INCREMENTAL INNOVATION BY DESIGN: A DYNAMIC CAPABILITIES PERSPECTIVE (44)

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"Innovation distinguishes between a leader and a follower"
[Steve Jobs]

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Abstract

Drawing together knowledge and research from a variety of fields, it is demonstrated that although IT-enabled innovation might be critical to the long-term success of all organisations, it is not an ambition that is always easy to achieve. Consequently, the broad purpose of this short, conceptual paper is to both provide an overview of our proposed, new approach to innovation - Incremental Innovation by Design – and to reflect upon the role dynamic capabilities may have to play in supporting its successful deployment. In so doing, we introduce a provisional research agenda, to indicate how our research interests may be productively developed in the future.

Keywords: Information Technology, Innovation, Dynamic Capabilities; Research Agenda.

1.0   Introduction

The drive to better understand and document the relationship between information technology and innovation and organizational performance, has already attracted much scholarly interest. Much of the early academic interest was devoted to better understanding how the innovative deployment of IT might support improvements to an organization's operational performance [Brynjolfsson & Hitt; 1996]. Within this broad domain, a significant number of researchers have been particularly interested in exploring the extent to which the innovative application of IT might have the potential to deliver either an outright competitive advantage, or a significant improvement in competitive positioning[1], to their adopters [Powell & Dent-Micallef, 1997; Dehning &

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[1]   For the remainder if this paper, the term '*competitive advantage*' will be used as short-hand to cover both an outright competitive advantage and a significant improvement to an organisation's competitive positioning.

Stratopoulos, 2003]. However, it wasn't long before serious questions were being asked about the sustainability of these strategic information systems [Galliers, 1993], as it is relatively easy for firms to understand, and then copy their competitors' systems [Melville et al, 2004].

Because of the concerns about sustainability, much of the more recent research has shifted away from using IT innovatively, to directly foster competitive advantage, to exploring how IT can be used to foster and facilitate innovation, by allowing organisations to creatively: reshape their organisational structures; re-engineer their processes; or redesign their products and services [Peppard et al, 2015]. However, as Joshi et al [2010; p. 472] note, such IT-enabled organisational innovations can still often be classified as: *'competitive actions'*, as they are often *'aggressively undertaken by firms to gain market share or to achieve profitability'*.

Whether IT is being used, directly and innovatively, to realise a competitive advantage, or the competitive advantage arises from organisational innovation, which is, itself, enabled through IT, there is broad agreement within the literature that the organisation must create an appropriate resource base of competencies, resources and complementary capabilities to facilitate this strategy [e.g. Knight & Cavusgil, 2004]. However, there is growing recognition that in a fast moving and highly competitive environment, the organisation's resource base must itself keep evolving, to ensure that it remains well aligned with said environment [Verona & Ravasi, 2003]. To this end, an organisation's dynamic capabilities may have a particularly important role to play, as has been argued that they represent an organisation's ability to develop and reconfigure its resources and competences, in response to changes in its environments [Teece & Pisano, 1994]. Whilst much research may have already been conducted into the resources, capabilities and resources that are necessary to effectively deploy IT or enable innovation in support of competitive advantage, there is still a significant gap in the literature with regard to the role that dynamic capabilities may have to play, in this respect. Moreover, whilst the topic of continuous innovation has already attracted much attention in the literature [e.g. Verona & Ravasi, 2003], the specific idea of how design principles might be applied to incremental innovation has yet to be fully investigated.

Against this backdrop, the broad purpose of this short, positioning paper is to both provide an overview of our proposed, new approach to innovation - *Incremental Innovation by Design* – and to reflect upon the role dynamic capabilities may have to play in supporting its successful deployment. The paper is organized as follows. First, we review the innovation literature to assess the role of IT in supporting innovation. We then examine the dynamic capabilities literature, to consider their role in supporting IT-enabled innovation. Next, we introduce our proposed *Incremental Innovation by Design* approach, and consider the role dynamic capabilities might play in supporting it. Finally, we conclude with a discussion of our reflections on the current state of the literature, and present an outline research agenda to help focus future studies.

2.0   Delivering IT-enabled Business Innovation

The purpose of this section is to provide a broad introduction to the literature pertaining to the role IT may play in the attainment of business innovation.

