
Developing a Framework for Assessing Innovative Capability within Complex Organizations

Stephen McLaughlin

School of Business and Management
University of Glasgow
West Quadrangle, Gilbert Scott Building
Glasgow G12 8QQ Scotland, UK

Structured Abstract

Purpose: This paper outlines the initial conceptual development of a research project currently being undertaken by the author with IBM. The paper looks to address how service-orientated organizations can assess their overall 'innovative capability' against four main criteria: their external operating environment, management practice, organizational culture, and technology.

Design/methodology/approach: The research will follow a critical research approach, with the initial theory concerning the breakdown of the criteria for innovative capability being developed from a case study on how the migration to a service-orientated environment is creating new challenges for the stimulation of the organizations innovative capability. The emergent framework will then be tested, and refined through a series of practical assessments within other organizations.

Findings: This research project is only at its first stage, and as such an emergent framework has been developed, but not fully tested. It is this framework that will be discussed within this paper.

Research limitations: This is emergent, inductive theory building, and as such should only be construed as providing a starting point for further research.

Practical implications: It is the belief of the author that the framework presented in this paper can help complex organizations better understand those aspects of

their business that need to be managed if the 'innovative capability' of the organization is to be improved.

Originality/value: Currently there is little research relating to service innovation frameworks. There is literature relating to product innovation, but this framework endeavours to identify how an organization can assess its ability to manage all four types of innovation (product, process, paradigm, and position).

Keywords - Service Science, Service Innovation, Performance Improvement.

Paper type – Conceptual paper

1 Introduction

Recent years have seen an increase in the number of organizations with a traditional 'product' based focus making the transition over to a 'service' based focus (Chesbrough *et al*, 2006; Miozzo and Walsh, 2006). This transition is not an easy move for many organizations to make, and relies on more than simply adopting a 'customer perspective' to ensure a successful transition (Haskett *et al*, 2008). The rate of change and dynamic nature of the global marketplace requires organizations to not only monitor their business environment, but also develop processes that allow the organization to respond in a flexible and timely manner (Haskett *et al*, 2008).

Those organizations that have relied on innovative products to ensure their competitive advantage are now facing increased competition from all quarters of the globe (Elfring, 1989; Looy *et al*, 2003). The ability to build a better product no longer can assure market dominance. Organizations now have to think about not only product innovation, but also how to innovate around the way products and services are provisioned (OECD, 2005; Hauser *et al*, 2006). In effect this takes the onus for innovation out of the research labs, and places it across all aspects of the organization (Bell, 1999; Tidd and Hull, 2003; Karmarkar, 2004).

A key issue now is how can large service-orientated organizations manage the process of stimulating, capturing, and implementing innovative ideas across complex lines of business? As the nature of business varies from organization to organization, even within similar sectors, it is not possible to proscribe a standard approach to improving process innovation (Pavitt, 2004) across complex supply chains. Because of the nature of the four aspects of innovation (process, product, paradigm and position) (Francis and Bessant, 2005), and the need to stimulate the wider organizational desire to contribute, defining a generic intervention strategy is not practical because of the different cultures, management practices, operating environments and technology experienced by each organization (Pavitt, 2004).

However, even though it is accepted that organizations must define their own intervention strategy model, the author believes that prior to doing so, organizations must first understand what their current innovation capability is. By first doing this the organization is then better placed to understand where best to apply resources in order to stimulate, capture and act upon performance enhancing innovation.

Because of the contingent and heterogeneous nature of innovation (Pavitt, 2004) identifying a suitable approach for stimulating and managing the innovative capability of an organization becomes specific to that individual organization. However, that does not mean that the approach to understanding the characteristics of an organization's current innovative capability cannot be applied in a generic manner. It is the author's contention that a framework for assessing innovative capability can be defined, and that the framework can help particularly service-orientated organizations identify suitable methods for developing not just product related innovation, but also process, paradigm, and positional innovation.

This paper will present the author's initial framework for understanding and stimulating service innovation.

