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Socially innovative and commercially viable: Partners or prisoners of future business developments

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Abstract

There is a growing need for supply chain partners to work together in improving their performance and systems of operation. New information and communication technologies can be used to improve operations and facilitate the building of closer relationships, but they can also serve to undermine relations and create tensions. RFID represents the first major improvement traceability technology that potentially supersedes barcodes and our study seeks to develop a simulation model that moves beyond a purely technical analysis, towards an assessment that is able to accommodate the social and cultural dimensions in providing a dynamic roadmap for change.

SOCIALLY INNOVATIVE AND COMMERCIALLY VIABLE: PARTNERS OR PRISONERS OF FUTURE BUSINESS DEVELOPMENTS

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ABSTRACT

There is a growing need for supply chain partners to work together in improving their performance and systems of operation. New information and communication technologies can be used to improve operations and facilitate the building of closer relationships, but they can also serve to undermine relations and create tensions. RFID represents the first major improvement traceability technology that potentially supersedes barcodes and our study seeks to develop a simulation model that moves beyond a purely technical analysis, towards an assessment that is able to accommodate the social and cultural dimensions in providing a dynamic roadmap for change.

Keywords: Supply Chain Management, Social Innovation, Simulation, Change

INTRODUCTION

The coordination and integration of operations remains a challenge facing business both in terms of their internal operations and across supply chains, which within Australia, also often have to tackle the issue of geographical separation [1]. The internationalisation of business and the growth in potential supplier outlets has also increased the potential spatial separation within supply chains which in turn heightens the need for good communication in developing and sustaining collaborative supply chain relations [2]. While advances in information technologies and transportation hold the promise of greater efficiencies across networks of organizations, both here and abroad [3], these advances also require changes to existing techniques, and the development of new ones, that enable supply chains to be managed and improved [4]. There is a growing body of research suggesting the importance of new technical innovations to enhance supply chain performance [1]. For example, technical developments can enhance a firm's ability to source suppliers globally, communicate between product and service providers and forecast customer demand and it is widely accepted that efficient, responsive and competitive supply chains rely upon technology driven real time information sharing and collaborative relationships [5].

Increasingly, commercial competitiveness and strategic business positioning often rests on the establishment of strong collaborative partner relationships that are not only commercially viable but also socially innovative [6]. There is often a balance required between assessing commercial viability (longer term mutual business gains) and evaluating the nature and strength of ongoing relations (common understanding, trust, strong inter-personal relationships). In practice, there can be a tendency to over emphasise the commercial dimension and in so doing, underplay the commercial significance of social processes to sustaining competitive partnerships. Companies who feel imprisoned or constrained by existing sets of relationships may look to secure opportunities elsewhere and threaten the longevity of existing arrangements. Creating, developing and sustaining good strategic collaborative relationships over time is an essential part of managing a modern business and yet, with fluctuations in business activity, the globalisation of markets and the uptake and use of new technologies, many of these ongoing supply chain collaborations can come under severe strain and face social challenges that threaten their longer term viability [4] [7].

In this paper, we seek to examine some of these issues through first discussing some of the findings in key studies that have examined the influence of technology on the development and maintenance of supply chain partnerships. This is followed by a brief section that examines some of the insights that can be drawn from the change management and innovation literature. Particular attention is given to the notion of 'social innovation' and how this may support and enhance business competitiveness through enabling collaborative change processes to occur across existing supply chains without threatening or destabilising inter-firm relations. We then draw on some initial findings from our research into the implications of adopting Radio Frequency Identification (RFID) technology in an end-to-end supply chain. Through using simulation techniques we highlight the financial business case for introducing this new technology whilst also drawing attention to the social implications of change for disrupting relations both internally and across the supply chain as a whole. We contend that managing these processes is more than a technical reconfiguration problem and requires the careful management and understanding of complex social processes. These socio-technical issues - of implementing change not just in one organisation but across a network of organizations – raise a number of challenges. A key element of this, is in gaining a balanced assessment of the appropriate strategies for the supply chain as a whole rather than an approach that attempts to manage a system driven by the best interests of each partner organization. We conclude by calling for more multi-disciplinary approaches to these complex issues of integration through innovation in which both the technical parameters and social processes to change are accommodated. We believe that the simulation techniques that we have developed can usefully be combined with the newer notion of social innovation and our understanding of change management, in the design, development and maintenance of longer term strategic collaborative relations across supply chains that also have to accommodate the uptake of new technologies and deal with continual processes of change.