2.1 Business Innovation – a Brief Introduction

Innovation has become an increasingly important theme within the academic, management literature, and consequently its study has spawned numerous attempts at a comprehensive and distinctive definition. Whilst there may be significant numbers of definitions, they all tend to share a common focus / emphasis on the delivery of value through the introduction of an idea or approach that is new or novel, which leads some commentators to adopt extremely simple definitions, such as: "*innovation = creativity + exploitation*" [O'Sullivan & Dooley, 2009, p. 8]. However, even with such simple definitions, it still begs a range of questions, with regard to how individual organisations recognise innovation, in the context of their own business environment. For example, should only real break throughs, as opposed to incremental improvements be considered as true innovations, and does the creative idea have to be generated internally, or could it be the application of an innovation that has been discovered elsewhere [Westerman, & Curley, 2008)]

Whilst innovation may be relatively easy to define, it is rather harder to measure, in the organisational context. In their study of firm-level innovation, Joshi et al [2010] measured it based upon two observable outcomes, namely patents, and new product

and service introductions. Indeed, Armbruster et al. [2008)] advocate that all organisations should establish an '*innovation monitoring system*', which is designed to monitor the complexity, life-cycle, extent of use, and quality of all innovations. Consequently, before an organisation can embark upon any IT-enabled strategy to more effectively and proactively manage innovation, it must first define how it will unambiguously identify and measure innovation within its own business context.

2.2 IT-enabled Business Innovation

Because of its power, flexibility and responsiveness, many commentators [Joshi et al. 2010; Peppard et al, 2015] argue that IT is uniquely well positioned to act as a significant catalyst for, and enabler of, business innovation. Indeed, some researchers believe that information technology can be both a source of innovation and the mechanism through which organisations can improve their competitive positioning. For example, Brynjolfsson [2010] suggests that organisations that can use IT innovatively still have plenty of scope to out-perform their competitors. Moreover, the ability for organisations to innovate using IT doesn't necessarily require them to invest heavily in new technology, as there is always significant scope for organisations to critically rethink how well they are using and combining their existing softwares. As Brynjolfsson & Saunders [2009] note:

> "*If all technological progress in the economy stopped today, would productivity growth grind to a halt? We don't think so. On the contrary, we believe that there are decades worth of potential innovations to be made in creatively combining (and making use of) inventions that we already have*" (p. 95).

It is now widely agreed that organisations can harness both new and existing technologies to enact innovative design changes to their: products and services; business models, customer experience and business processes [Peppard et al, 2015].

2.3 Business Innovation – Conclusions

In their study of business innovation, when reflecting upon the question '*why do firms find it difficult to renew their products and organizations,* Rohrbeck and Gemünden [2010; p.234] identified the following three key factors: '*the high rate of change*'; *ignorance* and *inertia*. All three of these factors are linked, both to each other and to the organisation's competitive environment. The high rate of change is typically being

enacted in the organisational environment, in the form of competitor activity, government regulation, and scientific / technological breakthroughs, and it is often ignorance of these changes that puts an organisation at a competitive disadvantage. Even in circumstances in which a business is aware of strategic changes in its environment, then organisational inertia may stop it from responding in a timely and appropriate manner. It is because organisations generally find it difficult to understand and respond effectively to their rapidly changing competitive environments that the idea of developing a set of dynamic capabilities to help manage innovation appears to have so much potential.

3.0 Dynamic Capabilities

The purpose of this section is to present a summary and critique of the literature relating to the leveraging of value from business software through the development of a portfolio of dynamic capabilities.

3.1 Dynamic Capabilities – What are they?

The resource-based view (RBV) of the firm [Barney, 1991] posits that organizations should invest in those assets and resources that will best assist them in gaining a competitive advantage. Whilst physical resources and assets are clearly an important element of an organization's competitive armory, sustainable value is more typically created by the ability of firms to apply these resources, through the exercise of competences and capabilities [Bowman and Ambrosini, 2000]. Moreover, organizations will only attain a sustainable competitive advantage if they can assemble a set of capabilities that can be consistently applied in ways that competitors find difficult to imitate [Barney, 1991]. Whilst the traditional resource-based theory provides a very useful lens for helping us to understand the nature and role of an organization's portfolio of physical resources, capabilities, competencies and skills, at a particular point in time, it doesn't offer any insights into how this resource-base changes overtime, in response to environmental demands and challenges.

