CONCEPTUAL MODELS FOR THE IMPLEMENTATION AND EVALUATION OF LOCAL GOVERNMENT INNOVATION

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Abstract

The political rhetoric that accompanied the introduction of eGovernment expected it to produce innovation in the way government agencies conducted themselves with citizen and business alike. It was assumed that innovation was both "good" and inevitable. This paper challenges these assumptions and presents a more realistic model of how innovation might occurs in UK local government. The model is supported by anecdotal evidence, literature and a recent study of eGoverment achievement in the UK – VIEGO. A key element in the model is the notion of innovation value.

Introduction

The simple agenda to get government information on to the web, along with private sector organisations, soon evolved in toi a much more complex target. Both in the UK and Europe the pervasive impact of taking an organisation's business activity online led politicians to seize upon eGovenment as a means to an end.

> *"Profound changes [are needed] to the way Government works… Electronic service delivery [eGovernment] will be a key source of innovation"* (Rt Hon Tony Blair MP, Prime Minister, 2000)

With these drivers, eGovernment evolved to be almost any use of information and communications technology (ICT) within the public sector. Despite initiatives like the UK's Local e-Government Programme (later called the e-Innovation Programme – DCLG, 2006) that invested over £20M to supporting more than 40 projects agencies it is unclear how much has been achieved. The "e-Innovations Evaluation report" is not what we, as academics, would recognise as public sector evaluation. This is a web site that offers:

> *"a series of perspectives on how innovation can be created and sustained in a local authority organisational setting … it is based on the views of those involved in the e-Innovations Programme … you don't have to read this from start to finish. Instead, you're encouraged to use it as an interactive resource, finding your own way through using the hyperlinks and scenarios."* (Anon 2007)

In addition there have been lots of smaller projects falling below this national profile. Oakes (2002) points to significant variation in the way local authorities have used ICT to address the same problem and anecdotally even simple sounding innovations encounter problems.

For example a local authority in the north of England has social care workers who support and visit clients that are elderly and infirm. Often these people live alone or with a relative who is not capable of providing some of their care needs. After each visit a short report (tick boxes and brief description) is required. Unfortunately the reports didn't get completed, or they were done at the end of the day when some of the detail had been lost, or the handwriting of the care worker was not legible at a later date. A solution to these problems was implemented using digital pens and digital paper. Use of this technology meant that not only could the client reports be digitised (addressing the handwriting problems) but there was also an opportunity to capture data at source (ensuring no loss of detail). The pens, through Bluetooth technology, could transmit the data from the forms to the local authority database via the social worker's mobile phone. The use of the technology was innovative and worked well ensuring accuracy and currency of data. The typical social care worker is female, middle-aged and may not be well educated. They felt intimidated by the technology, were reluctant to accept it and didn't feel confident in its use. The pens needed a degree of stylised writing which did not lend itself to the often hurried writing of the workers needing to get to the next visit.

Should a system with these affects be described as a success? The view of those involved – the social care workers – is that it was not. A counter argument would be that the pens worked and that the innovation was a success, if only the staff had not undermined the project. Not only is innovation a complex and multi faceted notion but evaluating the impact of innovation is also poorly understood.

Several innovation-related issues have been raised in the Oslo Manual (OECD and Eurostat, 2005). Understanding of innovation activities and their economic impact is still deficient, and its guidelines are essentially designed only for innovations in the business sector. Little is known about the innovation processes in the public sector thus leaving much room for the exploration of innovation in such type of context. The aim of this paper is to present a conceptual model of innovation that local government could use as a guide for implementing an innovation process that brings about transformation and also provides a framework for the collection of innovation data in the public sector. Additionally, a novel structure for an innovation value model has been developed to help guide the evaluation of the process.

The next section of the paper discusses a project – VIEGO – that reviewed the state of eGovernment in the UK and argues strongly for the type of model proposed. This is followed by a literature review which first looks at innovation concepts and theories, and then highlights issues relating to innovation measures and evaluation. In the third part of the paper the conceptual model for innovation is presented with particular attention to the notion of innovation value as a guide to the evaluation of the success of any particular innovation.