2. Conceptual basis for assessing Innovative Capability.

The theory underpinning the development of a conceptual framework for assessing innovative capability is based on the growing literature relating to Service Science, Management and Engineering (SSME). From this growing

body of knowledge the author is taking a holistic perspective to targeting and managing innovative practice. Service Science applies scientific and engineering principles, combined with management insight, with the objective of analysing how people and technology interact in order to effectively generate value for both service providers and clients (Maglio *et al*, 2006).

2.1 Overview of Service Science.

Although an emerging field of study SSME, or for short Service Science, is not necessarily looking to reinvent management theories, but to take a fresh, or different view of management theories as they relate to service innovation, and improving complex organizational performance. SSME is born from a real pragmatic need to understand how best to manage dynamic, responsive, customer-focused, service-orientated organizations (Horn, 2005; Hipp and Grupp, 2005; Chesbrough and Spohrer, 2006; Spohrer *et al*, 2007). The following are key points as they relate to the development of an innovation capability framework.

- Service Science is based around a 3-D model (dimensions being business, culture and technology) (Bitner *et al*, 2008) (Figure 2.1). The methodological consequences of this model is the creation of an instinctive attitude in the people related to provision of service i.e. they will be continuously asking themselves whether they went far enough in understanding all aspects of the relationship between the various parties in the service; whether they have understood the business model, the technology provision and critically whether they have analysed the customer needs and expectations.
- Service Science also requires a deep appreciation of the interaction between “actors” and systems and the need for services to fit cultural and community expectations (Abe, 2005).
- Service Science focuses on developing and linking existing disciplines and languages that enables efficient and effective refining or re-architecting of the service systems as technology, organizational culture, and management practices change.

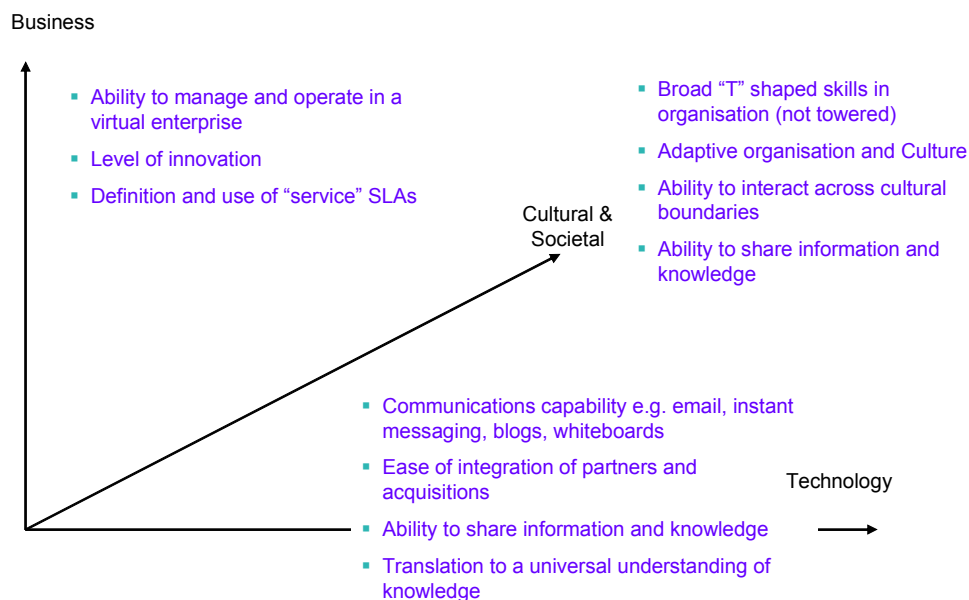


Figure 2.1 – Core components of a Service Orientated Organization.

From this the author has defined the base environment from which organizations will be assessed for innovative capability as being initially made up of 3 core areas: business, technology, and cultural. However, from a practical perspective the 'Business' component needs to be further defined. This can be broken down further into two areas; Management Practice and the Competitive Environment.