As noted earlier, it is increasingly recognised that dynamic capabilities, in particular, may play be critical to an organization's long-term competitive success, as they can be used to explain why some organizations are better than others at continuously

leveraging and reconfiguring their resources and capabilities, in key areas, such as business computing [Kim et al, 2011]. Consequently, the dynamic capabilities theory may provide an ideal lens for studying the ways in which an organisation may need to significantly redesign and reconfigure its resource-base, to leverage long-term value from an investment in new applications software. Whilst much research has already been conducted to explore the role of dynamic capabilities in facilitating both IT and innovation, less academic interest has been focused upon IT-enabled innovation.

As Peter Drucker (1985) noted, over 30 years ago, '*most of what happens in successful innovations is not the happy occurrence of a blinding flash of insight but, rather, the careful implementation of an unspectacular but systematic management discipline'* [p.67]. Consequently, whilst the evolution of a set of dynamic capabilities might make a very positive contribution to the systematic management of IT-enabled innovation, it will also require the deployment of more formal and methodical innovation approaches, such as the one that we introduce in the following section.

4.0   Incremental Innovation by Design

As described above many organisations understand that innovation is a critical enabler for survival and growth but in practice organisation sometimes struggle to make innovation happen. It is well understood that there are a number to different dimensions of innovation – from incremental improvement to new product and service development to transformational innovation. In the extreme innovation can be used to disrupt existing markets and industries and create new ones. Whilst many organisations focus on product and service development and a number place a strategic emphasis on the transformational element, many do not take a structured and systemic approach to incremental innovation to their existing business processes and the IT systems and applications which support them.

Organisations often invest heavily in procuring, customising and deploying IT applications, including cloud based services, to address business needs. Once these applications and/or services are deployed often little investment or focus is made on understanding the incremental benefits (cost, business productivity, wider business benefits) which could be made by making changes to the applications and/or services

and/or to wider business processes that make use of them. The authors of this paper consider that the application of a structured and systemic approach to identify, prioritise and implement incremental improvements to existing IT applications and cloud based services and/or the wider business processes which make use of them can drive significant business value can offer significant benefits to an organisation.

In addition in order to gain maximum benefit, it is argued that the scope of this approach should include IT and business functions and external service providers, suppliers, partner organisations and wider sources of ideas and inputs. In this way organisations can derive benefits from the use of elements of "outside in" Open Innovation approaches to introduce external ideas and technologies into the firm's own innovation process.

It is accepted that a number of organisations do focus on continual service improvement. For example many organisations use the ITIL Continual Service Improvement (CSI) process which uses quality management methods to learn from previous experience in order to continually improve the effectiveness and efficiency of IT processes and services. This paper argues that a structured and systemic use of innovation focused techniques and approaches can deliver benefits through application of incremental innovation, above and beyond use of quality management methods.
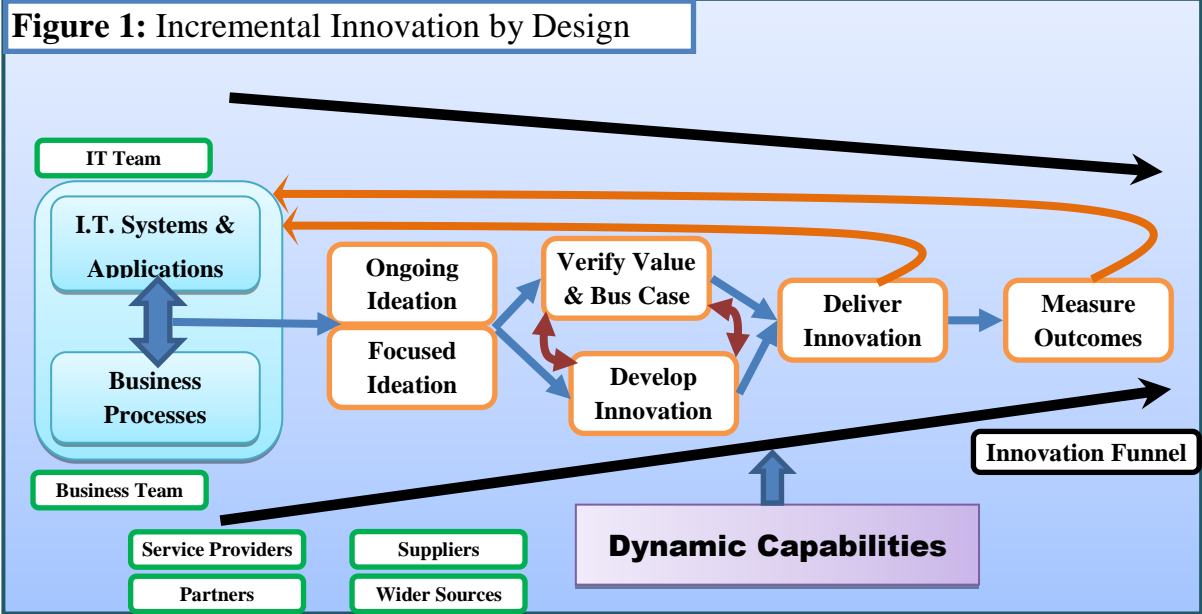
The paper makes the case for the application of a structured and systemic approach to identify, prioritise and implement incremental improvements to existing IT applications and cloud based services and/or the wider business processes that make use of them. The paper describes this new approach as "Incremental Innovation by Design". Inclusion of the words "*by Design*" is deliberate and linked to two key elements:

1. Use of a structured and systemic approach to drive innovation – i.e. ensuring that innovation happens "by design" rather than through chance or not at all;
2. Use of "Design" tools, techniques and approaches to implement changes to IT applications and services and the wider business processes which make use of them in order to deliver innovation
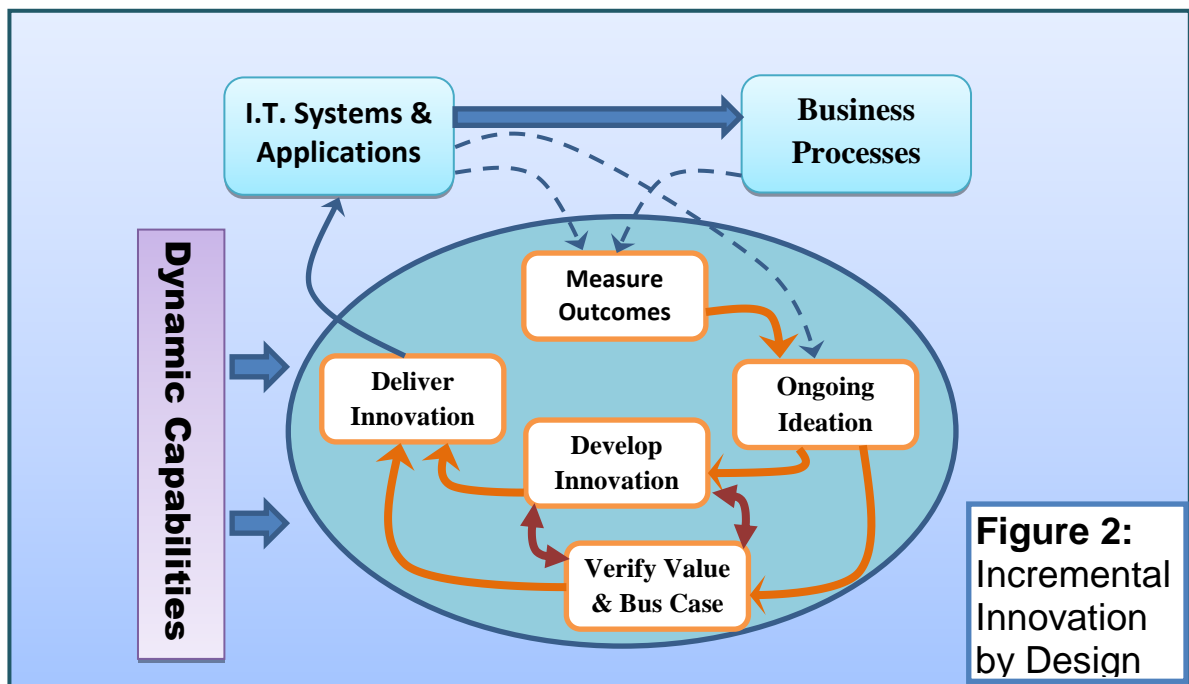
The defining characteristics of our *"Incremental Innovation by Design"* approach include:

- The use of a combination of ongoing and regularly scheduled idea generation, prioritisation and development techniques involving IT and business, service providers, suppliers, partner organisations and wider sources of ideas and inputs;

- The use of an ongoing innovation management funnel to develop and deliver innovation to drive incremental changes to IT applications & services and in the wider business processes which make use of them;

- A strong emphasis that the critical test for any potential innovation is its capacity to deliver real business value. Consequently, this approach has a very explicit and proactive approach to the management and realisation of business benefits [Doherty et al, 2012];

- The use of innovation and design tools, techniques and approaches to optimise ideas selected for development and delivery – for example use of "Design Thinking" methodologies to ensure that the innovations developed focus on usability and benefits to the end users of IT systems and business processes;

- Activities to imbed an "innovation culture" in IT and business employees, extending into service providers, suppliers and partner organisations;

- The assignment of an individual or team to be responsible for managing and driving the innovation management process, working in conjunction with IT and business teams and sponsors, external service providers, suppliers, partner organisations and wider sources of ideas and inputs.