Project VIEGO

Over 2006 project VIEGO (Irani and Elliman, 2007) set out to identify relevant key areas for future research in electronic Government (eGovernment). The project was based on a perceived need to take stock of the achievement to date. The vision is to create a virtual research institute that will address the most relevant problems by bringing together academics from many disciplines in different UK Universities.

The main research tool employed by VIEGO was a series of consultation workshops – two in London and one each in Cardiff, Manchester and Edinburgh – to consult with different groups of stakeholders concerning their views on current eGovernment initiatives, as well as on issues and topics they considered to be important for practice in the future. The workshops were carefully organised to be a structured discussion with the researchers putting a minimum of content into the discussion. Thus the VIEGO findings arise from the stakeholders concerns rather than those of the academic staff. All the workshop discussions were recorded and subsequently analysed following a grounded theory model.

The attendees for each workshop were self-selecting groups responding to open invitations to attend and the themes identified in different workshops were clearly influenced by the composition of each group. Overall the contributors ranged from managers, public sector employees and independent consultants to local government officials, academics (as informed citizens) and elected representatives. The workshops included IT specialists and lay users and covered both local and regional

government. Prior to publication comments on the findings were sought from central government (The Cabinet Office) and national professional groups such as the BCS and SOCITM.

There seemed to be a general consensus that existing eGovernment activities remained to be evaluated and measured in order to better design future services. It was seen as difficult to promote any meaningful well-founded research without first exploring the impact and value of existing initiatives. Although the need for financial efficiency was recognised, government is fundamentally a social activity. All participants were interested in getting a clearer view of what users of eGovernment services want; how to provide services; and how they may be evaluated and measured. At a deeper level we also need to understand how eGoverment is changing social structures and the implications for good governance. Hence there is a compelling need to understand the ***social*** value of government action as something distinct from its cost.

The consultation workshops showed that there are more questions raised than can be answered. The research questions coming from eGovernment stakeholders appear to involve complex social and managerial issues driving technological elements or research. This is the inverse of the politic rhetoric above where technology change is seen as the driver. Two of the three overarching issues to emerge from VIEGO are that:

- Constant change is a natural occurrence in government and it impacts people, processes and systems in equal measure. We need to create flexible systems that can adapt and change with demand. In particular the means to manage change is critical.

- Co-ordination and integration of inter-governmental agencies at all levels (joined-up government) is important. Co-ordination needs to include research and development activities, the eGovernment policy-making process, and to follow right through to co-ordinated exploitation of results.

The drive to transform government and moves to foster innovation makes the first of these issues more acute. Innovation also challenges the second one. "Local government" may sound small but it is often one of the largest employers and most diverse organisations within any particular area. Encouraging innovation and getting access to its potential benefits is seen as a real and complex problem within these organisations.

Literature Survey

Having established the problem and the need for a solution this paper now turns to the extant literature in the area. Although VIEGO shows that those directly involved perceive a gap in their knowledge it did not set out to show which of these gaps were, or were not, present in the academic literature

Theoretical Foundations

The definition of innovation is very diverse. Innovation can be viewed as an idea, or practice or object that is perceived as new (Rogers, 1995). It can also be new use of an old idea by advancement into practice (Tushman and Anderson, 2004) or exploitation as a new method of production or product handling (Schumpeter, 1934). It could also be a set of tools to create new business (Drucker, 1985). Innovation should create a new or better product or service that offers something valuable for customers and a sustainable competitive advantage for the supplier (Snyder and Duarte, 2003). Additionally, innovation does not stand alone but has to be supported by methods and processes (Hamel, 2003), and people.

The technological-based view of innovation emphasises technology transfer and in the second edition of the Oslo Manual (OECD and Eurostat, 1995), it refers to the incorporation or adoption of new technology into products, services, and processes. In the third edition (OECD and Eurostats, 2005) this is expanded to include marketing innovation which involves new marketing methods for products, and organisational innovation which links to business practices, workplace organisations or external relations. The successful management of innovation is a knowledge intensive process which requires the capture and use of knowledge, followed by integrating knowledge from diverse sources (Tidd et al, 2005).

