

Open Innovation within Defence Acquisition

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Abstract

Supply Chain Management (SCM) as a relatively young subject area, is presently contested on several conceptual and theoretical fronts as well as what its ultimate aims should be. SCM has shifted away from a focus on improving inter-organisational operational efficiency in terms of logistics and operations management to greater value creation through innovation in supply chains.

This paper examines the United Kingdom's Ministry of Defence (UK's MoD) interaction with its supply chains in order to develop greater conceptual and theoretical clarity on SCM innovation. Using data gathered over a twenty year period it is posited that there are two approaches that can best explain the MoD's SCM innovation strategy. These are Open Innovation (OI) and Service-Dominant Logic (SDL). The paper concludes that there is potential to exploit the synergies between both approaches by integrating them under a specific strategic management theory commonly known as capability dynamics.

Introduction

Innovation is of strategic core concern to most contemporary organizations. While innovation is a vast topic in its own right, a particular approach known as 'open innovation' (OI) has received increasing academic, consultant, and practitioner interest over the past three decades. OI is defined as 'a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology' (Chesbrough, 2003, p.xxiv). Interest in OI appears to have increased significantly following the widespread global implementation of neoliberal ideology by many Western-styled economies. The adoption of this ideology has resulted in a greatly increased globalization of markets and an expansion of the outsourcing of many activities by most large public and private sector organizations (Steger and Roy, 2010). The increasing dependence by organisations on suppliers has progressively expanded to include accessing the knowledge and resources of the supplier network in order to generate innovations (Herstad et al., 2008).

At the same time the OI literature was coming into prominence, a parallel development, known as Service Dominant Logic (SDL) and attributed to Vargo and Lusch (2004), was taking place in the marketing literature. Put simply, SDL has shifted the traditional marketing perspective away from a goods dominant logic (GDL) within an economic exchange. Under SDL, goods are considered as vehicles by which to deliver services. SDL, like OI, is concerned with generating innovation. Lusch et al., (2008) claim that the world's most innovative companies share a different mindset, or mental model, on how markets work compared with the traditional view of exchange. OI and SDL share many overlapping concepts including a greater engagement with supply chain management (SCM) principles in order to achieve desired results. In particular, both seek to create and deliver

value through the SCM networks which support supply chains. The evolution toward partnerships and value creation networks in SCM are viewed as evidence of developments in line with SDL (Lusch, 2011; Tokman and Bietelspacher, 2011).

This paper examines developments in the UK's MoD acquisition strategy over the past twenty years in order to explore issues associated with the application of OI and SDL. The rationale for choosing this focus is as follows. First, the UK is widely acknowledged as being one of the countries which was, and remains, a leader on the implementation of neoliberal principles through a reform programme known as New Public Management (NPM) (Pollitt and Bouchaeret, 2011). The MoD, as part of government, has had to apply and implement NPM principles. Second, the MoD has articulated and implemented a deliberate strategy based on OI principles, titled, "Innovation Strategy: Creating a new environment for innovation within the defence supply chain" (MoD 2007). The aim of this strategy is to access battle-winning technology, at a lower cost and in shorter time frames than could be achieved by traditional in-house arrangements. Third, faced with ever increasing budgetary constraints, made even worse by the recent global financial crises, the MoD has determined to outsource even more activities to suppliers (MoD, 2010). Many of these activities involve the delivery of support services associated with the through life support of major weapon systems. Finally, defence suppliers have had to alter their business strategies in response to changing market circumstances.

Literature Review

As the research investigates the interplay of OI and SDL, this review first examines both and then briefly examines some core themes common to both.