At this very preliminary stage in our research we have developed two separate alternatives of how our *Incremental Innovation by Design* approach might best be represented. In Figure 1the funnel representation has been used to reflect the fact that the innovation management process should generate very large numbers of potential ideas for innovation, each of which will be evaluated, but only the very best will be taken forward and ultimately implemented.

Figure 1: Incremental Innovation by Design

IT Team

I.T. Systems & Applications

Business Processes

Business Team

Service Providers

Partners

Suppliers

Wider Sources

Ongoing Ideation

Focused Ideation

Verify Value & Bus Case

Develop Innovation

Deliver Innovation

Measure Outcomes

Innovation Funnel

Dynamic Capabilities

By contrast Figure 2 doesn't explicitly reflect the on-going screening process, but it does demonstrate rather more clearly the incremental and cyclical nature of the process.

I.T. Systems & Applications

Business Processes

Dynamic Capabilities

Measure Outcomes

Deliver Innovation

Develop Innovation

Ongoing Ideation

Verify Value & Bus Case

Figure 2: Incremental Innovation by Design

Irrespective of how the approach is best represented, its key concepts and phases include:

- **Ideation** – a combination of ongoing ideation and focused events (e.g. face to face innovation workshops and online ideation events) focused on the

incremental improvement of IT systems, services and applications and the business processes which make use of them - taking inputs from IT and business teams, service providers, suppliers, partner organisations and wider sources. The output will be a number of prioritised ideas selected for driving through the innovation management funnel process.

- **Development of innovation** – run iteratively and in conjunction with actions to verify the value and business case of selected innovations. Activities include confirmation of the business value, business case, sponsorship and funding for proposed changes, along with the development activities required to verify the innovation works and prove the business case is viable. Design tools, techniques and approaches will be used to ensure focus on usability and benefits for end users.

- **Delivery of innovation** – implementation of the changes required to deliver the innovation into production IT systems and business processes.

- **Measurement of outcomes** – actions to verify the value delivered and review against submitted business cases to ensure benefits are realised and to quantify benefits to the business.

In addition to improving the organisation's competitive positioning, the benefits of this approach should include increased business productivity and company profitability and reduced IT running costs which could be used to invest in higher value differentiating capabilities

5.0   Concluding Remarks and Research Agenda

Steve Jobs, the founder of Apple computers commented that: '*innovation distinguishes between a leader and a follower*', and consequently any organization that wants to attain a position of market leadership must develop capabilities and approaches that facilitate on-going innovation. It has become clear from this review of the literature that although many important and interesting contributions have already been made with regard to the use of IT to facilitate the effective management of innovation, within the organisational context, there are still many significant gaps in our knowledge. In particular, very little is known about how on-going, incremental innovation might best be integrated into an organisation's routine operations and

behaviours. Moreover, whilst the role of dynamic capabilities in fostering successful innovation have been previously explored [e.g. Kindström et al, 2013], their role in enabling incremental innovation, by design, in particular, has not been subjected to academic scrutiny.

In terms of a provisional research agenda for building upon and extending our exploratory study, the following are all areas and questions that we are actively planning to explore:

1. What are the primary ways in which IT can be used to facilitate innovation, to help an organisation improve its competitive positioning;
2. How might a more systematic approach to incremental innovation be developed and integrated into everyday organisational behaviours;
3. What specific dynamic capabilities are necessary to ensure that and organisation can deliver IT-enabled innovation, over the long-term;
4. What particular approaches are needed to effectively create, evolve and sustain such a portfolio of dynamic capabilities?

Whilst this is clearly not a definitive agenda for studies in this increasingly important and challenging research domain, these are all areas in which we feel that there are very significant theoretical contributions to be delivered. Moreover, when addressing this embryonic research agenda, it will be important to identify opportunities for translating this research into practical tools, methods and strategies which will directly support the successful deployment of IT-enabled innovation within the organisational context.

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