Rogers (1995) views innovation as a social temporal process, which encompasses: the innovation itself (as invention in Stoneman, 1995); dissemination through communication channels or diffusion (Metcalfe, 1999; Stoneman, 1995); over a period of time; to members of social system or the market (Stoneman, 1995). According to Metcalfe (1999), invention does not suffice but innovation ought to spread and survive, just like weed, through diffusion.

Innovation as an iterative process model (Tidd et al, 2005, p.89) consists of three phases namely: Search, Selection, and Implementation. The Search Phase involves a broad scan across a diverse set of sources where innovation (e.g. technology, knowledge, idea or practice) could be acquired (Leonard-Barton, 1995). These innovation sources could be internal or external. Some of the examples of external innovation sources given by Von Hippel (1988) are manufacturer, end users, or communities of users. However, in the UK Innovation Survey (Robson and Orstman, 2006), they are classified into 3 categories: market (e.g. suppliers, customers, consultants, competitors, commercial laboratories, R&D enterprises, etc.); institutional (e.g. public sector – research organisations, universities, etc.); other (e.g. conferences, trade fairs, publications, standards, etc.). In the Selection Phase there is a need for well developed mechanisms for identifying, processing, and selecting useful information relating to the innovation so that there is a good fit between the company's current situation and the proposed change effected by the innovation (Tidd et al, 2005). According to Tidd et al, the Implementation Phase consists of three core elements relating to knowledge acquisition which involves the fusion of new and existing knowledge to offer the solution to a perceived problem; execution of the project; launching and sustaining the innovation process which will only be considered complete when there is adoption of the innovation.

Tidd et al's three Phases are broadly in line with Rogers' (1995) innovation diffusion model. Rogers has: an initiation stage which deals with information gathering, conceptualisation and planning for the adoption of an innovation; an implementation stage where events, actions, and decisions occur in order to put an innovation into practice; and an adoption stage. According to Arundel and Hollanders (2006), the uptake and successful adoption of an innovation are two important aspects of innovation diffusion.

Dvir and Pasher (2004) argue that the process of innovation poses as one of the managerial challenges of the next decade and beyond. However, the diversity and complexity of innovation identified above makes the universal modelling of such a process difficult.

Innovation Evaluation, Indicators, and Monitoring

If organisations are going manage the changes to become innovative – in the sense that they have an environment that fosters innovation – they need to be able to evaluate and compare their performance. This section the paper reviews other attempts at creating such instruments within the EU and UK.

The European Commission, under the Lisbon Strategy initiative, has created the European Innovation Scoreboard (EIS) to

Theme	Categories	Purpose
Innovation Inputs	Innovation dirvers (5 indicators)	Measure the structural conditions required for innovation potential (e.g. broadband, level of education, etc.)
	Knowledge creation (5 indicators)	Measure the investments in R&D activities which contribute to a successful knowledge-based economy
	Innovation and entrepreneurship (6 indicators)	Meaure the efforts towards innovation at the level of organisations (e.g. Ict expenditure, venture capital, collaboration, etc.)
Innovation Outputs	Application (5 indicators)	Measure the performance, expressed in terms of labour and business activities and their added values in innovative sectors (e.g. employment, exports, and sales)
	Intellectual property (5 indicators)	Measure the achieved results in terms of successful know-how (e.g. patents, trademarks, and designs)

Table : Innovation Inputs and Outputs in EIS (EC, 2006)

produce a comparative analysis between the EU Member States (EC, 2006). The 26 innovation indicators utilised by EIS in 2006 are grouped into five categories and organised under the two themes: Inputs and Outputs which are depicted in Table 1. Innovation efficiency is measured as the ability of the organisation to transform innovation inputs to outputs and is calculated based on a ratio between the two. However, the EIS is not suitable to measure innovation performance at the sectoral level

because the indicators used do not address other important innovation activities such as diffusion, innovative entrepreneurship, organisational innovation, and demand conditions (Arundel and Hollander, 2006). Additionally, it only focuses on innovation in the private rather than public sector.

Another European Union instrument is the INNOBAROMETER – an opinion poll that is carried out annually by the European Commission beginning 2001 (EC, 2007). The main objective of the survey is to sound out the opinions of European managers on their companies' needs in innovation, their investments in innovation and the output achieved. The survey has generally followed a two-step sampling approach using the FLASH methodology with about 4,000 managers contacted by telephone in each year. However, the content and focus of the interview has varied each year depending upon the current concerns:

2006 investigated the role of company clusters in facilitating innovation and increased competition.

