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Costing value chain relationships: A challenge for strategic cost management and value chain management

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ABSTRACT: The global business environment is changing rapidly. Among the many changes are a number of challenges; one important change being the increase in inter-organisational relationship management and the challenge being – how do we cost the transactions between these increasingly different value chain network structures. Strategic cost management (and analysis) has attempted to explore these issues. Shank J and V Govindarajan (1993) probably offered the most visible approach of the 1990s using Porter's value chain and contributions from Scherer (1980) and Riley (1987) Chandler (1962). Shim and Siegal (2000) identified the value chain as being important from two perspectives; strategy and administration *and* management accounting. Macri, Silvi and Zanoni (2000) began to tackle the issues of inter-organisational relationships. This paper discusses the characteristics of the "new economy" business model and proposes that the 'structural costs' of Scherer and the 'executional' costs of Riley be reviewed in the context of the value chain network structures that are increasing in number and application. To do this we discuss the interpretations of value from a purchaser and a corporate perspective, introduce the notion of value builders and value drivers as planning and costing concepts and revisit activity based management on the way to making proposals for a value chain network costing approach.

KEY WORDS: ***Business models, "value", value builders and value drivers, value chain networks, production economics, and, attribute based management and costing (ABMC)***

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1. Introduction: Strategic and market structure changes – the virtual business model

Changing stakeholder expectations have brought about changing patterns of corporate responses. In Europe and the Asia/Pacific regions the growing power of the emerging or newly developed economies has evoked positive responses. The Manu*future*-European Technology Platform was launched in December 2004 from which emanated a recommendation for the preparation of a more detailed Strategic Research Agenda, identifying research priorities to be implemented. In the subsequent "Agenda" a number of concerns were expressed. The report identifies two major threats to European manufacturing. In the high value/low volume sectors the threat is emerging from developed countries; in the high volume/low value sectors the threat is from the industrialised Asian countries. However it is arguable that countries such as India and China now compete in both sectors.

Myers (2006) suggests that manufacturing responses are already operating in the context of value chains that compete against each other; suggesting further that the extended businesses of the future will be virtual enterprises in which business units continuously reconfigure their operations, collaborative partnerships, and supply chain relationships, forming and reforming networks on a project by project basis, relying upon networked information systems and virtual engineering to ensure *concurrent* design, production, marketing, service and sales support. They will operate as if their firms are members of a single and flexible enterprise.

Manu*future* considered the changing characteristics of the marketplace suggesting the market increasingly demands products that are customised, yet available with short delivery times. The business focus must shift from designing and selling *physical* products to supplying a *system* of product-services that meet end-user demands while they also reduce total life-cycle costs and environmental impact. A fundamental concept of the Manu*future* vision is one of "innovating production" which embraces new business models, new modes of "manufacturing engineering" and ability to profit from ground breaking manufacturing sciences and technologies. The report suggests a dominant business model that will emerge:

> *"The "virtual factory" of the future will manufacture in adaptable networks linking medium and large-sized OEMs with value chain partners and suppliers of factory equipment/services selected according to needs at a given time. Its composition will not be limited by the presumption of physical co-location, nor by a need to maintain long-term relationships"*
>
> *Executive Summary, Manufuture-EU, 2006*

1.1 New Economy – new business models

The "New Economy" business model has embraced the developments of knowledge management, technology management, process management, and relationship management and espoused the notion of cooperation. Fig 1 identifies the typical characteristics of the virtual organisation, and as a consequence its advocates are acutely aware that solutions to customer satisfaction are found within the inter-organisational structure of a multi- faceted value chain network. This approach to strategy and

structure and its environment of cooperation based upon inter-dependency and transparency shifts the perspectives of costs and cost structures.

A working example of the concept can be seen in the Hong Kong based Li and Fung value chain network coordinator that works with some 7500 partner organizations in 37 countries manufacturing a range of apparel products from high quality woolen sweaters to synthetic slacks: Li and Fung sit at the hub of a network of specialist enterprises that mobilize resources in different combinations depending upon the rapidly changing demand and coordinate a response. Li and Fung operate a number of *flexible value chain networks* that reflect the needs of their 'client organisations. They are *global operations;* they source from a range of locations, usually based upon a series of criteria such as input costs, local taxation policies and labour legislation and, increasingly, the availability of a potential domestic market for their products.

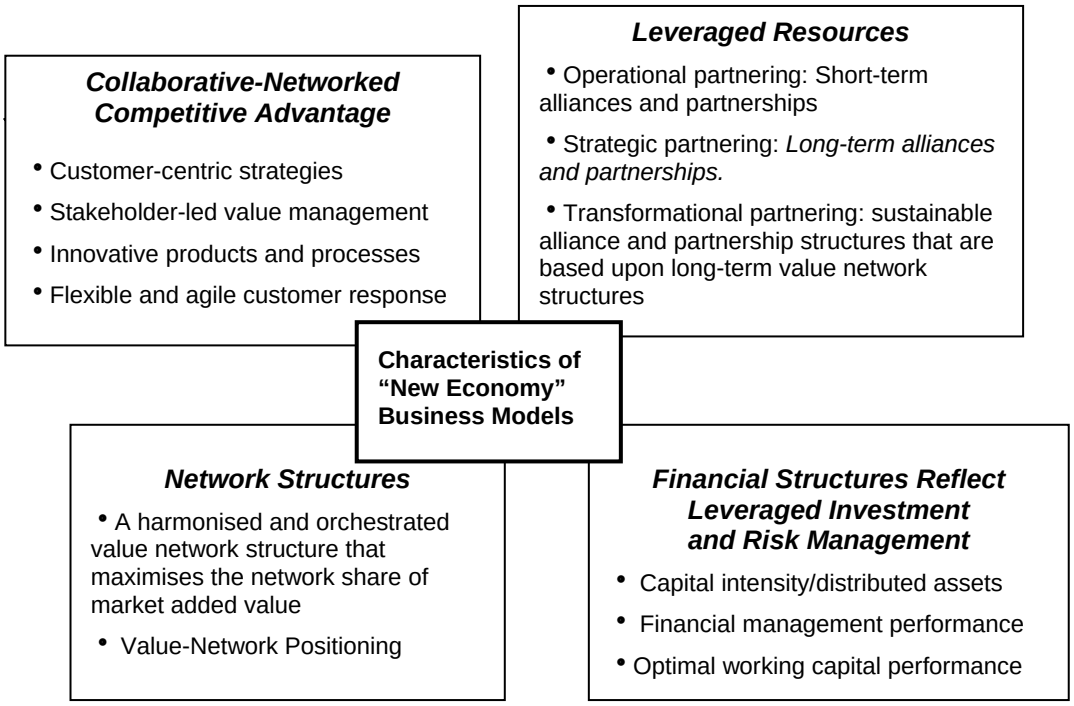

Fig 1: The "new economy" business model is an integrated network structure of relevant resources

