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The implications of interactions theory and application for value chain management

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As organisation structures become flexible in the response to market opportunities it is interesting to probe the underlying reasons that have facilitated these developments. It is not the just attraction of low capital intensity and diversified risk that makes the virtual organisation attractive. Transaction economics (Coase: 1937 and Williamson: 1985) identified the choices available to the firm: essentially a comparison between the relative costs of using internal resources and those of external suppliers. If the external sourcing option is lower cost and comparable (acceptable quality etc) the economic solution was to outsource. One of the cost items that influenced the choice was that of assembling the information required to make the decision; another was the process of negotiation, the transaction process required, and any subsequent follow-up activities. The development of information communication technology (its costs, accuracy and accessibility) had a huge impact on the overall costs. What have been described as interactions are the processes that are engaged when organisations relate with each other in sourcing and procurement decisions; interaction costs occur as these processes are engaged. This paper introduces the topic and explores the implications for value production networks.

Value networks; transformation interactions, exchange transaction interactions, communications interactions

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1. Introduction

The application of ICT (information communications technology) to management decision making processes, together with the expanding adoption of value creating networks has led to an interest into *interactions activities* between process managers. Interactions as facilitators between organisations have become a significant facilitator in decision making processes within the business environment.

The work of Coase (1937, 1991) and Williamson (1990) on *transaction costs* argued that commercial transactions take place where the cost of transaction is the lowest. In other words firms’ trade-off the value of specialisation against the costs associated with external supply alternatives when deciding upon organisational structure and the implementation of strategy. The theory of transaction costs suggests there is a balance between the *transformation costs* of manufacturing and delivery and the *interaction costs* (the costs of negotiating contracts, managing risk and the opportunity costs) of alternative supply arrangements. The developments in ICT processes and costs have increased the reach and richness of *communications interactions* reduced the costs. More recently Butler et al (1997) suggested that typically interaction costs are lower when production occurs within the firm, while production costs are lower for specialist external suppliers and it follows that the structure of firms and industries is designed to minimise the total costs of transformation and interaction.

Parallel to this argument is that made by Sawhney and Parikh (2001) who contend that value in a networked world behaves very differently than it does in the traditional, bounded world. They suggest the elements of infrastructure that were once distributed among different machines, organisational units and companies will be brought together. Shared infrastructure (*value in common infrastructure*) will include not only basic information storage and dissemination but common functions such as order management, and: “... even manufacturing and customer service”.

They suggest *value in modularity* as an important trend. Here their concern is with the entire range of: “devices, software, organisational capabilities and business processes”. These will be: “restructured as well-defined, self-contained modules and: “value will lie in creating modules that can be plugged into as many different value chains as possible”. Examples of modularisation can found in automobile production. And they conclude; “value in orchestration” will become: “…..the most valuable business skill”. Modularisation will require an organisational ability and the authors suggest: “Much of the competition in the business world will centre on gaining and maintaining the orchestration role for a value chain or an industry”. Value network analysis identifies the core processes and core capabilities involved in meeting the essential corporate and customer expectations. Clearly intra and inter-organisational interactions have increasing importance.

Many businesses structures are too rigid and need to be reviewed these against the changing business environment. Hagel and Singer (1999) argue that the traditional organisation comprises three basic types of business: a customer relationship business, a product innovation business and an infrastructure business. They suggest each of these differ concerning the economic, competitive and cultural dimensions. They argue that as the exchange of information and "digestion" increases through electronic networks, *interactions*, the traditional organisation structures will become "unbundled" as the need for flexible structures becomes an imperative and 'specialists' offer cost-effective strategy options (low cost alternatives) in each of these basic businesses. They also suggest that it
The implications of interactions theory and application for value chain management
David Walters

this that is leading to car manufactures, for example, adopting outsourcing models for manufacturing operations (as is beginning to occur) and to enter the after-market through partial acquisitions or partnerships or even fully acquiring downstream companies.