2005 investigated companies' needs in innovation, investments in innovation and output achieved. Also, it provides a measure to research on the impact of innovation demand

2004 evaluated public support from a business point of view.

Another part of the European Commission's Innovation Programme (EC, 2002) is European Innovation Monitoring System (EIMS). This aims to facilitate information and knowledge sharing about enablers and barriers to innovation among stakeholders (e.g. managers and practitioners in firms, academics, policy makers, intermediaries, etc.), through publications, workshops, and conferences EIMS activities include monitoring of innovation and diffusion through surveys, developing a conceptual framework for the innovation process and sharing of the experiences of an innovation policy. This is similar to UK Framework for Innovation in Local Government.

In contrast to the qualitative data from INNOBAROMETER and EIMS, the Community Innovation Survey (CIS) provides a statistical assessment of innovation policies of the EU and its Member States. This survey by Eurostat is based on the Oslo Manual (OECD and Eurostat, 1995; 2005) which provides guidelines for the collection and interpretation of innovation data. These surveys have been conducted in 1992, 1996, 2001 and 2005. Also since 2001 CIS has become a major data source for the European Innovation Scoreboard described above. According to Eurostat (March, 2007), innovation data collected from enterprises relate to product innovation (goods or services) and process innovation where the former entails the introduction of a new or significantly enhanced good or service to the market while the latter concerns the implementation of a new or significantly enhanced production process, distribution method or support activity for goods or services. As mentioned above, the definition of innovation has been extended to include concepts in marketing and organisational innovations and the next CIS will contribute a better understanding of non-technical innovation.

At a national level the UK Innovation Survey, run by the Department of Trade and Industry (DTI), is part of the wider European CIS. Even so the sample size for the UK Innovation Survey 2005 is more than 28,000 UK enterprises where data is collected by means of a postal questionnaire. This survey introduces the concept of an organisation being 'innovation active' (DTI, 2006, p.13). A business is innovation active if it: introduces new or significantly enhanced product or process; is involved in innovation projects; or invests in internal R&D, training, external knowledge acquisition, or machinery and equipment linked to innovation activities. These are elements of absorptive capacity and in the UK Innovation Survey, the level of qualification is taken as an indicator of innovation related skills in business.

According to Robson and Ortmans, (2006), the survey investigates the direct as well as indirect effects of innovation. The UK Innovation Survey (p.59) also introduces a new variable, innovation activities, which according to the Oslo Manual (OECD and Eurostat, 2005), could be coded into three types being: the successful ones that have brought about the implementation of a new innovation; ongoing ones which have not resulted in the implementation of an innovation; those abandoned before the implementation of an innovation. Thus, the concept of an innovation activity in the Oslo Manual is so broad that it ranges from the acquisition of external knowledge to improvement of innovation capacity, and all scientific, technological, organisational, financial, and commercial steps which actually are or intended to lead, to the implementation of innovations. On the other hand, in the UK Innovation Survey, an innovation activity is defined in terms of: introduction of new or significantly improved products (goods or services) or process; engagement in innovation projects; investment in R&D, training, knowledge acquisition or equipment linked to innovation activity. The indicators employed for product-oriented improved quality of products (goods or services); new market or increased market; increased range of products while the indicators utilised for process-orientated effects are: reduced cost; improved flexibility and increased capacity of production process or service delivery; other effect being increased added value About 25% of the 2005 sample are involved in product innovation while 16%, in process innovation, and the most frequently reported impact of business innovation

activities is the quality of goods or services produced or supplied. The results of the survey also show that the sources of information to enable innovation are: internal; market partners (e.g. supplier, clients, consultants, R&D enterprises, etc.); public sector; technical and other formal standards.