TECHNOLOGY AND SUPPLY CHAIN MANAGEMENT

The structure and nature of supply chains posits the dependence between organisations. Min and Mentzer [9] describe supply chains as a set of organisations involved in the upstream and downstream flow of products, services, information, and finances. These activities include material information which flows from initial suppliers, through the channel members to the final end user or customer [10], via the network of value adding suppliers, factories,

warehouses, distribution centres and retailers through which raw materials are acquired, transformed and delivered to the customer.

As supply chains become more global, and more competitive, they strive to differentiate themselves by building their capabilities (eg. technology readiness) and competencies (eg. service quality and logistics) [11] [12]. Therefore good communication becomes essential for linking and coordinating off shore production facilities with logistics activities such as warehousing and distribution facilities [13].

The main benefit of technology to supply chain management revolves around efficiency and responsiveness. Efficiency is enhanced through real time information sharing [14] between supply chain partners. This enables reduction in cycle time, the increase in visibility and reduction in inventory holding [15]. A variety of technology solutions, such as: Vender Managed Inventory (VMI) [16], Just In Time (JIT) [14] and Direct Store Delivery (DSD), and collaborative planning and forecasting replenishment (CPFR) [17], have been applied to improve efficiency of operations across the supply chain.

As technology develops information transference is more real-time. Systems such as Electronic Data Interchange (EDI) and the Internet [18] have enabled organisations to communicate by integrating business activities. Increasing levels of customer demand are pushing supply chains to further differentiate themselves in their levels of service. The adoption of RFID technology can streamline supply chain activities and increase productivity. Most RFID solutions involve fixed and costly infrastructure installations where reading antennas and related equipment, network and communication systems as well as integration towards legacy systems need to be established [19]. Such RFID solutions are only financially justified in setups with high volumes and high value items. Consequently, most implementations are based on closed-loop systems (intra-company where there is only one actor developing, implementing and utilising benefits). By using RFID tags as carriers of data it is possible to give the goods identification smart features. 'Smart goods' enhance supply chain performance through collaboration by enabling improved access, capture, usage, modification, dissemination and verification of information. Currently many large scale RFID initiatives intend to deliver labour cost savings. Smart goods and mobile RFID solutions can leverage existing infrastructure and thereby utilise previous infrastructure investments and enable smooth implementation.

MANAGING CHANGE AND INNOVATION

Within the mainstream change management and innovation literature attention has centred on the commercial drive for business organizations to innovate and change. Typically, company survival is explained in terms of an 'innovation imperative' where new products and services are part of the dynamic business environment of securing and maintaining competitive advantage. Entrepreneurship and innovation are often seen to go hand-in-hand as new markets and opportunities are identified and exploited in the pursuit of profits and the drive for growth. Market and economic forces are seen to promote the need for new products and services to enable competition in rapidly changing markets and yet in recent years, social impediments and cultural barriers have been identified as a major, and often overlooked, determinants of 'successful' innovation and change. The importance of social processes to creating and sustaining a complex network of relationships across companies is of central concern here, and aligns with a growing interest in the concept of social innovation. But what do we understand by the term 'innovation'.

Bessant and Tidd [20, p. 29] summarise innovation as: 'the process of translating ideas into useful – and used – new products, processes and services'. They support the Department of Trade and Industry (DTI) definition that: 'innovation is the successful exploitation of new ideas' [20]. For them, innovation can take many forms but these can largely be reduced to four dimensions of change, namely: production innovation (changes to product/services); process innovation (new ways of creating and delivering products/services); position innovation (for example, the watch making industry and the quartz watch); paradigm innovation (a shift in long held assumptions about the organization/business, for example, the emergence of low-cost airlines) [20].