1. **Business (Management Practice):** Business success is defined as the achievement through good management practice of key Business Objective, which can be profit, efficiency or achievement of primary business goals.
2. **Business (Competitive Environment):** How is the organization impacted by current environmental factors (SWOT, PEST analysis).
3. **Technology:** The Appropriate application of, or most effective use of, technology as a facilitator (not simply using the latest or large amounts of technology).

4. **Culture:** The optimal situation is when the Organisational Culture is matched to the Environmental culture in which it will operate.

Each dimension will have a series of attributes that will allow measurement of capability. In order to assess how an organization's core business processes are aligned to the current business environment key attributes will need to be measured. Figure 2.2 shows the key areas of impact on supply chain performance. From this the key attributes can be determined.

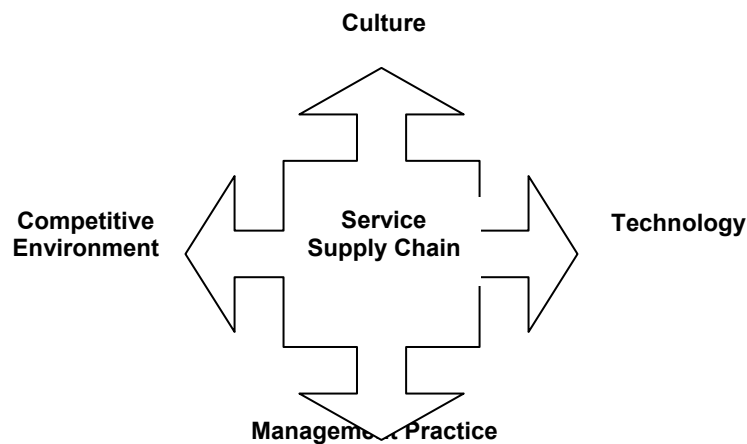


Figure 2.2. Four Dimensions of Service Innovation.

These four dimensions impact an organizations ability to develop and manage responsive and flexible service-orientated supply chain processes. However, for the framework to be effective at mapping an organization's service supply chain's 'Innovation capability' relative to the respective competitive environment, consideration must be given to the fact that technology, culture, management practice and the impact of the competitive environment cannot be considered in isolation of one another.

2.2 Innovation Capability Framework Objectives

The object in developing this framework is to achieve the following:

- To establish a framework for analysis based on the four dimensions of service science, (technology, management practice, competitive environment, and culture) which can be used to model or describe an

organisations position on maturity in service provision and innovation. Also to provide a framework upon which a methodology could be developed to progress an organisation along an innovation 'maturity curve'.

- Improve the ability of organizations to align their supply chains to achieve their strategic objectives in a manner that builds competitive advantage
- Create a framework and roadmap for service innovation and improvement

3. Methodology

The research methodology follows a critical theory approach in identifying best practice in assessing innovative capabilities across complex organizations. The research is exploratory in nature and a case study (Yin, 2002) methodology is used to support this line of inductive theory building. The research is based of 2 key stages:

- **Stage 1: Inductive Theory Building** – This encompasses the development of the initial framework model for assessing innovative capability. The theory building is supported by both primary (single case study) and secondary research.
- **Stage 2: Theory Testing** – This stage focuses on testing the framework model with other complex organizations. The outcome of which will be a refined innovation capability framework model.

As stage 2 of the research is currently underway this paper will limit itself to discussing the findings of Stage 1 only.

The findings presented in this paper are based on data collated within one organization only: IBM's Integrated Supply Chain. For the purpose of this stage (stage 1) of the research the author has surveyed individuals working across an IBM supply chain in order to develop and refine the innovative capability framework model. The author used a semi-structured questionnaire and one-to-one interviews to identify the organizational parameters around the four dimensions of culture, management practice, competitive environment, and technology. Although the number of interviews conducted for the initial case study was small (<10), the purpose was to define an initial framework model for further testing during stage 2 of the research.