The DTI (2007b) has also provided self-assessment tools to help UK companies benchmark their own innovation performance and also to provide useful feedback to help companies reflect on their business thinking. The Innovation Self Assessment questionnaire helps a company assess how well it has managed the innovation process while the Innovation Exchange questionnaire consists of statements that business people will consider when they plan their innovation activities. Answers to these questionnaires will lead the respondents to useful information and links about innovation that will be tailored to their business needs. Undeniably, innovative businesses require strong leadership. Consequently, DTI built an Inspirational Leadership: Insight to Action tool to help innovation leaders measure their leadership qualities and also provide insight into their innate leadership styles and strengths so that they can adapt their roles accordingly.

Many of these measurement instruments address national performance or the private sector rather that the explicit needs of management in a local government division. There is thus a need for a more explicit model of innovation that fits these contexts. It also needs to look at "value" from a different perspective. In the next two sections of the paper we turn to answering these needs.

The Conceptual Action-Oriented Innovation Model

As mentioned in theoretical foundations above, modelling an innovation process is difficult and this poses a challenge to innovation managers. Consequently, in this theoretical research, we have developed a Conceptual Action-Oriented Innovation Model by integrating Tidd et.al's iterative innovation process (2005), Rogers's innovation diffusion model (1995), and the typical action research cycle. This model has two objectives. The first is to foster understanding of the entire transformation inspired innovation process (from creation to adoption and embedment) that will lead to an appreciation for the innovation actions entailed. The next is to guide innovation managers in the evaluation of the organisation's innovation activeness based on indicators (e.g. specific tasks, etc.) The correlation between the level of innovation activeness and added value of the innovation will be explored. This attribute, innovation activeness, is inspired by the terms 'innovation active' or 'innovation activity' used in the UK Innovation Survey 2005 and the Oslo Manual discussed above.

The motivation for harnessing an innovation is that a discrepancy in a process, product or service has been identified and which leads to a definition of the problem. In order to find an innovative solution to the problem, the organisation will first have to scan (search) the sources of innovation. The sources of an innovation could be internal which is from within the organisation itself or other subsidiary organisations that come under the same umbrella, and external (e.g. suppliers, customers, consultants, competitors, etc.). According to Leonard-Barton (1995), it is vital to import knowledge and technology from beyond an organisation's boundaries, assimilate and apply it so as to increase its innovative capability. The search action is followed by the selection action which involves decision-making, risk analysis, and feasibility studies. The subsequent action is planning and conceptualising how to put the innovation into practice. Action taking will be in the form of pilot testing the innovation (e.g. change in people, process, or technology). In the initial innovation cycle, a formal evaluation of the pilot implementation will be conducted through reflective inquiry (Keating, et. al, 1996) which will uncover underlying causes for discrepancies between the ideal and actual situations (or goals and actual achievements). This will lead on to the next iterative innovation cycle which is similar to the initial one except that the implementation is scaled up and measures taken to facilitate the diffusion process and foster adoption. According to Wield and Rhodes (2001), the diffusion process could be a prolonged process, and it is likely to involve progressive development and evaluation necessitating adaptation within the workplace.