A number of organisations have developed interesting and effective business models around these concepts. It is well known that Dell has revolutionised computer distribution by using the internet as a means of direct communication with customers and suppliers thereby reducing overall lead times. It is interesting to note that Dell is reported to be selling its assembly facilities and moving towards contract manufacturing, a system used by its competitors. Scheck (2008) suggest this move together with the introduction of retailers into the Dell sales model will have a significant impact on Dell's cost structures. IKEA create value by working with suppliers to manufacture their products such that the production process (creating form utility/value) and distribution process (time, place and convenience utilities) can be completed by the purchaser. In both these examples the organisations manage their value chain networks based upon effective and efficient management of logistics flows

and relationships. Boeing is using a quite new approach for the 787. Boeing is retaining much of the expertise of all levels of production within the organization; however the Company is collaborating with its partners at several stages of design and production; (Harrigan: 2006). Boeing has reduced the number of its suppliers and selected some key partners as tier one suppliers to manufacture more complex products. In Boeing's supply chain, the first-tier suppliers are considered as an extension of Boeing's internal processes; Boeing's future business model would appear to be embracing the concept of leveraging partners' assets, processes and capabilities.

1.2 Some considerations for strategic and operational cost management

Macri, Silvi and Zanoni (2000) suggested that a broad perspective is required when considering inter-organisational transactions, arguing that: "The overall performance of a firm thus depends not only on its internal activities and their efficiency, but also on the way it manages its relationships with its customers and suppliers." They further suggest that this puts more emphasis on transactions costs because in the process of 'vertical disintegration' of traditional business model structures transactions costs represent a sizeable and growing amount of overall costs that can only be understood by examining the firm as a member of a value creating network.

Sawhney and Parikh 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 (v*alue 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". This is a similar view to that proposed by Hagel and Singer op cit.

They also suggest *value in modularity* as a 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".

While the concept of networked structures has been readily accepted the complications of cost management are a problem. Coad and Cullen (2006) have recently published a literature based review of the complexity of inter-organisational cost management. They cite Amigoni et al (2003), in arriving at the view that:

> *"… IOCM (inter-organisational cost management) may or may not involve methods recognisable as management accounting, and may or may not involve management accountants. But, whilst its practices are varied, its central concern is with cooperative efforts by members of separate organisational units to modify cost structures and create value for its participants. In summary, the role of information sharing has been presented as a way of understanding inter-organisational reality, as enabling partner organisations to learn skills and identify cost reduction and value creating opportunities, as the glue that binds collaborating organisations together, as a means of reducing uncertainty, and as a basis for sustaining and renewing inter-organisational relationships "*

It would appear that the concerns of the authors cited, and indeed others, there is a growing (and important) requirement to revisit the topic of strategic managing accounting and do so from the basis of an inter-firm organisational structure. However any discussion on costs should be preceded by their causes: the creation of customer satisfaction.

2. What is value?

Value is a term frequently used and for which numerous interpretations exist. Value is not a new concept. It will be recalled that Adam Smith introduced the notion of "value in use" in 1776 when he argued two aspects of value. One was the view that value was determined by labour costs (subsequently modified to 'production costs'). But Smith also argued that “value in use” from a user's point of view is important. It is only when it is used that the full costs and benefits of a product-service may be identified.

In a business context, value implies stakeholder satisfaction, which is a broader consideration than simply customer satisfaction. Stakeholder satisfaction ensures that not only are customers' expectations met, but also those of employees, suppliers, shareholders, and the investment market influencers, the community and government. It follows that stakeholder satisfaction presents the business with a broader range of decisions and, typically, a larger number of ways in which satisfaction can be delivered.

Since the marketing concept emerged in the 1980’s supposedly replacing production driven management philosophies, the customer has been seen as at the core of business processes and customer satisfaction the key objective. The creation of value has then taken on strong customer centric perspectives.

2.1 Customer value

Slywotzky and Morrison (1997) introduced the term “customer-centric thinking”. In customer-centric-thinking the customer becomes the focus of an organisations activities and everything follows. This approach changes the traditional chain such that it takes on a customer-driven perspective. They suggested:

> *“The value of any product is the result of its ability to meet a customer’s priorities. Customer priorities are simply the things that are so important to customers that they will pay a premium for them or, when they can’t get them, they will switch supplier.”*

The authors also commented upon two more recent perspectives of value. They identify a number of contributions that make calls for organisations to become more market and customer-focused:

Creating and delivering superior customer value. The essential thrust of this approach is for organisations to create and or strengthen the linkages between customer value (expectations and delivered value) and organisational financial performance and competitive advantage. The argument made is that a company’s success is dependent upon the extent to which it delivers relevant value to its customers. . Slywotzky and Morrison in their “customer-centric” approach to the value chain develop a commercial perspective to this.

The customer's value to the firm focuses on the value outcome to the organisation that can be derived from providing competitively superior customer value. Hence the research orientation is based upon the cost- benefit relationship of customer retention. Both quantitative and qualitative approaches are reported. Quantitative approaches are essentially based upon net present value measures of future profit flows over an estimated customer lifetime period. Qualitative models consider the relationships between marketing programmes and others consider the linkages between customer responses to service and quality aspects of the value offer.

It follows that it is management's responsibility to identify what is valued by the end-user and by its partners and to create, monitor and modify organisational systems that add value to the product-service. It is an approach to strategic management that can be used to ensure that organisations respond to customer expectations, doing so with flexible organisational structures. Value creation is *strategic* (because it entails both organisational and behavioural change), and it is *continuous* and *operational* (because the challenge of delivering customer satisfaction in a dynamic market place requires unrelenting attention to achieving higher and higher levels of performance. It follows that value is determined by the utility combination of benefits delivered to the customer but there is a cost to the customer of acquiring such benefits: *Value then from the customers' perspective is a preferred combination of benefits compared with acquisition costs*. This has been explored by a number of authors. Anderson and Narus (1998) have argued that very few suppliers in business markets are able to answer questions concerning what value actually is, how it may be measured and what the suppliers' products (or services) are actually worth to customers. They comment:

> *"Customers - especially those whose costs are driven by what they purchase - increasingly look to purchasing as a way to increase profits and therefore pressure suppliers to reduce prices. To persuade customers to focus on total costs rather than simply on acquisition price, a supplier must have an accurate understanding of what it is customers' value, and would value".*

The authors suggest that the successful suppliers in business markets are successful because they have developed *customer value models,* which are data-driven representations of the worth, in monetary terms, of what the supplier is doing, or could do, for its customers. Customer value models are based on assessments of the costs and benefits of a given market offering in a particular customer application. *Value* is defined by Anderson and Narus (1998):

> *"Value in business markets is the worth in monetary terms of the technical, economic, service, and social benefits a customer company receives in exchange for the price it pays for a market offering".*

Value is expressed in monetary terms. Benefits are net-benefits; any costs incurred by the customer in obtaining the desired benefits, except for the purchase price are included. Value is what the customer gets in exchange for the price it pays. Anderson and Narus add an important perspective concerning a market offer. A market offer has two "… elemental characteristics: its value and its price. Thus raising or lowering the price of a market offering does not change the value such an offering provides to a customer". And, finally, value takes place within a competitive environment; even if

no competitive alternative exist the customer always has the option of 'making' the product rather than 'buying' it.