In managing innovations they view this as a process ('an extended sequence of activities') involving the generation of innovation possibilities; strategic selection of an innovation from a range of options; and the launching of an innovation – the introduction and implementation process of making it happen in practice. They also explain the difference between 'incremental' and 'radical' innovations [20, p. 14]: 'running from minor incremental improvements (incremental innovation) right through to radical change…sometimes they are so radical and far-reaching that they change the basis of society – for example the role played by steam power in the *Industrial Revolution* or the ubiquitous changes resulting from today's communications and computing technologies.'

For Bessant and Tidd, successful innovation is a complex and difficult process that involves transforming ideas into new products or services that 'make a mark' [20, p. 440]. Their emphasis is largely on the profit-driven version of innovation and yet, innovations that bring about significant change are necessarily composed of both social and technical dimensions; they are not devoid of social processes in the creation of new ideas and their implementation and broader diffusion. Spotlighting these social processes and their place in technological and organisational change as well as the intentions and agendas behind these developments, all help us to better understand this concept of innovation. As Josephine Green [21] states 'if you only concentrate on technology research then you invariably get technology innovation, but if you also research the social and the cultural, then you get social innovation. Technology and social innovation promises a more balanced quality of life and a more inspiring future'.

In our brief case that follows, Radio Frequency Identification (RFID) technology represents an innovation in the way that goods can be tagged and monitored throughout a complex supply chain. However, setting up an effective system requires the management of relations – social processes and innovation – in order to achieve the potential benefits from adopting new technology. For us, innovation represents 'new ideas that work'. This differentiates innovation from improvement (which implies only incremental change); and from creativity and invention (which are vital to innovation but miss out the hard work of implementation and diffusion that makes promising ideas useful). As such, we use *social innovation* to refer to new ideas that work in meeting social goals in conjunction with other organisational, technical or scientific goals. Furthermore, we contend that there is always a mutual shaping in the development, uptake and use of innovations between the social and technical dimensions [22]. However, there can be different intentions behind the development of innovations that can range from business, economic, political, social or militaristic objectives. In the case of RFID technology, these changes seek to secure commercial gain but achieving this requires equal consideration to be given to the technical reconfiguration of operations and the maintenance of good social relationships across the supply chain. Social innovations

often have aims that draw on notions of contributing to welfare of society and improving the social capital of people in communities, organisations and society. Such innovations may involve using existing skills and knowledge in new ways to meet social goals, or they may centre on the novel use of technologies to improve social circumstance by addressing domestic, infrastructure or environmental goals. Consequently, whilst there is a mutual shaping of the technical and social, the economic and political dimensions also come into play in securing the uptake and development of these innovations in the pursuit of well being.

In seeking to develop innovative social relationships across the diverse collaborative partnerships, organisations first need to find ways to positively leverage the social capital that resides with their partners. That social capital will provide the relational resources that can support a durable network of relationships and thus facilitate innovation and development of the relational framework [23]. Where the new ways of working with partners require innovative approaches to knowledge sharing and value creation, social capital has been found to facilitate interactions and trust among partners such that value creation is enhanced [24].