The issue for the "traditional" organisation is to consider what the authors define as interaction costs. Interaction costs include transaction costs (as described by Coase and others) but add the costs for exchanging ideas and information. They argue that the three businesses correspond to what are popularly called core processes. Virtual organisations (or value chains) form around core processes and these expand to meet the specific customer needs identified. Hagel and Singer's argument is that as the exchange of information and "digestion" increases through electronic networks, traditional organisation structures will become "unbundled" as the need for flexible structures becomes an imperative and “specialists” offer more cost-efficient strategy options in each of these basic businesses.

Butler et al’s notion of “interactions”, suggests they account for over a third of economic activity in the US. Interactions are described by:

Individuals and organisations interact to find the right party with which to exchange; to arrange, manage, and integrate the activities associated with this exchange; and to monitor performance. These interactions occur within firms, between firms, and all the way through markets to the end consumer. They take many everyday forms – management meetings, conferences, phone conversations, sales calls, problem solving, reports, memos – but their underlying economic purpose is always to enable the exchange of goods, services, or ideas.

And;

the searching, coordinating, and monitoring that people and firms do when they exchange goods and services, or ideas – pervade all economies, particularly those of developed nations. ... interactions exert a potent but little understood influence on how industries are structured, how firms are organised, and how customers behave.

The authors argue that any major change in their level or nature would trigger a new dynamic in economic activity suggesting that the current convergence of technologies is a catalyst that will increase the capacity for “interactive capacity”. The convergence of technologies refers to the growth of networks, the improvements in connectivity – broadband – is multiplying the inter-active power of networks, the continued expansion of computer processing and power, accompanied by lower costs, the acceptance of a new set of standards (HTTP and HTML for example) are increasing the growth in Internet, intranet and extranet usage. The continuous penetration of basic technologies such as telephone infrastructure and the number of PCs on a global basis will accelerate the growth rate of interaction capability.

The predicted impact of “the age of interactions” proposed by Butler et al is already visible. The shift away from vertical organisations towards virtual organisations is clearly underway. The authors suggest that specialisation is fragmenting integrated business systems such as textiles and the utilities industries. For example the introduction of EDI (electronic data interchange) has resulted in the disaggregation of procurement, spinning, weaving, finishing, logistics and retailing in the apparel industry. They argue that
horizontal integration and cooperation will become more economically attractive due to economies of scope. As interaction costs decline companies are better able to coordinate marketing and distribution of an increasingly wider range of products and services. Amazon.com is an example of this. It has expanded the range of products available and manages the electronic offers of a number of traditional book retailers. The traditional production economies of scale are declining in importance and this is likely to continue. Where scale was essential falling interaction costs are making smaller business sizes are becoming increasingly viable. A new era of production economics is replacing the traditional economies of scale.

The increase in interaction efficiency will increase the number of businesses working together as networks and it will also increase the application of network applications within businesses. Butler and his colleagues provide examples of intra-organisational networks such as Caterpillar who are now linking designers, distributors and technicians with customers as it builds a global parts service network. They also contend that as interaction costs decline so too will transaction costs resulting in more market information transparency. Seely Brown and Hagel III (2005) discuss Li and Fung a Hong Kong based organisation. In their exploration of the organisation’s use of demand chain analysis they also demonstrate the company’s development of an approach to “managed aggregate interactions”; Li and Fung company an apparel producer and distributor that works with 7,500 business partners, in 37 countries, and can call on any number of specialists to manufacture everything from high-end wool sweaters to synthetic slacks. The company uses interactions management to offer its customer base (typically large, often multinational, apparel retailers) an extensive range of product finish options. Orchestrators such as Li & Fung are rapidly expanding the range of participants in order to gain access to more specialized skills, as well as nurturing and developing relationships that help all parties build their capabilities more quickly. Li & Fung sits at the hub of a network of specialist enterprises that pull in resources in different combinations and configurations, depending on the nature of demand.

An interesting aspect of all of this is the impact that it will have on traditional intermediaries, who traditionally exploited the lack of transparency. Their role as providers of market information is being undertaken by “informediaries”, organisations that provide search facilities across markets. Rayport and Sviokla (1994) suggested a new emphasis for ICTs; not only one of marketing communications, but also based upon product-service characteristics and transactions payment systems. The concept of marketspace removes the need for dominant location; “…customers can shop across the globe or country, dramatically cutting the advantage of local presence that is the mainstay of many retailers.” Rayport and Sviokla suggest, the product is replaced by information about the product and information processes are the value for the customer. The product format is changed to become “digitised” to add convenience to the “value package”.