The notion of a customer value model is not new Heskett *et al.* (1997) proposed a *customer value equation* which in addition to customer benefits and acquisition costs also includes process quality and price. The model is described by:

Value	=	Results produced *(Value-in-Use)* for the customer	+	Process quality
		less		
		Price to the customer	+	Costs of acquiring the product

In their model *value produced for the customer* is based upon results not products or services that produce results – the actual value benefits delivered.

Process quality had been described by Parasuraman (1985) *et al.* as:

- Dependability (did value provider do what was promised?)
- Responsiveness (was value provided in a "timely" manner?)
  Authority (did provider elicit a feeling of confidence in the purchaser during the delivery process?)
- Empathy (was a customer view taken?)
- Tangible evidence (was evidence left that the value was delivered?)

Price, observes Heskett and his co-authors, is often used by both the customer and the supplier but clearly acquisition costs may be high, and possibly exceed price. The authors suggest that suppliers who can lower customer acquisition costs may be able to charge premium prices. This relationship has been used in value-based pricing where the life cycle costs of products are considered as an aspect of the total purchase (i.e. acquisition costs) and these with price are the value actually delivered.

Another important element is an understanding of the purchasers' use of the product – the value realised and MacMillan and McGrath (1997) suggested that competitive advantage may be realised if the *consumption chain* is identified. The authors claim that:

> *" a company has the opportunity to differentiate itself at every point where it comes into contact with its customers -- from the moment customers realise they need a product or service to the time when they no longer want it and decide to dispose of it".*

MacMillan and McGrath's consumption chain has an interesting and worthwhile application for strategic value chain decisions, particularly their implementation through the value chain. The technique identified; "all the steps through which customers pass from the time they first become aware of your product to the time when they finally have to dispose of it or discontinue using it" describes the customer life cycle typically used in life cycle costing. The process considers a number of questions: awareness, availability, choice, purchasing procedures followed, product delivery and installation, financing payment, storage, mobility, end-user uses, applications service, returns or exchanges, maintenance and disposal issues. Each of these activities creates cost for

customers and, as such, need to be considered when the customer is making a purchase decision. Customer acquisition and life cycle costs must be deducted from the benefits delivered by the product or service to derive a measure of total delivered value.

The information provided by consumption chain mapping can be directly applied to value chain decisions. Two examples will illustrate the benefit of such an analysis. Ordering procedures are being revolutionised with internet technology and, in the future, these may be automated as wireless technology is applied to both business to business and business to consumer markets, making reordering an automatic response to levels of use and inventory holding operating in response to predetermined 'rules'. The American Hospital Supply application of customer installations of computers to inventory management has been widely adopted over the years. The recent wireless technology developments are forecast to replace this technology with yet even more intelligent replenishment systems. Many value chain intermediaries are currently developing intelligent technology (using "Smart" technology); for example, the replenishment of soft drink vending machines and the expectation that home delivery activities of the large food retailers are considering 'technology' that will link consumers" refrigerators with home delivery services.

In other applications remote diagnostics are used by *Tandem Computers* and *Caterpillar Construction Equipment* for identifying product component malfunctioning. This advance notice of failure allows early dispatch of replacement parts (thereby reducing field inventories and the alerting of technical staff (increased utilisation of human resources) both of which reduce costs for customers and the value chain. Clearly these developments do not occur by chance; rather they are influenced by researching customer expectations and developing a series *value drivers* that can be evaluated for their cost-effectiveness and if found to be positive form the basis of a value proposition that identifies the product-service offer for the customer *and* the expectations of suppliers.

2.2 Corporate value

While it can be argued that organisations are also customers they are accountable to shareholders and other investors. A number of academics have commented on the role of value creation and delivery in strategic management. For example Porter (1996) suggested:

> *"A company can outperform rivals only if it can establish a difference that it can preserve. It must deliver greater value to customers or create comparable value at lower cost or do both. The arithmetic of superior profitability then follows: delivering greater value allows a company to charge higher average unit prices; greater efficiency results in lower average costs"*

It is probable that a firm's shareholders will have value objectives other than purely financial ones. The shareholders or owners for example may well have legitimate non-financial qualitative objectives. The rise of "ethical" and "green" investment funds is recent and clear manifestations of this. It is also reflected in shareholder support of firms for regional or nationalistic reasons or other social criteria. It is suggested that these are likely, though not always, to be secondary value objectives. Often these play an important role in the selection of partners. The exploitation of third world workers has lead a large number of organisations to set "conformity" criteria for their partners. These determine rates of pay and working conditions that must be adhered to if

partnership arrangements are to be agreed. Shareholder Value Management then is the identification and ranking of shareholder value objectives and the management of value delivery processes and activities that maximise those objectives. More recently Phelps (2004) proposed the notion of value growth as a product of EVA x Market Share; this is a short-term perspective. We suggest long-term value growth is measured by an NPV based metric such as CFROI.

3. Value drivers and value builders

Understanding the importance of "value" to customers and other stakeholders helps strengthen relationships between, and among, customers, suppliers, shareholders and investors and an organisation as these "value based" relationships are the link an organisation needs if it is to develop a strong competitive position. To do so it clearly needs to identify the *value drivers* and *value builders* that are important to the end-user customer to structure a value delivery system that reflects these *and* the objectives of the other value chain participants. Using Slywotzky and Morrison's "customer-centric" approach to the value network/value chain the: "things that are so important to customers" are the customers *value drivers* and the important value drivers are those adding *significant* value to customers. Within the context of the value chain, value drivers assume a two-fold significance. One is clearly that of adding value for customers; the other is the ability to differentiate the value offer such that it creates competitive advantage. In the increasingly *virtual world* in which business is conducted four questions emerge:

- What is the combination of value drivers required by the target customer group?
- What is the customer groups' order of priority?
- What are the implications for differentiation decisions? Are there opportunities for long-term competitive advantage?
- What are the implications for cost structures?
- Are there opportunities for trade-offs to occur between value chain partners that may result in *increased* customer value (and stakeholder value) or *decreases* in the value system costs or the costs of the target customer group?

There are a number of considerations involved. Clearly the first of these is to identify the value drivers and their *relative importance* to the target customer group. If there are any major discrepancies (difficulties in reaching consensus on value driver rank ordering) it would suggest there is more than one target group involved in the analysis. Given this is not so we can continue to identify competitive offers and structures (what the offer comprises in terms of value content, which are the major competitors and the value delivery structure(s)).

