government interventions that previous research identified (Choudrie et al, 2003). It also allows formation of a narrower, micro understanding of the diffusion of innovation in specific contexts, in this case an SME.

It is recognised that although the diffusion theory used in this study is useful in highlighting impacts and relationships, it provides a restricted view. That is, this research provides information and an understanding of the impacts of implemented policies and supporting instruments in forming collaborative research between government organisations, academic institutions and SMEs. However, the findings are not intended to be generalised to a population, but to offer empirical insights that extend the theoretical framework that allows a better understanding of the innovation's diffusion.

Further research on the factors of diffusion that Oni and Papazafeiropoulou (2008) identified combined with this framework would be useful as it will allow a more in-depth understanding

that could also be quantified and provide a detailed, but deep understanding to emerge. A second limitation is that this research study is limited to only a single case study that hinders and prevents generalisations regarding the role of SMEs and decision making to be made. Although indirectly evident, the role of a SME CEO did form, but due to the single case concept and as the purpose of this paper is to form an understanding, generalisations could not be made. Further research using this framework and the context of SMEs but in larger numbers could allow saturation and more novel research and generalisations to form.

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