To provide the social innovation necessary to leverage value chain outcomes it is necessary to consider the way in which participant interactions contribute to the development of a relational foundation of shared cognitive (agendas and motivations), relational (trust and commitment) values [24]. Furthermore, Simsek, Lubatkin and Floyd [25] also raise the importance of context, relationships and interpretations in participant sense-making. They reveal the importance of reciprocal interactions in the development of inter-firm networks that enable partner organisations to adapt and coordinate in ways that overcome contingencies. We develop those models here to embrace the recursive interactions of broader informing industry/organisational contexts, accommodating relational perceptions and interpretations (professional, collegial, historic and so forth) and the individual stakeholders through their behaviours and activities. These influences collectively are recognised as intrinsic and fundamental to sense-making in the acceptance and negotiation of social relationships that can facilitate social innovations and support operational adaptations between partners without compromising economic goals and commercial agendas (see Figure 1 below).
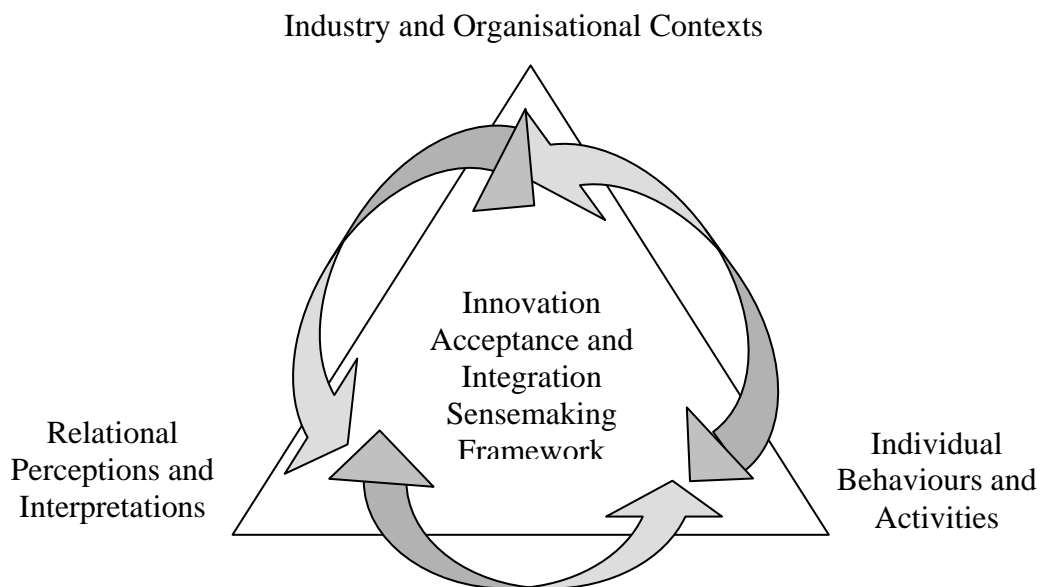
Industry and Organisational Contexts

Innovation
Acceptance and
Integration
Sensemaking
Framework

Relational
Perceptions and
Interpretations

Individual
Behaviours and
Activities

Figure 1: Building Supplier Chain Relationships across Contextual Settings

The influence of professional associations and the contextual environment in which the interactions occur, including the existence of long term relational networking through either institutional and historic patterns, and the various informal and opportunistic interactions between partners facilitate understanding, communication and action between supply chain participants. All interactive opportunities contribute to developing a shared space in which collective sense-making, mutual engagement and negotiated agreements can be achieved. In practical terms, recognizing the many intangible social and contextual influences in the development and uptake of innovations requires a flexible framework that enables variable stakeholder positions to be taken into account.

SUPPLY CHAIN SIMULATION: A CASE STUDY

A detailed simulation model of the current state and working interfaces of an end-to-end supply chain of a major electronics manufacturer in Australia is currently under development. The simulation is based on a hierarchical model which provides an overview of the complete end-to-end supply chain. It is then possible to observe a particular component within the supply chain and then focus on a specific operational function within that component. The class of simulation models used here intrinsically evaluate the variability and interactions within the system and provide a natural environment for Activity Based Management (ABM) and soft computing techniques [26] so that a unifying methodology can be established for evaluating new technology and establishing the appropriate change mechanisms for its successful implementation.

Currently the model of the internal supply chain of the Distribution Centre has been completed. The model includes material and information flow, inventory levels, process times and activity based costing so that cause and effect analysis can be preformed on a particular scenario concerning the implementation of new technology such as RFID. The model is in the process of being extended to include other partners within the supply chain. Their internal supply chain will be modeled together with external logistics and interfaces between the supply chain components.