Phelps op cit approaches value from a corporate performance perspective. He argues that it is insufficient simply to measure outputs to know if we are creating value; the (value) drivers of present and future value must also be measured. Measuring output indicates success (or perhaps lack of it) whereas understanding (and measuring) what it is that drives value provides management with an indication of the success of resource allocation. Phelps also argues that it is important to distinguish between factors that drive current value (suggesting cost reduction as an example) and those responsible for creating future value (such as brand development and research, design and

development). He makes the point that overlap may occur; value drivers may well contribute to building both current and future value.

Phelps considers value drivers and builders from the perspective of the organisation. Identifying Value Drivers begins by asking "What drives value in your business? Who are the competitors? What are the characteristics of the market?" He suggests there are no generic answers or prescriptions; one company may derive the greatest value from improving brand image while another may do so by improving its recruitment policies.

Identifying Value Builders "gives the ability to take advantage of risks and opportunities as they arise". The author suggests organisations take a strategic perspective by identifying potential market developments and then addressing the scenarios with 'positioning decisions' (i.e., develop ownership or access to processes and capabilities) that will enable the organisation to move rapidly into an opportunity. Phelps suggestions are in fact, equally applicable to the value producer and the value consumer in a B_2B context.

The ***value drivers*** in any business depend on the specific setting, competition and the market structure Their time perspective is clearly short-term given they are factors that "drive present value" and as levers of present value. Focus on adjustments to the value drivers results in short-term improvements in performance. Value drivers include strategic adjustments and operational implementation characteristics such as:

- Integrated and networked procurement and production operations
- Synchronised cash and operating cycles
- Access to relevant process and capabilities management
- Agile/flexible production facilities and networks
- Proactive and reactive service response networks
- Market entry and management networks
- Share of market value

Value driver efficiency may be measured by; EVA (economic value added). See Fig: 2**.**

Value builders help build *long-term* future value. They give an organisation the ability to plan to take advantage of opportunities as they arise and help avoid threats and risks. For this to be effective *value builders* are built on *positional characteristics* (strategy, investment levels, and partnerships), the ability to *capture value* in a dynamic market environment, *building and strengthening relationships* externally and internally, and *expanding (or at least maintaining) shareholder value.* Among the *capability characteristics* are (quality of management, innovative expertise, flexible processes).

The ability to capture value in a dynamic market environment is "value led": management should plan around;

- Customer aligned solutions
- Innovative product-service solutions
- Innovative processes
- Adaptive organisational structure
- Network modularity
- Network orchestration
- Develop value chain loyalty relationships that encourage increased comprehensive customer cooperation & commitment

Value builders may be measured by the 'value' of future growth (the NPV of anticipated free cash flow), share of market added value, customer perceptions and sales response, market reputation. See Fig: 3.

Phelps contends there is a structure of linkages between value drivers and value builders and between present value being generated and future value being built. It would seem essential to make clear the fact that both customers and suppliers have value drivers and cost drivers. There could be problems if these are incompatible or if they were attempting to operate in different markets/market segments. Furthermore the network structure of virtual organisations often opens numerous organisational options – value delivery alternatives - that become available.

The expanding application of the virtual business model suggests a need for a review of the specific coverage and application of value and cost drivers. Figures two and three illustrate how they may be developed. Their structure reflects the basic difference between the vertically integrated and the virtual business model, the vertically integrated model was centrally controlled with no (or very few) external linkages. By contrast the virtual model comprises a structure of independent and inter-related business units each contributing a specialist input. Figure two is a planning/strategic model in which the *value builders* reflect questions concerning opportunities and risks for the future: What will keep our customers' businesses successful in the future? What would a competitive response require? Will a change in their positioning in the value network be required? Will an increase in investment be necessary? Should new partnerships be contemplated? Will management changes be required? Given that a *supplier's value builders* and *performance metrics* may be influenced by a response to future relationships the structure and content of these should also be examined.

Figs 2 & 3 suggest that value drivers and builders influence the *strategic and structural and operational cost drivers*; and changes may require a review of their impact on costs (and therefore their relative importance) and may well result in a complete revision of the cost drivers. Performance metrics reflect the short and long-term considerations. The importance of cash flow is recognised as is the qualitative rank ordered composite measure of *strategic control* being acknowledged as: an Industry/Market leading competitor, a network coordinator, having a strong global presence, being a dominant customer, recognised brand leadership characteristics, having significant product-service-market-differentiation, having a commodity product-service with market cost advantage, or with cost parity, or having no cost advantage whatsoever. (Slywotzky and Morrison: 1997). *Risk* is measured as the returns spread.