Clearly such changes have implications for business organisation. Internet transactions will facilitate both customer and supplier relationship management. Product customisation will become easier, faster and less costly as interaction facilities and costs increase in cost efficiency and communications can become more closely targeted, frequent and accurate. It has been the impact of ICT (information and communication technologies) that has led to Coase’s theory becoming practical reality. Bornheim (2001) cites Woodall who claimed that the transaction costs of purchasing products and services are being reduced by up to 60 percent through e-procurement technologies.

Other influences are also responsible. For example changes in attitudes towards suppliers, customers and competitors (relationship management) has accounted for other, similar
changes. The notion of working with a competitor in any way shape or form was an anathema some twenty years ago but now we have the automotive manufacturers sharing R & D, sharing basic vehicle platforms, and working together in buying exchanges to reduce costs. Pharmaceutical companies share production, and sales and distribution facilities.

Towards A “Theory” Of Interactions

Butler et al identified the importance and impact of interactions. Their purpose appeared to be to bring an awareness of interactions and to a degree “create an agenda” for others to explore. Beardsley et al (2006) did so by expanding on the original research by Butler et al and beginning a typology. They argue that “tacit interactions” are the increasingly collaborative and complex aspects of many tasks. They suggest they are; the exchange of information, the making of judgements requiring the use and exchange of “multifaceted knowledge” with co-workers, customers and suppliers and those interactions that are increasingly a part of the standard model for companies operating in the developed world. Because of the large proportion of the labour force this represents the authors argue that increasing the productivity of “interactions” will have a significant impact on financial performance. Furthermore there are major implications for enhancing competitive advantage.

Beardsley and his colleagues argue that typically organisations increase the efficiency of transformational and/or transactional activities by adding (or substituting labour) with capital solutions. They argue further that the boundaries between transformational, transactional and tacit interactions are not static; they are changing constantly as a result of innovation. Furthermore increasing the productivity of tacit interactions is not a simple task; rather it is about avoiding standardising interactions and adopting an approach that fosters change, learning, collaboration, innovation and shared values. They are suggesting that productivity increases when mutual confidence and trust exists and extends beyond traditional organisational boundaries; this occurs when tacit interactions are allowed to emerge rather than be “engineered” by senior management. Intra and inter organisational communication and collaboration have been observed as beneficial to the increase in the productivity of interactions. Essentially Beardsley and his colleagues are suggesting that the effectiveness and efficiency of interactions is increased by taking advantage of the benefits offered by developments in knowledge management, technology management, process management and relationship management particularly when the intuitive response of a cooperating group is allowed its initiative.

However this falls short of developing a conceptual approach to the increasing interest in interactions; to do this requires an alternative view of how interactions may be classified. Sutton (1998) introduces the notion of market coordination and Fig 1 suggests how this role may be integrated into an attempt to formalise “interactions” into a useable concept. The approach suggested is to focus tacit interactions (that are knowledge based, requiring experience and judgement typical of decision making roles) but is too broad, and is replaced with two; integration and coordination (a visionary and orchestrator role) and communications (an activity that pervades information transfer throughout the value creation system). Transactional interactions include not just administrative roles and accounting tasks but also the tasks that are increasingly becoming automated by the application of software packages such as order management and payment. Transformational interactions are the “production” related tasks in which raw materials are extracted and processed into finished products. Transformational interactions require
the “integration and coordination” role that is facilitated by ITCs and other forms of communication. For example IKEA invests considerable resources to ensure that its suppliers produce a product that “fits” the flat pack concept they have built their value proposition around and probably more to ensure that their customers are able to perform the tasks necessary to complete the production assembly process. Communications interactions become “search and response” processes in this model. They occur throughout value production networks in sourcing, order management and customer service/relations management. Beardsley et al argue that interactions are an integral part of strategy, organisational structures and operational implementation. Skilfully used interactions can enhance strategic and operational responses to market opportunity. It can be argued that Dell did so when he saw an opportunity to create competitive advantage by challenging and changing the traditional approach to end-users.
The implications of interactions theory and application for value chain management
David Walters