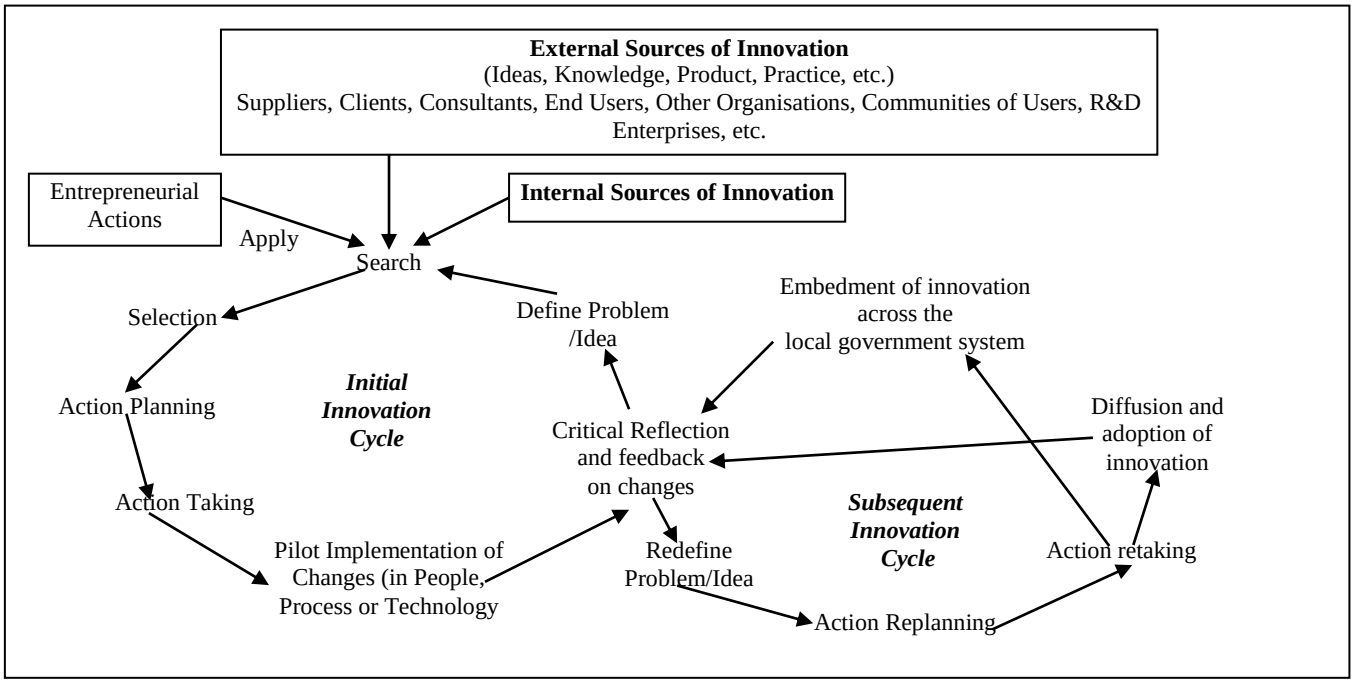

Figure 1: Conceptual Action-Oriented Innovation Model

The PPT (People, Process, Technology) Innovation Value Model

The success or failure of an implemented innovation could be measured holistically based on social (e.g. effectiveness) and public value (e.g. cost efficiency and money). For an innovation to be successful, it is imperative that there be a synergy between its technological and non-technological dimensions (e.g. people and process).

Whilst there have been a number of initiatives, funded at European, national and local levels, evaluating innovation and technology diffusion they have tended to evaluate initiatives quantifiably (European Innovation Scoreboard, INNOBAROMETER, UK Innovation Survey). Whilst these and the others outlined in this paper, provide important reflections on innovation much of the evaluation is concerned with public value, that is, they are concerned with efficiencies, investments in ITC, impact of the market, etc. They don't directly address the impact on society, that is, social value. Yet the desire for eGovernment initiatives is for both high social and public value delivering high quality service at acceptable public expenditures.

The success or failure of an implemented innovation could be measured holistically based on social (e.g. effectiveness within society) and public value (e.g. cost efficiency and money). This is important because there needs to be a way of comparing these to ensure that the right balance is struck as systems that deliver high social value may be expensive but the opposite is not necessarily true. High investment does not guarantee high social value, as has been seen in recent Government initiatives.

What is apparent from the evaluations is that it is not just the level of investments that determines the success, or otherwise, of innovations. This is supported by the findings of the Viego project and further supported through anecdotal evidence obtained from practical experiences working with local authorities in the north of England. What emerges from these is that there is a common set of factors that can be grouped loosely into People, Process and Technology. Each of these is often addressed in eGovernment research for example O'Sullivan (2002) links people and process when discussing innovation failure whilst Leonard-Barton (2001) talks of technical misalignment. Hamel (2003) talks of innovation being supported by processes and people whilst Tidd et al (2005) includes people but considers them as technical resources. Rogers places a great deal of emphasis on the role of people in the innovation diffusion process but although these, and other, authors place

emphasis on different combinations of people, process and technology there is little evidence that the three are considered together.

The proposition here is that the three factors should not be considered separately but that it is the relationship between the three that determines the success of innovation. This is illustrated by the anecdotal from the North of England in the introduction. Proper consideration of the people factor during design and implementation would have overcome the negative reaction to the digital pens and increased the chances of success.