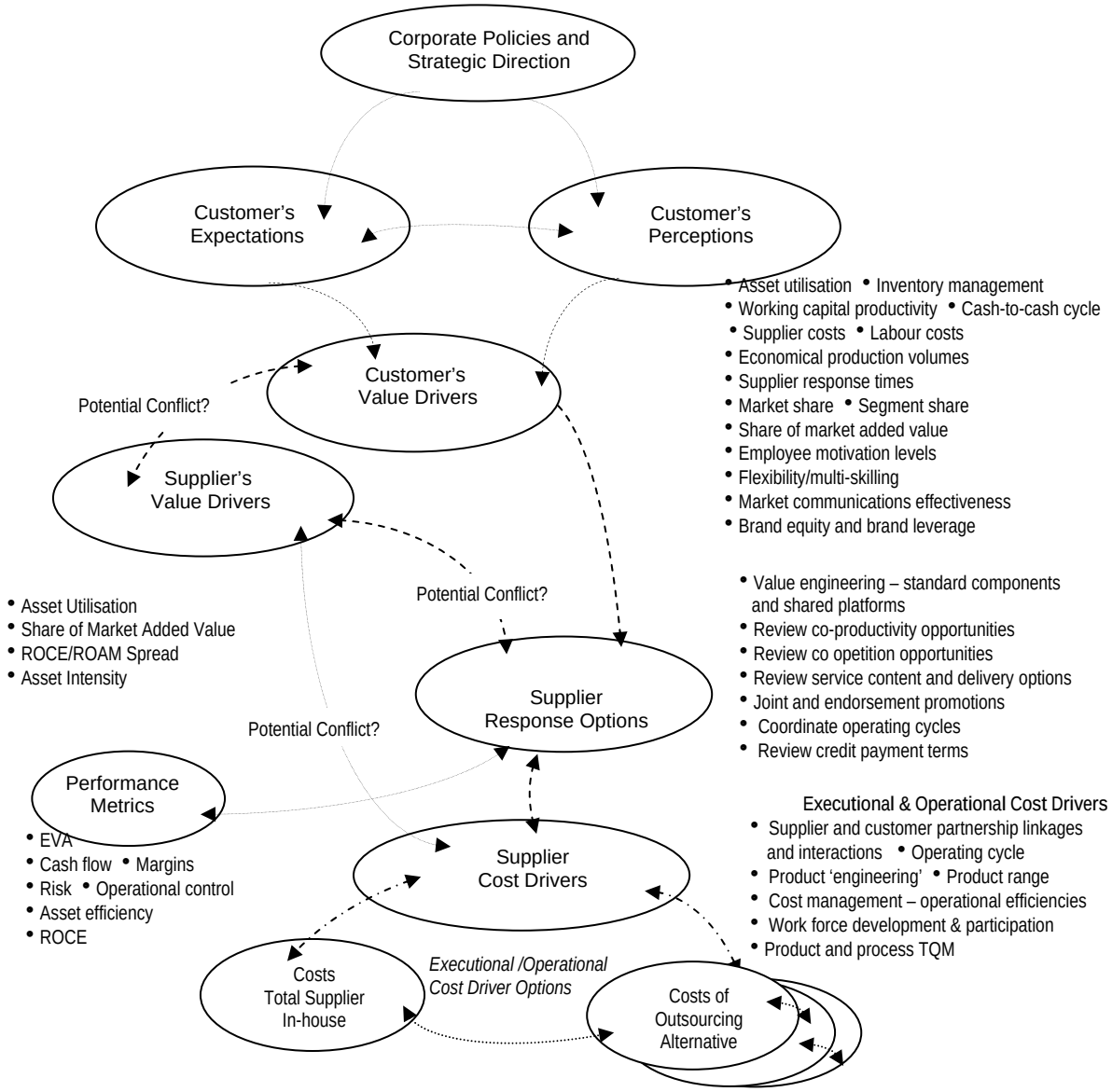

Fig2: Operational aspects of value drivers and operational cost drivers

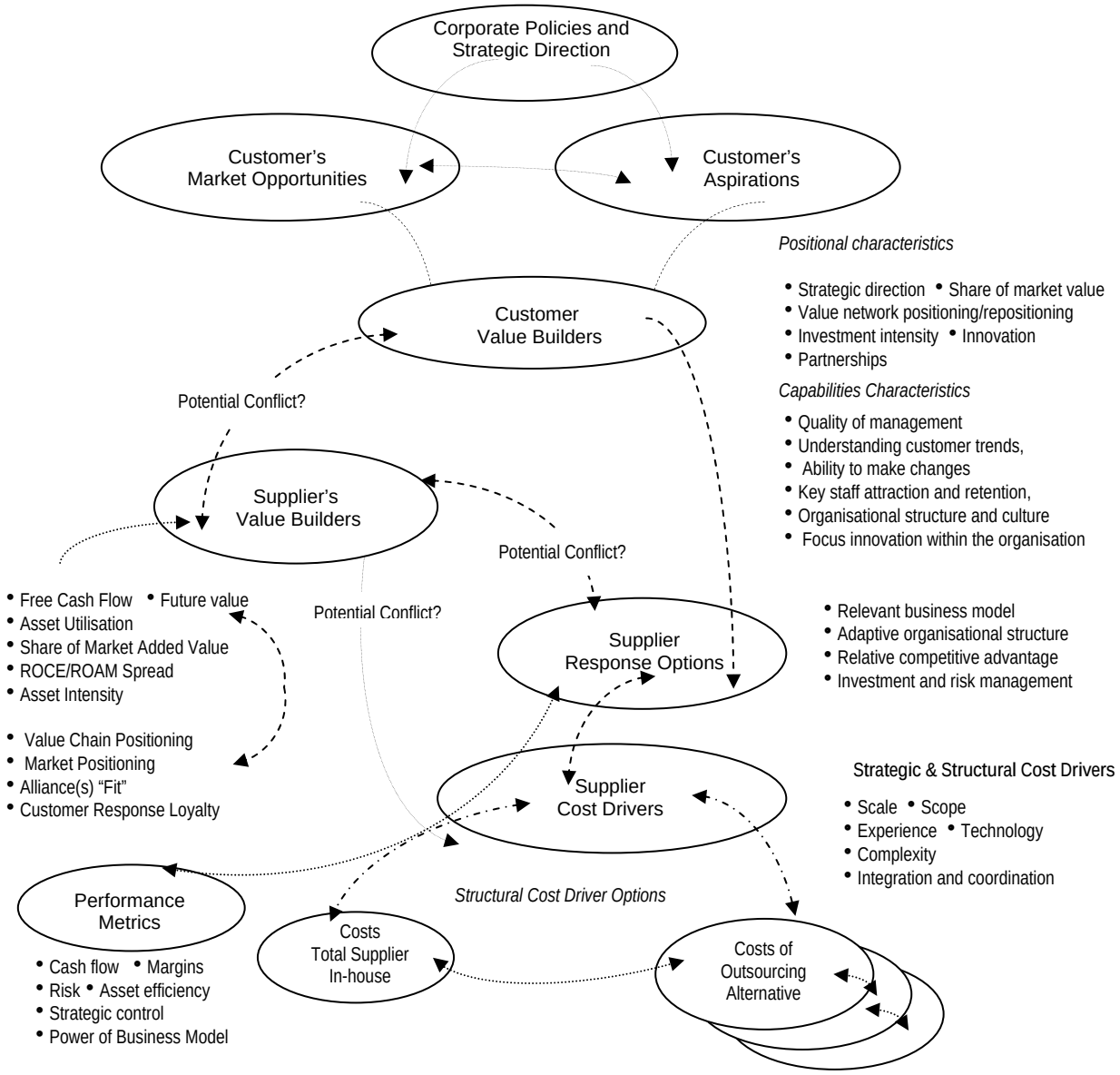

Fig 3: Strategic aspects of value builders and strategic and structural cost drivers

An operational model is suggested in Fig 4. Not surprisingly the *value drivers* are essentially short-term as are the *supplier response options* these being subject to evaluation against the *supplier's value drivers. Supplier cost drivers* are based upon the *executional and operational cost drivers* (in turn reflecting topics identified by Riley (1987) and modified to accommodate recent developments in virtual business models). Figure four illustrates the fundamental structure and relationships that exist in value networks. Li and Fung (cited above) are a typical example of the model operating a production network across 37 international boundaries with 7500 partners.