The title of Chesbrough's (2006) book "Open Innovation: Researching a new paradigm", captures the essence of much of his argument. The use of the word "paradigm" builds upon previous work in which Chesbrough (2003) made claims of OI leading to a "new economy." These claims have been challenged as being overly simplistic and exaggerated as all organizations have had to contend with decisions around whether to make, buy, collaborate or form alliances (Herstad et al., 2008). In the early part of the 20th Century in the US, industries cooperated and sourced the research and development (R & D) services they required from external sources (Hollingsworth, 1991). The UK military has an even longer history of engaging in OI processes. For instance, in 1714 the British Government offered, by an Act of Parliament, £20,000 for a solution which could determine longitude to within half-a-degree (two minutes of time). A watchmaker, John Harrison, not only solved what has been described as the "greatest scientific problem of his time" but as a result of doing so also greatly enhanced the capability of the British Navy (Sobel, 1995). Over the next three centuries, the UK's military progressively integrated more and more R&D activities into its core work. Under this "insourcing" trend, suppliers had fewer opportunities to provide services and moved toward a GDL. Given past historical patterns, OI is, in respect to the British military, better conceptualized as a return to older military procurement practices than the adoption of novel and radical approaches to acquiring leading edge technology.

Other areas of literature which also appear to have been exploring OI under various guises include Granovetter's (1985) work on embedded socio-economic networks; Jarillo (1988) on innovation and intentional networks; Von Hippel (1988) on sources of innovation that exist outside of firms; Dyer (1991) on extended enterprises and Herstad et al., (2008) on the shift away from large vertically integrated firms (Fordism) to more networks.

Chesbrough and Crowther's (2006) evidence for OI was gathered predominantly from the 'high technology' industries, such as computers, information technology and pharmaceuticals. However the same study produced weak results in respect to capital

intensive industries with only 40 out of the original 1,000 searches being positive. The state of OI is one of a weak theoretical foundation and insufficient empirical research (Herstad et al., 2008).

The OI trend in defence is similar to those found in other industries; namely, that where defence uses smaller, high volume applications, supported by markets with many players, then OI works well. For instance, the Economist (2009) reported the following, the US Air Force ordered 2,200 Sony PlayStation 3 videogame consoles which then formed the building block of a supercomputer. Soldiers in Iraq and Afghanistan used Apple iPods and iPhones to run translation software and calculate bullet trajectories. Xbox videogame controllers have been modified to allow control of reconnaissance robots and drone aircraft. Graphic chips that power PC video-cards are being used by defence firms to run simulations. In respect to the acquisition of large state-of-the-art assets, there is not yet conclusive evidence available to demonstrate that the MoD, or indeed the military of any western styled democracy, successfully employs OI principles.

Vargo and Lusch (2004) published on SDL at about the same time that Chesbrough (2003) published on OI. While authors after Vargo and Lusch refer to SDL as a 'paradigm shift' (Tokem and Bietelspacher, 2011, p. 717) the original authors are far more modest in their claims. Lusch and Vargo (2011) state SDL is not a theory but is "pre-theoretical." SDL was initially built on eight foundational premises or axioms which have now been expanded to ten (Lusch, et al., 2008). The authors assume these ten premises to be true. They also acknowledged that these premises can, and need to be, subject to verification. Their caution appears well justified because as 'yet the empirical support for SDL, especially when compared to GDL, is lacking' (Edvardsson et al., 2011, p. 541). Others have criticised the foundational assumptions of SDL and limited to a few countries which informed the findings (Brookes, 2007; O'Shaughnessy and O'Shaughnessy, 2009).

Lusch and Vargo (2011) acknowledge that they are building upon concepts developed by others going back as far as 1860. They explicitly chose not to define "service" in the same way that economists do. Rather, they prefer to apply what they consider to be an everyday usage definition, that 'service is usually viewed as assisting or helping or aiding someone and this can be through activities, tasks, processes and performances' (Lusch and Vargo, 2011, p.1302).

While the terms OI and SDL are not identical, there are significant areas of overlap in respect to generating innovations through engaging in processes of co-creating value through customer-supplier interactions and their networks. Sørensen and Torfing (2005) offer several possible explanations for the growth in organisations working with networks, including the emergence of neoliberalism. Implementation of this ideology involved the removal of controls on global financial and trade flows; and the regional and international integration of national economies (Steger and Roy, 2010). It is speculated that the combined effect of implementing these principles resulted in a weakening of governance by government and that what emerged to replace it was network governance. Bales et al., (2004) claims that the worldwide recession of the 1980s and 1990s forced firms to move away from large vertically integrated organisations and into global SCM practices in order to be competitive. These authors also suggest that major developments in SCM from dyadic to chain and, finally, to network were in line with changes in the wider global business environment.