Ultimately the aim of this research is to develop an underpinning theory and associated models relating to improving process performance in complex organizations. The research and analysis outlined in this paper has been conducted using qualitative methods with all data gathering complying with validation criteria as outlined by Yin (2002).

4. IBM Case Study

Over the past decade the IBM Corporation has been repositioning itself as a service-orientated business. The organization has seen significant change internally with respect to organizational structures, and externally with respect to moving into new market spaces. Changes in the type of products and services offered have resulted in some changes in the operating practices of the organization, with significant outsourcing, and partnering deals with organizations such as Sanmina and Lenovo directly impacting the product and services portfolio of the company. As a consequence of the move to a more service orientated operating model the organization is now constantly having to assess and re-assess its' ability to understand and respond to changing customer needs. This case study indicates the issues now being faced by the organization as it responds to the changing business, cultural, and technical dimensions as outlined in figure 2.2.

Dimension 1: Management Practice

As the organization moves away from a product focus and onto a customer focus, service-orientated processes have taken precedence. Many employees also now find themselves working on customer sites thus increasing the need to be able to work independently, with little management contact on a daily basis. The shift in focus has also seen a shift in the type of employee being sought by IBM. The organization has seen an increase in recent years in the number of graduates and professionally qualified individuals being employed, over those with no third level qualifications. This changing skill, educational, and age demographic, coupled with the need to place more employees on customer sites has also necessitated a change in existing management practices. The concern is how these practices will influence innovation.

Dimension 2: Competitive Environment

Though the process of moving from a product to a service-orientated business IBM has seen significant changes to its competitive environment. By re-positioning itself as a service organization IBM has moved from one market place into another; effectively replacing one set of competitors for another. The operating practices of competing with, say Acer and Dell (product-focused), are different than those needed to compete against organizations such as BT, or EDS (service-focused). The services that now form part of the IBM portfolio have evolved, and continue to evolve, and as such require the organization to be quicker, and more efficient at responding to customers changing, and often-unique service requirements.

Dimension 3: Culture

IBM employs over 300,000 people worldwide. This means many cultures are represented as part of the overall organizational culture. The way individuals work and trust employees from different countries will have an impact on the way they share knowledge, and collaborate with each other. As IBM seeks to open up new service markets in India and China the cultural mix will change within the organization. How the organization will deal with the changing perceptions of their new customer base, based on the customers own cultural perceptions, will impact the way IBM develop and offer services.

Dimension 4: Technology

The organization is very dependant on technology to access and share information around the organization. The organization is also shifting over to a remote / off-site working model for a majority of the work-force over the next few years. This is to take advantage of wider and faster access to broadband and wifi technologies. However, for innovation to exist there needs to be some element of tacit-to-tacit knowledge sharing (Nonaka *et al*, 2003; McLaughlin *et al*, 2006). How will technology support this within a remote working model?

By gaining an initial awareness of how these dimensions impact the organisations ability effectively operate within a dynamic market place the author has constructed an initial framework for assessing innovative capability. This framework is called the Service Innovative Maturity Framework (SIMF).

5. Developing a Service Innovative Maturity Framework for assessing Innovative Capability.

In order to understand an organizations ability to deliver services via its service orientated business processes certain tools needed to be developed. To that end the SIMF is made up of three components:

Service Innovation Analysis Tool. (SIAT)

This analysis tool is designed to understand how the organization is currently aligned from a cultural, management practice, technology, and environmental perspective to develop innovative capability. More specifically the SIAT will look to provide the following:

- A generic analysis tool to provide a holistic view of Service Provision.
- An analytical tool to assess how an organization's supply chain fits with its business environment.
- The tool will analyse current supply chain capability against Management practice, technology intervention, and cultural aspects of the organization.

Service Innovation Descriptor Model. (SIDM)

This looks to provide the organization with a descriptor of how they compare with other similar organizations within their industry sectors. More specifically the SIDM will look to:

- A model that describes best practices in service provision. This will use the data from the analysis tool to help position the organizations capabilities as they relate to ability to innovate (process and product) and respond to changing customer / market dynamics.