Fig 1: Interactions occur between suppliers and customers, and between upstream and downstream partners. Their importance in the exchange process is their influence, not only within pricing agreements, but also the nature of relationships within the value creation system.
The implications of interactions theory and application for value chain management

David Walters

Fig 1 suggests there is a shared set of tasks that the overall integration and coordination process sponsors. Partnership collaboration is essential if customer expectations are to be met and satisfied. This is essential in both vertical and virtual structures; in vertical structures the emphasis is on internal collaboration in an attempt to create seamless processes, while external collaboration is essential as inter-organisational value systems do much the same thing. Cooperation and co-opetition are in a sense a form of continuum, cooperation occurs between partners (who may well be competitors in unrelated markets); however co-opetition is likely when direct competitors can mutually benefit from cooperation when each has something to gain and there is a very low risk of loss. For example, buying groups in the automotive and pharmaceutical industries share a purchasing activity for common products. It is quite common for ‘competitors’ to use each others production and distribution capabilities and capacities in situations where both can decrease costs without market loss.

Customer satisfaction requires an integrated and coordinated set of processes. Products and services are designed and manufactured (transformation interactions) based upon information that expresses customer expectations and upon knowledge of the availability of materials, components and manufacturing processes (communications interactions and transaction interactions), they are then exchanged through a series of transactions (transaction interactions). The “visionary or orchestrator” assumes a role of matching resources with opportunity(ies) and this role requires communication, collaboration and co-destiny (the organising ability to create a network or business coalition that shares the same objectives, strategies and values) of the interaction process. In the example of Li and Fung, cited earlier, their integration and coordination interactions result in the selection of the appropriate supplier of materials, the selection of a fabricating processor(s) having the capabilities to meet Li and Fung’s customers’ expectations for finish quality and production capacity(ies) to meet the quantity/time requirements. Li and Fung are an ideal example of interactions at work because their expertise is the ability to manage integration and coordination more than adequately, and therefore at lower cost, than their clients.

Interactions create costs. These are incurred between suppliers and customers, and between upstream and downstream partners. Their importance in the interaction process is their overall influence on the process, not only within pricing agreements, but also the nature of relationships within the value creation system. Sutton implies that understanding these relationships is essential in deciding upon the structure of the organisation, introducing qualitative considerations (such as control) into the decision process as well as the quantitative issues of cost and price. Fig 2 illustrates the impact of interactions costs. Costs are incurred either by the supplier or the consumer and as Fig 2 suggests how these costs are borne has a significant impact on the size of the market that is available. Consider transformation interactions as an example. Consumer durable products are accompanied by a service warranty (or guarantee) that commits the manufacturer to ensuring a period of no-cost service with the sale of the product. The alternatives available to the manufacturer are influenced by the transformation interaction costs. The manufacturer has a number of options. He could design the product to a cost/price target based upon an acceptable percentage of product failures that would be serviced directly by the manufacturer (or indirectly by a service partner); the issue for the manufacturer to decide is the impact that a specific level of product failures will have on customers, their probability of making repeat purchases, and the impact that the failures will have on the company’s reputation;. Another option is to design the product to ensure that unless it has been abused it will be sufficiently robust to ensure its serviceability
throughout the warranty period. One other aspect of service can be considered, its positive impact on marketing. Periodically we see the automotive companies use extended warranties as a sales incentive. The cost of extending a three year warranty to a five year period clearly has cost implications; it will also (they anticipate) increase sales. By identifying the interaction costs involved the company is able to evaluate the financial viability of such a proposal. Furthermore because component suppliers and vehicle distributors are involved in transaction process interactions the overall interactions costs can be optimised as all parties can benefit. The process requires integration and coordination led analysis of the options; included in the analysis is an estimate of who will bear what proportion of the overall interaction costs.
Fig 3 illustrates other examples. Using only transformation interaction costs (to simplify the example) we can explore the implications of interactions for strategy and structure decisions. Typically a range of manufacturing and service provision alternatives confronts any organisation. Prosumerism is a term used when consumers become involved in creating products and service support to meet their expectations precisely. For the supplier this can have both positive and negative interaction cost effects. The positive effects are that the costs of product and service ‘design’ are borne, at least in part, by the customer; the negative effect exists because the costs of producing and delivering the customer’s value expectations will remain the responsibility of the supplier. For example, travel companies encourage customer involvement in building their own itineraries, and a number of financial organisations offer a ‘tailor your own’ mortgage service. The suppliers can contain the interaction costs by working with a menu of product and service components and options offering these to potential customers and from which they build a customised version of the product that best meets their needs. The automotive industry as is Dell a classic example of this approach but is by no means unique as small furniture manufacturers offer a similar service. Indeed the current interest in mass customisation is based on this concept and the costs and benefits of the approach. The automotive industry has become expert in using shared product platforms as a basis for building a range of vehicles that seemingly are different but do in fact share many basic components, the practice is now inter-organisational with platforms being shared by competitors. See Toyota below.