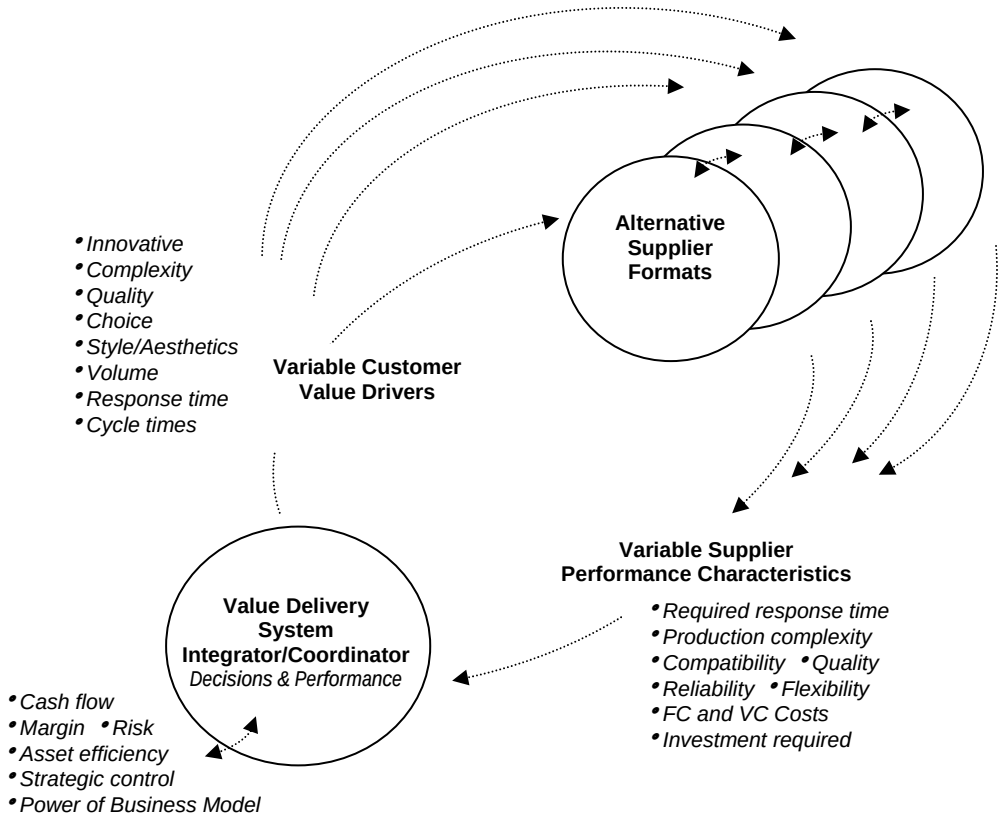

Fig 4: Network management decisions

The precise network they use to meet each client order will depend very much on the client/customer expectations; furthermore if the product proves to be very successful and the client value drivers are changed to reflect the need for very rapid replenishment the network will be reconfigured to meet this "driver". Typically the value network structure will change. The management implications of value driver changes for the integrator/coordinator decisions require an understanding of costs and knowledge of the relationships between the value drivers and cost drivers of the new network structure.

Value builders are future oriented and there is a need to take a prospective view of "forces" that will have an impact on the development of value chain networks and the impact these will have on the 'customer facing processes' that are likely to be important. While there is a large amount of "guesstimate" in all this an extrapolation of the "forces" by an experienced management team is likely to get very close to what the situation may be. This can monitored as information on relevant developments becomes known. It is of little value to take this discussion further here other than to say that as an exercise in long-term planning exploring customer value builders will identify the key developments in knowledge management, technology management and process management that will enhance relationship building – critical to the management of the organisation/customer interface. . Recently Capgemini (2008) published *The Future Value Chain* and proposed a prospective view of "forces" that will have an impact on the development of value chain networks. These include: customer-centricity, demographic and socio-economics change, organisational collaborative and culture

change, increasing applications of consumer "shopping" technology, manufacturer/retailer "integrated" logistics, an increased diversity of marketing channels, distributed manufacturing (sequential processes that may be inter-organisational, increasing regulatory controls, and sustainability. Clearly these are important issues but space prevents detailed discussion on their impact on value chain network costing.

4. Value drivers, value builders and cost drivers

Creating value incurs cost and for many organisations there is a decision to be made concerning the precise relationship between the *value delivered* to the customer, the value generated for the organisation and its partner stakeholders, and the *cost of creating, producing, communicating, delivering and servicing the value.* It follows that the relationship between value drivers and cost drivers is important. Scott (1998) commented:

> *"Since time immemorial there have been two sorts of activities in companies; those that drive value creation and those that drive unproductive cost ..."*

Scott suggested that the harsh reality of globalisation and the accompanying increase in competition has forced most companies into making efficiency gains. However, the persistence of competitive pressures makes the speed of efficiency gains in production and the speed of market responsiveness necessary to compete are increasing. And:

> *"Cost structures are shifting dramatically year by year as new producers come on line and new technologies propel shifts in business processes. Everything is moving faster and will continue to accelerate. Today's competitive "paradigms" will be tomorrow's old hat".*

A number of companies use the "value in use" concept to arrive at pricing decisions. The notion that an end-user should consider all aspects of a product-service purchase, not simply the price to be paid, enables both vendors and purchasers to identify all of the elements of the procurement - installation - operation - maintenance - replacement continuum. The process encourages both parties (customers and suppliers) to look for trade-off situations such as high customer acquisition costs with low operating and maintenance costs, together with relevant supplier services packages. This approach introduces the possibility of integrated activities in which the supplier-customer relationship expands from a one-to-one relationship into a fragmented, but economically viable, value delivery system.

Suppliers of industrial products who consider the total cost of ownership incurred by customers (as value drivers) are able to price a product competitively if the customer post-purchase costs of a product are considered during the design and development process. By simplifying equipment installation and operations and by designing simple maintenance procedures the total cost of ownership becomes lower. Within the context of value chain/delivery system partnership structures it is not unusual to find some of the post-purchase activities, such as routine servicing, undertaken by specialist organisations; for example road-side services offered by automobile manufacturers but implemented and managed by specialists.

4.1 A review of the economics of production as strategic and structural cost drivers

Shank and Govindarajan op cit argued that; "cost is caused, or driven, by many factors that are inter related in complex ways"; they argued that output volume influenced the cause of costs and that 'thinking' was dominated by the simple models of basic microeconomics whereas strategic cost management was based, more in the thinking of the industrial economics of organisation; Scherer op cit being prominent in this respect. They made an interesting comment related to the Boston Consulting Group's "experience effect", (a popular input into strategic management programmes), suggesting that; "rather than seeing experience as one of many cost drivers, or perhaps a combination of effects, the accounting literature sees it more narrowly as an explanation of how the relationship between cost and output volume changes over time as cumulative output increases for one particular product or process" And it remains that way today.

Shank and Govindarajan contend that *structural cost drivers* are, perhaps, a better approach citing Riley op cit who proposed five strategic choices by the firm that reflects its underlying economic structure that drives its cost position. These are; scale, scope, experience, technology, and complexity. They argue that each structural driver involves choices that underlie product costs. Riley's second category of cost drivers, *executional drivers*, are operational and determine its ability to implement its product-service-market strategy. These comprise; work force involvement, total quality management, capacity utilisation, plant layout efficiency, product configuration, and, exploiting linkages with suppliers and/or customers. The concepts of *structural* (or perhaps strategic *and* structural) costs and *executional* (or perhaps operational) costs continue to be a useful approach to both strategic and operational decision making, however their context, in a customer-led virtual business model, needs to be considered. We would argue that identifying strategic and structural cost drivers is helpful but does not fully address the complex issues of value chain network cost relationships. It is suggested that production economics offers a more useful approach in a business environment becoming strongly influenced by inter-organisational relationships.