What is meant by the term "network" is an area of considerable debate. Various network theories tend to polarise on what is referred as the four Cs. These are rational Calculation as distinct to institutionalised forms of Culture and Co-ordination as opposed to Conflict (Søren and Torfing, 2005). Despite definitional differences, there is a strong consensus that a causal relationship exists between networks and innovations (Jarvenpaa, and Wernick, 2011; Perkmann and Walsh, 2007) and diffusion of innovations (Rogers, 1995).

Chandler and Wieland, (2010) suggest that the networks which have the capacity to maximize innovation involve embedded relationships. Because of the importance given to relationships, they prefer to use the term “ecosystem” rather than network. Vargo and Lusch (2010) are in full agreement and in more recent writings have used the term “service-ecosystem.” Given the importance SDL places on the service ecosystem, it is hardly surprising that Vargo and Lusch (2010 p.177) concluded that ‘understanding the nature of the relationships in the ecosystem should be both a management and research priority’.

Research Methodology

In order to research the developments in the UK's MoD acquisition strategy, several data sources were accessed. The most comprehensive source of the data used were from key detailed reports, reviews and reforms on the MoD procurement practices generated over the past twenty years. Sources used included the National Audit Office (NAO), The Parliamentary Defence Select Committee, specialist consultant and legal reports (e.g. Gray, 2009; Haddon Cave.2009; MoD, Strategic Defence Review, 2010, and Levene, 2011) as well as MoD documents. In addition, a series of semi-structured interviews were conducted with senior managers from five major defence suppliers and officers in the MoD and the NAO in the years 2009 and 2010. The questions focussed on how well these different actors in the supply chain felt the new sourcing arrangement were progressing and what improvements could be made.

The author and another researcher were present at all interviews. Both took notes and transcribed them within two days. These transcriptions were then used to conduct a thematic analysis.

Findings

OI Findings

The United Kingdom's (UK) military capability has always been heavily dependent on the strength of the defence supply chains, which are in turn supported by privately owned firms. Two events worked to profoundly create even greater dependence on suppliers. These were firstly, the UK government's adoption of neoliberalism as expressed through the implementation of NPM and, secondly, the end of the Cold War. Under neoliberalism, the MoD has lost much of its monopsony power over certain UK suppliers. Working under fewer restrictions, many of these suppliers embraced globalization in order to increase market revenue streams and reduce single customer dependency risks. Furthermore, many of the larger suppliers sought to achieve growth through acquisition of other smaller firms. The net result was that the global market ended up with fewer, but larger, suppliers. The general view is that, as a result, power has shifted toward the supplier. Some suppliers refuted this view on the grounds that globalisation gave the MoD access to more suppliers.

Implementation of NPM principles commenced in the 1980s and has continued ever since. A guiding principle of NPM is that all purchasing activities should achieve “value-for-money” (VfM). While defining VfM in terms of precisely measurable ends has proven elusive, there is no such confusion about the means. VfM is viewed as best being achieved by contracting out work to competitive markets. The distinctive nature of the military meant that the MoD was initially under less pressure to aggressively implement NPM. Factors such as the Falkland's War in 1982, political considerations around maintaining employment in the defence sector, and the need for sovereign capabilities in a Cold War world era suggested higher risks requiring greater caution. The end of the Cold War in 1989 drastically reduced the risk of interstate war and therefore weakened the justification used for paying a premium to maintain sovereign capability. Further, the politicians were eager to cash in the peace