Service Innovation Intervention Methodology. (SIIM)

This part of the SIMF will help the organization decide on a suitable intervention strategy method for focusing on those aspects of improving innovative capability as outlined through the SIDM. In effect the SIDM will provide the following:

- A methodology and roadmap to achieve best practice.
- Based on an Intervention Strategy Method to drive necessary change to develop service related innovation.

The delivery of the Service Innovation Maturity Framework will be based on the successful implementation of these three key components. These components will in turn help organizations pro-actively develop their service capabilities in line with their operational and strategic needs.

6. Implementing the SIMF.

The intent of the SIMF is to develop the adaptive ability of the organization to meet the demands of successfully operating in a dynamic business environment. Because of the changing nature of the service environment, and the constant need to understand and meet changing customer demand, the assessment of an organizations innovative capability is a constant process. As such for an organization to continue to innovate it must continually assess its capability to innovate in line with the four dimensions already outlined. Therefore, for any framework to be of any practical use, it must incorporate a learning feedback loop (Argyris and Schön, 1978) as shown in Figure 6.1.

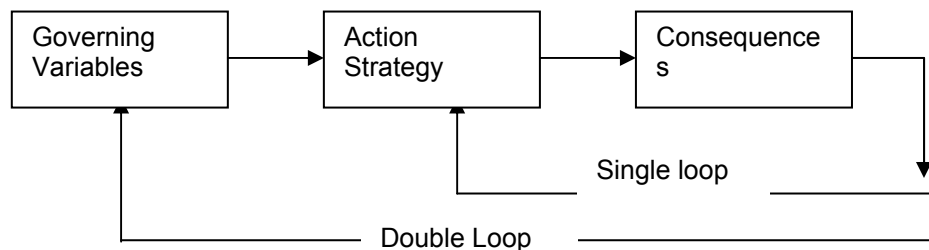


Figure 6.1 Double Loop Learning

As the analysis of innovative capability, modelling of the capability, and definition (and implementation) of an intervention strategy are largely based on human and organizational interactions through the four dimensions, the impact of any intervention strategy will have an impact on the interaction between culture, management practice, technology, and the influences of the competitive environment. Therefore, for the SIMF to be effective it should follow a 'Double-

Loop' learning cycle. This applies to the Service Innovations Maturity Framework (SIMF) as shown in figure 6.2.