Before we discuss a current perspective of strategic and structural cost drivers it is essential to review changes that have occurred in the economics of production; a number of significant developments have occurred with the increasing popularity of value chain network structures. Essentially these share the basic notion of decreasing, where at all possible, business model *capital intensity.* Changing *attitudes* towards relationship management, the impact of technology management (developments in ICT, information communications technology, and the ability, and willingness, to pursue inter- organisational technology integration, developments in process management (particularly the aspects of inter-organisational and inter-continental coordination and control) have resulted in surprising *changes in behaviour.* The world of transaction economics (as described by Coase (1937)) has been joined by a discipline of *interactions management* (see Butler et al: 2004) in which the arguments of organisational boundaries and inter-firm cost transaction management have needed revision as rapid developments in ICT have resulted in dramatic reductions in interaction costs, an enrichment of data delivery, massive reductions in transmission times and, huge increases in accessibility. The hitherto tedious and time consuming activities within interaction & transaction processes have been replaced by cost efficient and rapid systems for; developing product-service specifications, searching/sourcing products and services, evaluating alternatives, negotiating, coordinating performance

commitments and monitoring performance, for supplier and customer relationship management. Interaction and transaction costs are reduced by collaborative partnerships such as the buying exchanges established in the automotive and pharmaceutical industries.

Examples of *the economics of integration* are given by the principle of computer-integrated manufacturing links ,"islands of automation", combined *into a single, integrated* system that is fast, responsive, flexible and relatively low cost. Noori (1990) defines this as *economies of integration* resulting in a situation in which *unit costs decrease as output increases because the volume of the entire operation is increased.* Furthermore, the integration of new manufacturing technology and information technology brings the customer into the design process.

The *economies of coordination* comprises the searching, coordinating and monitoring undertaken by organisations for effective and efficient means to exchange products, services and ideas. They occur on an intra-organisational basis as well as an inter-organisational basis. ICT developments continue to enhance the interactive capacity of industries and individual consumers such that it will create new ways to configure businesses, organisational structures and to service customers. Accordingly it will have a major impact on the strategy, structure and competitive dynamics of entire industries.

The economics of relationships management or *adding value* (increasing quality, reducing cost, increasing "convenience, etc), working with suppliers, intermediaries and end-user customers to identify cost-efficient value delivery alternatives using: co-productivity, co-opetition, and co-creativity. *Co-productivity* is a more operational role by suppliers, distributors and customers in which they undertake tasks that hitherto were the role of other channel/chain participants. *Co-opetition* describes the situation in which competitors work together to meet individual objectives using mutual facilities. *Co-creativity* involves partnerships with customers at the concept stage of product-service development.

The *economics of differentiation* is an aspect of adding customer value by offering "product-service exclusivity" through "customisation "and "mass customisation" through *specialization, process and capability collaboration* and the *economies of choice.* Products are "individualised by mass customisation" by design a range of products using *shared product platforms* – components that are not of particular interest to customers.- offer manufacturing economies of scale; whereas the characteristics that have "differentiation appeal" may not do so. However for specialist producers, with business models based upon achieving economies of scale at low production volumes, there will be opportunity available because production has limited focus and is relatively small volume and it is likely that they will be supplying more than one customer e g, competitors in the automotive industry. The economics of differentiation reduces the burden of fixed costs (and financial risk) by using outsourced supply for shared product platforms, common practice in the automotive industry.

4.2 An alternative perspective of executional (operational) cost drivers

Riley's executional cost drivers require some thought as to their relevance in the emerging virtual network business models. Figure one (earlier) discussed the network based structure of these models and Fig 5 proposes a range of networked based operational cost drivers.

Both strategic/structural and operational cost drivers need to be developed so that they may be used as input into an activity based management approach towards identifying *and* managing optimal value chain networks. Both identify the critical decision making areas of network management at strategic and operational levels, and both are expressed in qualitative and quantitative terms.

Similarly strategic/structural drivers should be designed so that management identify the range of long-term options available and consider *strategic partnerships* (to achieve long-term strategic competitive advantage and growth by *deploying core* expertise/resources of own and partner organisations in adjacent industries and markets) and *transformational partnerships and alliances* ((including merger and acquisition activities) to achieve strategic inter-organisational response capabilities) structural alternatives.