dividend with the result that the UK's defence budget went from 4.2 percent of gross domestic product in 1989 to 2.4 percent by 2008. With fewer funds available, the MoD came under increasing pressure to work within NPM requirements and achieve VfM. This shift was not without its tensions. For instance, in 2005 The Secretary for Defence (2005) stated to Parliament when discussing the Defence Industrial Policy that "...value for money remains the bedrock of our commercial policy. Competition will remain a major element of that, but it will not be used when other tools, such as partnering, would deliver a better outcome, or where it would impinge on our operational sovereignty. The defence industrial strategy does not signal a move in the direction of protectionism" (Hansard, 2005, col. 1466). As this statement suggests, other considerations could override the VfM imperative. By 2010, however, the Strategic Defence and Security Review (MoD, 2010) made it clear that in facing a £38 billion black unfunded liability, VfM had to be given absolute, rather than discretionary, priority. The introduction of European Union requirements to open up all defence markets added a legal obligation to employ VfM principles and greater international market dependence. Therefore, despite the challenges posed by the recent global financial crisis in respect to limits of neoliberalism, these events have not moderated the government's desire to make greater use of markets.

The strategy document "Innovation Strategy: Creating a new environment for innovation within the defence supply chain" (MoD 2007) provides conclusive evidence of how the MoD has set about implementing a deliberate, clearly articulated, well funded OI strategy. An example of how the support structures are aligned with OI is found in the MoD's (2008) "Grand Challenges" website which reaches out into very wide networks search of innovations.

Organizational skill shortages have also encouraged greater dependency on OI principles. The global financial crisis has worsened this situation as it has resulted in severe saving targets being imposed on all departments, including the MoD. In 2010, the MoD was set the target of reducing staff numbers by 54,000 by 2015. While it is acknowledged that too great a loss of knowledge creates a risk, how that risk will be mitigated is not fully clear. Levene's (2011) report on how to reform the MoD acquisition has been accepted by government and implementation has commenced. One major recommendations of the report is to 'manage and use senior military and civilian personnel more effectively, with people staying in post for longer, and more transparent and joint career management' (p.4.) in order to address this risk associated with retaining the knowledge needed to remain an intelligent customer.

The MoD Innovation Strategy Document makes reference to the importance of the ability to access "world-class" technology. Limitations in the national skill base provide one clear example of why the UK must reach out beyond its national boundaries to access the "world-class" military innovations it requires. UK industry has suffered from a shortage of skilled scientists and engineers, technicians and managerial professionals. Based on the Organization for Economic Cooperation and Development (OECD) data, 'the UK has 5.5 scientists per 1000 people employed (below the OECD average of 6.5) compared to 7.1 in France, 8.6 in the US and 15.8 in Finland' (MoD, 2007, p.10). The recent austerity measures introduced by government in respect to higher education (e.g. tripling of tuition fees) are expected to further weaken the educated skill base in the UK (Scott, 2011). Therefore, factors other than financial help account for why the UK government and the MoD must engage in OI.

The results on the effectiveness of OI are mixed. There is wide agreement that it has been successful with smaller items such as Unmanned Aerial Vehicles (UAV) and various forms of personnel transport. These instances provided clear evidence of where the MoD accessed innovations developed by others in shorter cycle times and at less cost. However,

major weapon systems such as advanced aircraft and ships take at least a decade to develop. The move to a service rather than an equipment focus has the potential to make OI even less effective. The firms that made the assets have the bulk of the knowledge needed to deliver the lucrative through-life support services over several years. They therefore have economic incentives which work against sharing information in a manner consistent with OI principles

SDL Findings

Over the past three decades many activities traditionally carried out by the military have been outsourced to the privately owned defence industrial base (DIB). In the last two decades in particular this change has seen a movement away from procurement to acquisition. Under procurement, industry's role was limited to the provision of equipment, upgrades and equipment-focused support services within transactional relationships, and industries share of the budget focused on the Equipment Programme. Under acquisition, industry's role extended into non-equipment areas, with products and services previously supplied separately now being grouped into larger integrated packages. These new arrangements allowed industry to gain more than the Equipment Programme element of the defence budget and also resulted in a greater dependence on industry for the design, delivery, maintenance and on-going support of military assets which, in turn, required moving to a closer and collaborative working relationship model. These changes were in line with the UK's MoD "Through Life Capability Management" (TLCM) philosophy which has radically altered how it buys the goods and services needed to generate capability. The MoD defines TLCM as "the enduring capability to generate a desired operational outcome or effect, and is relative to threat, physical environment and the contribution of coalition partners" (MoD, 2007).