By simulating the introduction of RFID technology in the Distribution Centre several leverage points for improvement have already been identified. These include a significant reduction in processing time, reduced errors (such as misplacing goods), improved scanning accuracy and performance, improved product security, and increased visibility. RFID have an inbuilt security device that alleviates the need for security cages and electronic surveillance systems. The introduction of RFID will therefore result in a more trusting and conducive working environment. In this way the social benefits resulting from the change provide a leverage for technological innovation.

The simulation also indentified a number of challenges including: level of technological adoption across the supply chain, the degree of compatibility with the supply chains existing systems software and the cost of implementing an RFID system across the end-to-end supply chain. One significant problem from a global supply chain perspective is the difference in RFID international standards. This means that to achieve the full benefits of RFID technology products need to be re-tagged when entering a country with a different RFID standard, thus offsetting the benefits brought about by reducing processing time further down the supply

chain. In this case a global perspective to technological innovation needs to be considered by double tagging at source or introducing an international standard so that the optimal benefits of the change process can be realized.

The initial analysis has identified the key change mechanisms necessary to implement RFID within the internal supply chain of the Distribution Centre and once the research has been extended to include the external interface and other supply chain partners, the organisational cultural issues which exist between individual partners will be addressed to optimise the implementation and performance of new technology. Different stakeholders have varying commitments to technological change that reflects their assessment of the costs of implementing change and the benefits that are seen to accrue to their operations. The simulation illustrates the significant benefits that the Distribution Centre derives from implementing RFID and this draws attention to the competitive advantage of the Distribution Centre and can offset some of the benefits to the other stakeholders through influencing their perceptional and attitudinal responses. These social processes can be accommodated into the processual framework for managing change, once again highlighting the need for a more holistic approach that is sensitive to contextual and relational elements that are part of the sensemaking process in the acceptance and integration of innovation (see Figure 1).

CONCLUSION

In seeking to address some of the key challenges that face a collaborative network of organizations that aim to improve operating efficiencies through the introduction of new techniques and technologies, whilst simultaneously creating and sustaining good interpersonal relations between supplier firms, we highlight how social innovation is often an essential, but often overlooked element, in the management of change. Commercial viability is often counter posed to social innovations that have at their starting point the need to improve well being rather than simply secure profitable gain. It can be assumed that hard commercial decisions should be made on the numbers rather than the softer relational aspects on managing collaborative supply chain networks. However, we contend that notions of social well being and commercial success are not mutually exclusive, but to the contrary, can provide a more balanced appreciation of the socio-technical requirements of successful change. As such, managing the uptake of new technology that has implications beyond a single firm to a network of organizations requires equal consideration to the social aspects of managing such change as to the technical options for supply chain reconfiguration.

In our brief discussion of the implications of RFID technology for our case study example, it is shown how the initial focus is on efficiencies and returns on investment. In terms of improving information and material flow, there are a number of scenarios that can be played out using simulation software. This enables key decision makers to not only see the commercial benefits of investing in the technology, it also provides a useful business rationale for pursuing such a strategy. However, convincing other partners in the supply chain may not be so straightforward, especially if the major commercial benefits are seen to centre of the operations of the initiator rather than the other organizations in the end-to-end supply chain. At this stage, managing social relationships is central in maintaining and further developing collaborative partnerships. Attention needs to turn from simply focussing on the hard line commercial benefits to the possibilities of change for the network as a whole. If these processes are managed badly, then trust can be undermined and feelings of enforced participation in development may result in, for some at least, a sense of commercial imprisonment. In other words, companies within the supply change may feel a need to accept

the adoption of the new technology - to sustain a position in the network - whilst being dissatisfied with this outcome. This in turn, is likely to undermine the longer-term development of good collaborative relations and jeopardise future business developments.

In an increasingly volatile and competitive world, maintaining strong social relationships between partner-firms may prove more commercially viable than taking business decisions on immediate self-interest that threaten longer term strategies for competitive success. As in many collaborative ventures, not all partners are equal and not surprisingly, this can often influence decision-making in the speed and direction of change. However, we contend that it is in the interest of the more powerful partners when considering the commercial viability of technical innovations, to also consider the need for social innovations and the importance of managing the relational aspects of collaboration and change.

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