IKEA uses co-productivity to contain its costs. IKEA works closely with suppliers and customers in the design of transformation interaction process. IKEA sells its products in ‘flat pack’ format and the co-productivity aspects of the interactions are undertaken by customers who accept virtually all of the in-store selling tasks, transportation to their homes, and the assembly of the product. In this example the interactions comprise transformation, communication, and exchange; the interactions costs are assessable as IKEA offers its customers a service facility two of the tasks i.e. home delivery and assembly. Co-opetition may be seen operating in a number of industries. It is not unusual for competitors to manufacture, sell and physically distribute each others products. The consolidation of what are considered non-core processes creates synergies through economies of scale in non-competitive areas. Co-opetition can be seen to be a means by which transformation, communication interactions costs may be contained, reducing suppliers’ costs and customer prices. Co-specialisation can be seen in high investment industries and those linked to consumer markets which are often subjected to excess capacity, e.g. consumer electrical products and computer hardware products. In these markets we see specialists appear such as Intel manufacturing processor equipment and Sony manufacturing monitors. Collaboration is apparent in industries with high RD&D investment requirements. Collaboration is quite common in the automotive industry where the major companies join forces to develop low energy use engines and automatic transmission components. The role of the “market visionary” (integrator and coordinator) is to explore how new business models may be developed using interaction costs (separately or in an aggregate, in a modified or completely new business model) to add value for all of the stakeholders.
Fig 3 suggests a process in which management evaluates the available alternatives for realising objectives. Sutton suggests this to be a decision process in which the firm decides upon the mix of (or balance between) virtual and vertical integration. His market coordination is a process in which the firm decides to outsource their use of specific resources (assets, processes and/or capabilities) while the internal aggregation of a number of resources solutions (in which a number of stages in the overall value creation, production and delivery process) is integrated internally. This is the essence of the outsourcing decision.

Teresko J (2006) recently discussed the sources of the productivity successes of Toyota. A number of aspects of their operation were identified. These are shown in Fig 4. Teresko makes the point that these features are the result of Toyota management working on an intra and inter-organisational base to improve the interactions involved with each productivity performance characteristic. Beardsley et al (op cit) also cite Toyota. They suggest: “production workers (at Toyota), for instance, collaborate continually with engineers and managers to find new ways of reducing costs and solving quality problems”. It is interesting to see that while Toyota may not explicitly practice the “management of interactions” they have developed a business model around the principles of interactions management.
Fig 4: An example of interactions at work at Toyota
2. Concluding Comments

Clearly an understanding of how interactions influence business decisions can have a significant impact on both strategy and operational decisions. The impact of information communications technology, together with increasing globalisation, has increased the significance of interactions on inter-organisational (and inter-continental) processes. Perhaps, more significantly, it is the fact that many more firms are beginning to understand the implications of the value chain/value network model that operates in many industries and that achieving a manageable share of market added value by identifying a specific position within the industry value chain and establishing economically viable relationships with partner organisations (of similar minds) is more successful than attempting to dominate the entire value chain. The continued expansion and application of ‘interactions theory’ is likely to be responsible for further developments in contemporary business models. It is also likely that ‘industry drivers’ such as technology and relationship management will have influence as businesses develop more trust and dependencies upon each other as the continued developments in interactions applications increase the speed and transparency of their relationships.

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