Other Findings

The term TLCM has more recently been modified to Capability Management (CM) as it is believed to more accurately reflect the focus of this new strategic planning methodology adopted by the MoD. CM results in an acquisition strategy that is more aligned with buying services than equipment which also allows suppliers with greater freedom to innovate. The MoD's (2007) innovation strategy acknowledges new business models will be required in order to encourage suppliers to generate more innovations.

All of the firms interviewed were in support of becoming service providers. They expressed the view that it allowed them to provide greater value to the customer and to generate more innovations. Most had altered their strategic plans to reflect the changes in their business model which moved away from being manufactures to being providers of a capability. Both the MoD and the suppliers suggested that in order to effectively deliver value under these new arrangements, greater mastery of CM management was required. Several initiatives were underway to improve CM with stakeholders such as joint education and workshops with MoD and suppliers.

Discussion

Exogenous forces, account for much but not all of the reasons the MoD has embraced OI. Under neoliberalism globalization has flourished. "For better and for worse, globalization has become the most powerful force shaping the world's geopolitical landscape" (Cohne-Tanuqi, 2009, p. 2) and will continue to do so (Harris & Moran, 2000). Other forces which will continue to ensure greater dependence on global markets for innovation include the national shortage of required skill sets, the increasing complexity of weapons systems, the global market diversification strategies of suppliers, the economic attractiveness of using global supply chains and the ongoing consolidation of suppliers in a market that has never

been truly competitive (Bialos, et al., 2009). NPM combined with financial austerity measures provides a justification which fits in well with the cry of neoliberals for ‘less state and more market’ (Sørensen, E. and Torfing, J. (2005).

Exogenous factors do not account for all of the reasons for the adoption of OI. As shown, the UK has a very long history of using deliberate strategies to work with suppliers in order to generate innovations. A more realistic assessment is a large shift in the internal and external resources used to generate innovations. While results have been mixed they have been sufficient to support the continuation of OI. Applying OI principles to large assets (bundles of capability) appears less effective. This may be due to perverse incentives which encourage withholding knowledge. Far more research is required to understand what is involved.

The findings in this study suggest that OI and SDL principles will continue to converge within a CM strategic planning framework. Priem., (2012. p349) note technology scholars have long debated ‘whether innovation is driven by technology breakthroughs or by market demand, that is, technology push versus technology pull.’ They further claim that present evidence favours technology pull. If so, it is the CM process which defines requirements to generate this pull. While strategic management was not the focus of this paper the results of the study suggest it is an area that warrants further investigation. A potentially useful line of enquiry would be to investigate CM from the strategic management work of Teece (2007) and Teece et al., (1997:p.509) on “dynamic capabilities.” The basic argument is that competitive advantage comes not just from ownership of difficult to replicate assets (especially knowledge) but also from difficult-to-replicate enterprise capabilities. This approach in line with OI and SDL views the management of the “ecosystem” as key to competitive advantage. If correct then it provides grounds to investigate if neoliberal assumptions about the invisible hand of markets (Sørensen. and Torfing: 2005) also applies to networks or if visible interventions are warranted.

Conclusions

This paper investigated the relevance of OI and SDL principles in respect to the MoD’s acquisition strategy. The usual cautions and limitations apply to such a small scale study. Despite these limitations, the results demonstrated that the MoD had successfully applied OI principles with particular classes of goods and services. However no conclusive evidence was found to suggest OI works effectively in the case of large assets. This conclusion also held when these assets were defined in capability terms. There was also overwhelming evidence which showed that there has been a movement away from GDL to SDL and that suppliers are trying to adapt accordingly. Further, it appears that both OI and SDL principles are converging on many points. The area of convergence which suggests the greatest opportunity, both in practical and theoretical terms, is found in CM. Future research on underlying theoretical assumptions which inform CM could also assist in gaining deeper insights into making better use of OI and SDL in order to generate innovations.

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