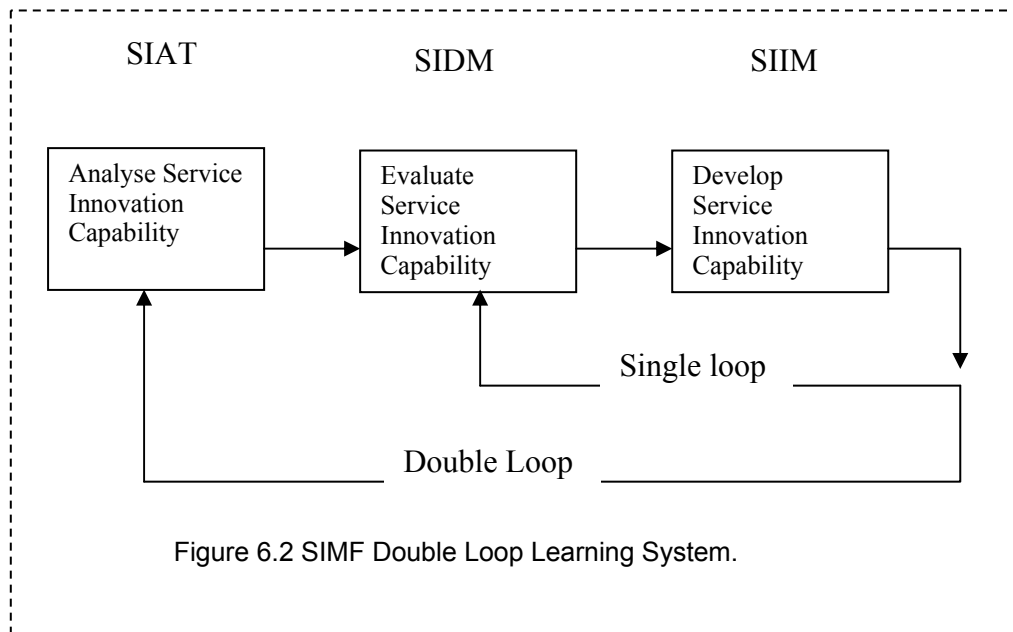


Figure 6.2 SIMF Double Loop Learning System.

6.1 Expected output from SIMF.

Because of the iterative nature of the SIMF output from the SIAT, SIDM, and SIIM will be used to stimulate innovative capability, and better understanding of current practices across the organization. Therefore, the output from each component must identify core aspects of current innovative capability. To that end the process of using the SIMF to assess capability can be broken down into three phases:

Phase 1. Analyse Current Service Innovation Capability

This phase uses the Service Innovation Analysis Toolkit (SIAT) to assess how an organization's core business processes support business objectives. This will identify the following:

- *Type of Innovation the organization is focused on.*
- *Management styles supporting innovation.*
- *How the organization drives / enables innovation.*

- *How the organizations culture supports innovation.*
- *How well innovations add value and are evaluated.*
- *Main cultural barriers to innovation.*
- *Employee's motivation to engage in innovative activity.*

Phase 2. Evaluate Current Service Innovation Capability

This phase uses the Service Innovation Descriptor Model to assess how the existing organization supports innovation and flexibility in line with expected outcome for that industry. The evaluation process then looks to identify gaps between actual and desired capability for supply chain performance. The output from this phase will help identify where interventions need to be made across the organization. This phase will look to develop a picture of the organization based on the following:

- *Culture (ability to support innovation)*
- *Market (dynamic versus static)*
- *Process (focus on process innovation)*
- *Product (focus on product innovation)*
- *Reward (team v individual reward structure)*
- *Capture (how innovations are captured for assessment)*
- *Span (focus on individual of collaborative innovations)*
- *Capability (realised need versus ability to innovate)*

Phase 3. Develop Current Capability

This will use a combination of mechanistic and complex change methods to strengthen weak aspects of existing supply chain capability, and develop new capabilities in line with the organizations strategic direction. Depending on the strategic requirements of the organization an innovations ISM can be developed based on any number or combination of innovation frameworks (such as TRIZ, NSD, NPD, etc) that focus on the following:

- *Developing / enhancing an organizational culture for innovation.*
- *Improving knowledge transfer across key groups .*
- *Improving core value chain business processes from an efficiency and / or responsiveness perspective.*

- *Improving end-to-end core business performance.*

7. Conclusions

The development of the SIMF has been based on a real need, as identified by IBM, to understand how 'service-orientated' organizations can stimulate, and capitalise on innovation across the entire organization. Although this paper is 'conceptual' in nature, the initial framework model has been developed through initial primary research with IBM.

To date the SIMF has been tested within IBM to a point where the framework has been used to analyse current service innovation (SIAT), evaluate current service innovative capability (SIDM), and propose the development of an intervention method (SIIM).

However, the value of this maturity framework is in its ability to be used generically across other organizations, and industry sectors. Therefore, the SIMF needs further testing with other organizations if the conceptual basis and framework is to be proved valid.

To that end, Stage 2, of the research is currently underway. Once, the data from this stage of the research has been collated and analysed, the SIMF can be further refined, and assessed for relevance in helping organizations realise their service-orientated innovation capability.