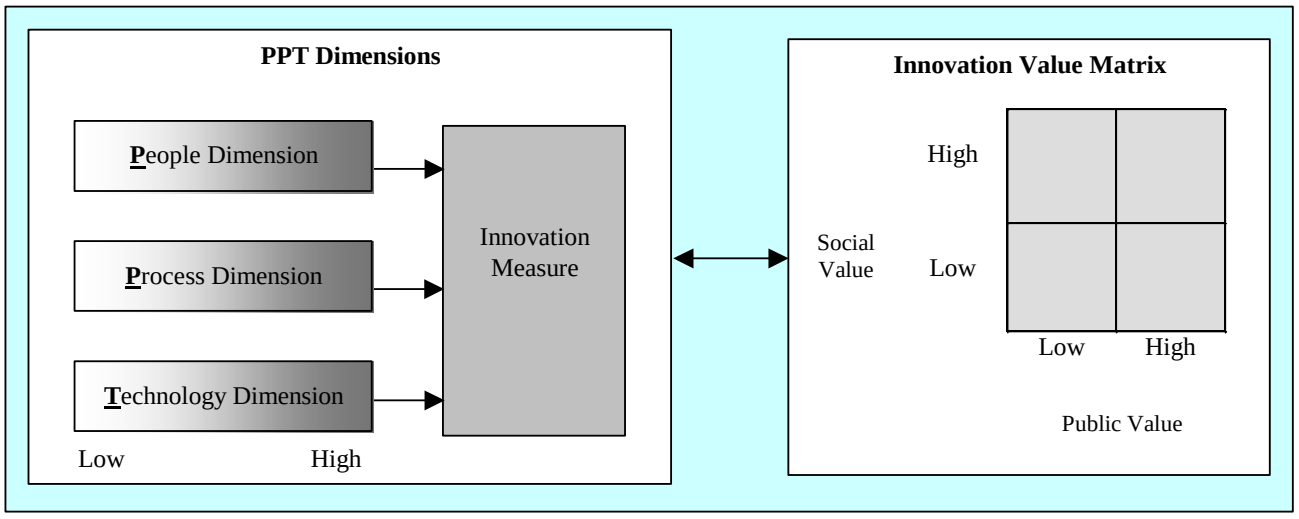

Figure 2: PPT Innovation Value Model

The model in figure 2 not only brings these factors together but also provides a means, through placement on the grid, of showing how an innovation meets social and public value requirements. For the above example the technology factor was considered as was the process factor, but the people factor was largely ignored. The digital pen system would have been placed firmly in the lower right quadrant of the model – potential for high public value but low social value.

Thus analysing the degree to which each of the factors is addressed in relation to where the innovation would be placed in the grid provides valuable insight into the impact that the relationship between people, process and technology will have on future innovation implementations. Furthermore it is envisaged that this model can be developed into one that can be predictive. That is, that for any given potential innovation variables within each factor can be manipulated to see where the innovation will be placed on the grid.

Conclusion

This paper has explored the nature of innovation and its role in achieving transformational government. A key finding of project VIEGO (Irani and Elliman, 2007) suggests that local government needs the knowledge manage constant change and create flexible systems that can adapt with demand. These are two sides of the same coin. Innovation ***is*** change and the challenge is to create the adaptable environment within which it will flourish. Based on this need and a survey of innovation theories, we have come up with the Action-oriented Innovation Model that we believe to be capable of supporting the growth innovative behaviour within the public sector.

Evaluation of the value of innovation is the second major need supported project VIEGO and the review of current national and international programmes. However, current measures are predominantly efficiency-based or focussed at the national level. Even the few tools available for single organisation are directed at the private sector rather than eGovernment. We have

addressed this by postulating a PPT (People, Process, Technology) model of Innovation Value. This takes a holistic view of innovation evaluation by combining efficiency and effectiveness of innovations. These are represented as social and public value respectively in our model.

Neither of these models has yet been put to the test in a practical scenario. There remains the need to investigate the actions involved in successful local government innovation projects and to refine or revise the innovation model in the light of such empirical findings. The concept of innovation value also need to explored in greater depth. We need to understand the relationships among these dimensions, gather empirical findings to establish their relationships with the holistic innovation value. We would then build a simulation of these interactions to help innovation managers acquire a deeper insight into the synergy of people, process and technology to deliver innovation.

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