References

- Abe, T. (2005) The development of service science, *Japanese Economy*, Fall 2005, Vol. 33, No. 3, pp 55-74.
- Argyris, C., and Schön, D. (1978) *Organizational learning: A theory of action perspective*, Reading, Mass: Addison Wesley.
- Bell, D. (1999) *The coming of post-industrial society: A venture in social forecasting*, Basic Books, New York.
- Bitner, M. J. and Brown S. W. (2008) The Service Imperative, *Business Horizons*, 50th Anniversary Issue, Jan/Feb (forthcoming).
- Chesbrough, H. and Spohrer, J. (2006) A research manifesto for service science, *Communications of the ACM*, Vol. 49, No. 7, pp 35-40.
- Chesbrough, H., Vanhaverbeke, W. and West, J. Eds (2006) *Open Innovation: Researching a New Paradigm*, Oxford University Press.
- Elfring, T (1989), 'The main features and underlying causes of the shift to services', *The Services Industries Journal*, 9(3), 337-356.

- Francis, D & Bessant, J (2005) Targeting innovation and implementations for capability development, *Technovation*, 25(3), 171-183.
- Haskett, J. Jones, T. Loveman, G. Sasser, E. & Schlesinger, L (2008), Putting the service-profit chain to work', *Harvard Business Review*, 86(7/8), 118-129
- Hauser, J., Tellis G. J. and Griffin, A. (2006) Research on Innovation: A review and agenda for marketing science, *Marketing Science*, Vol. 25, No. 6, pp 687-717.
- Herreld, J.B., O'Reilly, C.A. and Tushman, M.L. (2007) Dynamic capabilities at IBM: Driving strategy into action, *California Management Review*, Vol. 49, No 4, pp 21-43
- Hipp, C. and Grupp, H. (2005) Innovation in the service sector: The demand for service-specific innovation measurement concepts and typologies, *Research Policy*, Vol 34, Issue 4, pp 517-535.
- Horn, P. (2005) The new discipline of Services Science: It's a melding of technology with an understanding of business process and organization ... and it's crucial to the economy's next wave, *Business Week*, January 21st.
- Karmarkar, U. (2004) Will you survive the services revolution?, *Harvard Business Review*, Vol. 82, No. 6, pp 100-107.
- Looy, B. Gemmel, P and Dierdonck, R (2003), *Service Management: an integrated approach*, London: FT Prentice Hall.
- Maglio, P. P., Srinivasan, S., Kreulen, J.T. and Spohrer, J (2006) Service Systems, Service Scientists, SSME and Innovation, *Communications of the ACM*, July, pp 81-85.
- McLaughlin, S., Paton, R. A. and Macbeth, D. K. (2006) Managing Change Within IBM's Complex Supply Chain, *Management Decision*, Vol. 44, No. 8. pp 1002-1019.
- Miozzo, M. and Walsh, V. (2006) *International Competitiveness and Technological Change*, Oxford University Press.
- Nonaka, I. Keigo, S and Ahmed, M (2003), Continuous innovation: the power of tacit knowledge, in Shavinina, L (ed.), *International Handbook of Innovation*. New York: Elsevier.
- Paulson, L. D. (2006) Service science: A new field for today's economy, *IEEE Com*
- Pavitt, K. (2004) Innovation Processes, in Fagerberg, J, Mowery, D. & Nelson, R (ed.), *The Oxford handbook of Innovation*. Oxford: OUP.
- Spohrer, J., Maglio, P. P., Bailey, J. and Gruhl, D. (2007) Steps toward a science of service systems. *IEEE Computer Journal*. January, pp 71-77.
- Tidd, J. and Hull, F. M. (2003) *Services Innovation: Organisational responses to technological opportunities and market imperatives*, Imperial College Press, London.
- Yin R K (2002) *Case Study Research (3rd Ed)* Sage Publications. London.

BIOGRAPHICAL NOTES

Dr. **STEPHEN MCLAUGHLIN** is an Adam Smith Senior Research Fellow at the University of Glasgow, prior to which he was a manager with IBM (UK) Ltd. Most recently his roles within IBM have been related to supply chain optimization and performance management.