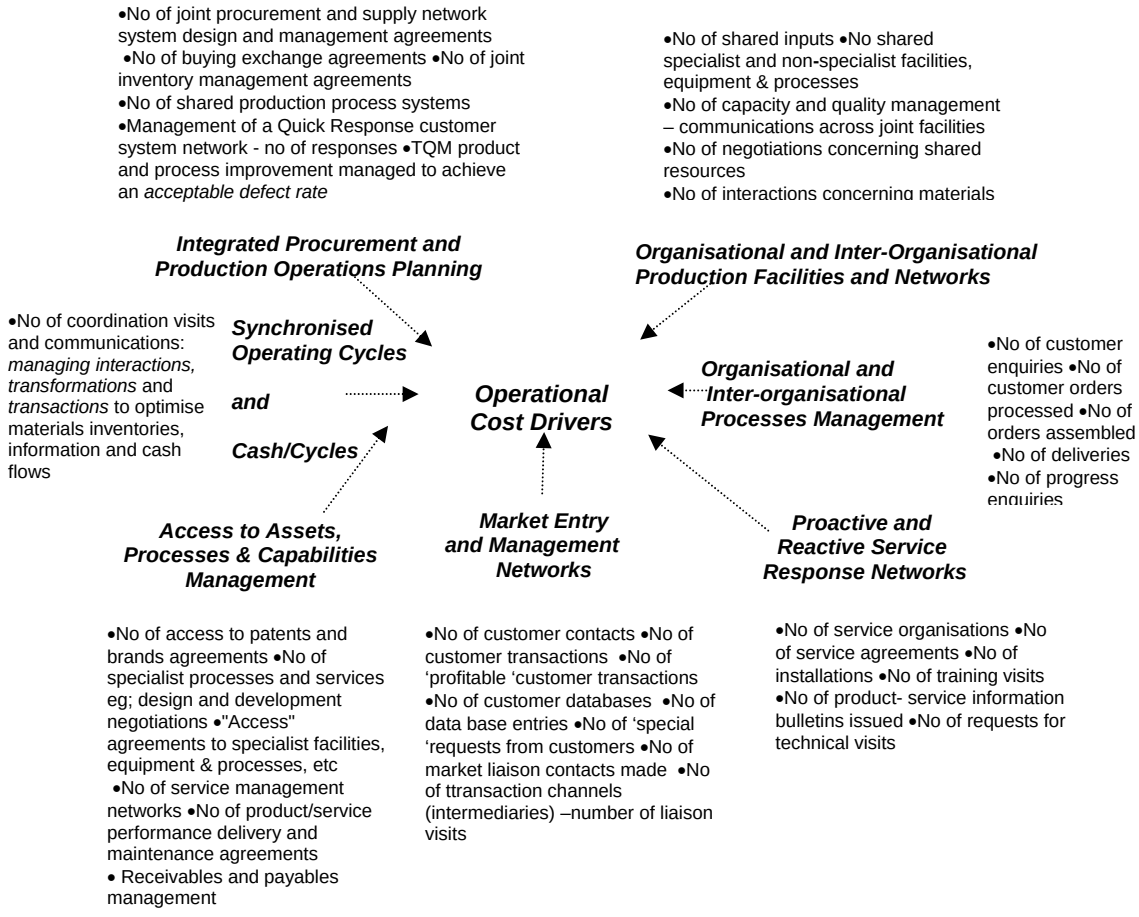

Fig 5: Operational cost drivers implement growth plans cost efficiently

4.3 Value drivers and customer facing processes

It is also essential requirement is for *all* members of the value chain network is that they understand the importance of identifying the all important processes that creates customer value growth, that in turn creates short-term customer satisfaction. **Figure six** suggests how customer facing processes (e g, access to design services, customised product-services, etc) can be aligned with the relevant value chain network delivery processes; research, design and development, procurement, production, marketing, sales operations and physical distribution, and service support. They are also aligned with their relevant operational cost drivers.

Figure six does not consider any specific market. The examples used have been drawn from research undertaken by the author, across a number of product-service offers and markets and clearly it is unlikely they will all be applicable in any one situation. However it does serve to illustrate how a customer response may be built up by researching the processes that have impact a large influence on the key value drivers of the target customer group. Once the value drivers have been identified they can be allocated to cost drivers (figure six) and an exploration of alternative value chain network delivery systems for the value proposition can be undertaken. .

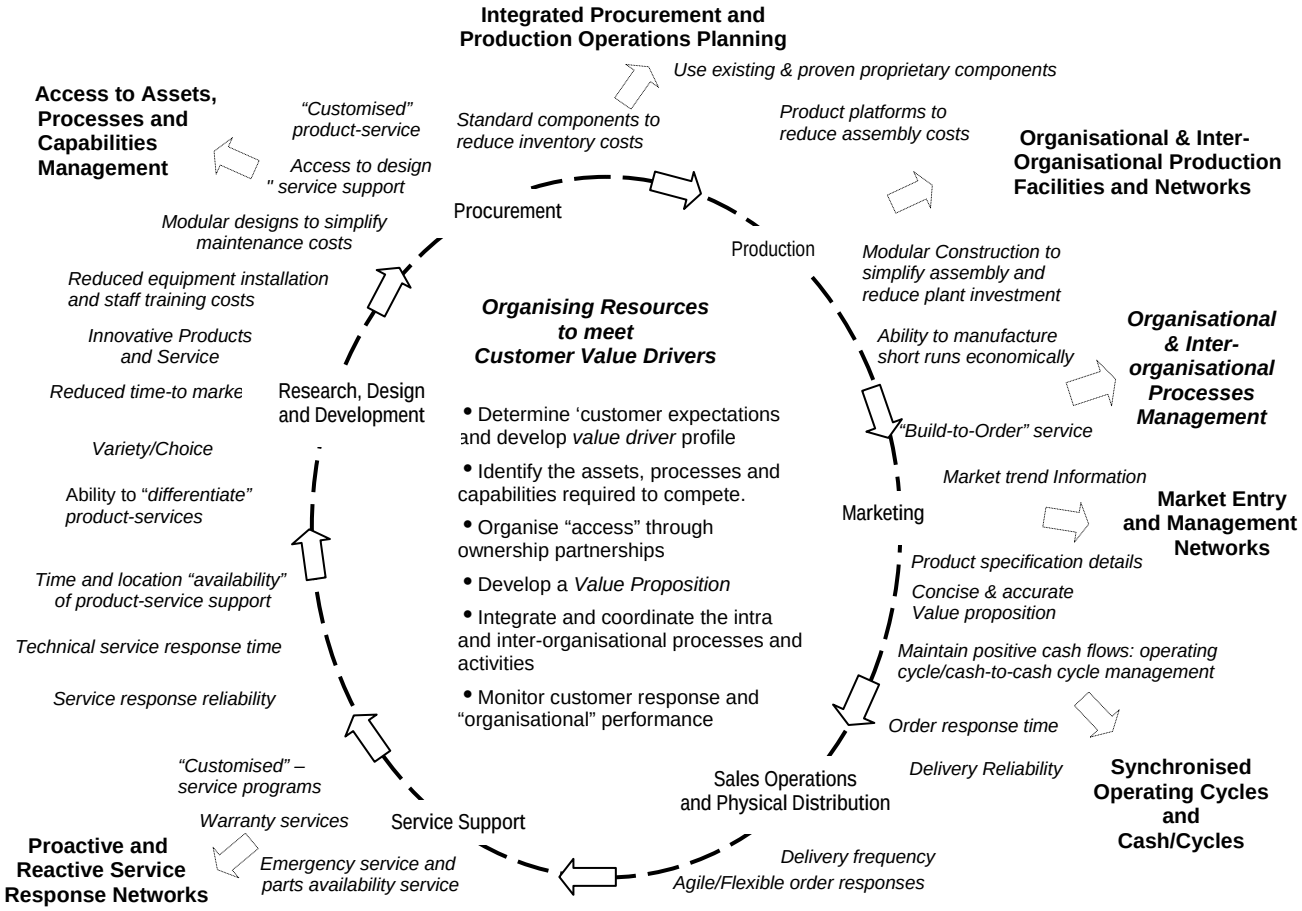

Fig 6: Using customer facing processes as value drivers and aligning them with cost drivers

5. Using attribute based management and costing: An example

Value drivers and value builders are the bases to what Phelps (op cit) describes as *value growth*; this has short and long term output implications for the firm, its customers, partners and its shareholders. Phelps suggests that in the short-term value drivers produce *present value* and value builders *build future value.* This clear separation may not always be possible to differentiate; in the current business environment as many organisations find their short-term and long-term are beginning to merge. For example, modular production systems are becoming popular in a number of markets. There are two primary reasons for this. The first concerns the role of the "manufacturer" who is increasingly becoming an "assembler" in the production process; this reduces investment in a number of value creation processes (RD&D, finished assembly manufacturing and inventory holding, etc) and the second reason is that 'downstream' servicing can be effected quickly and at lower cost by simply exchanging the unserviceable component module with its serviceable replacement. An assumption is made in Fig 7 that value drivers are an essential link in delivering customer satisfaction and developing long-term customer relationships. The proposal uses the principles of *activity based management* to develop an approach to "costing" value drivers.

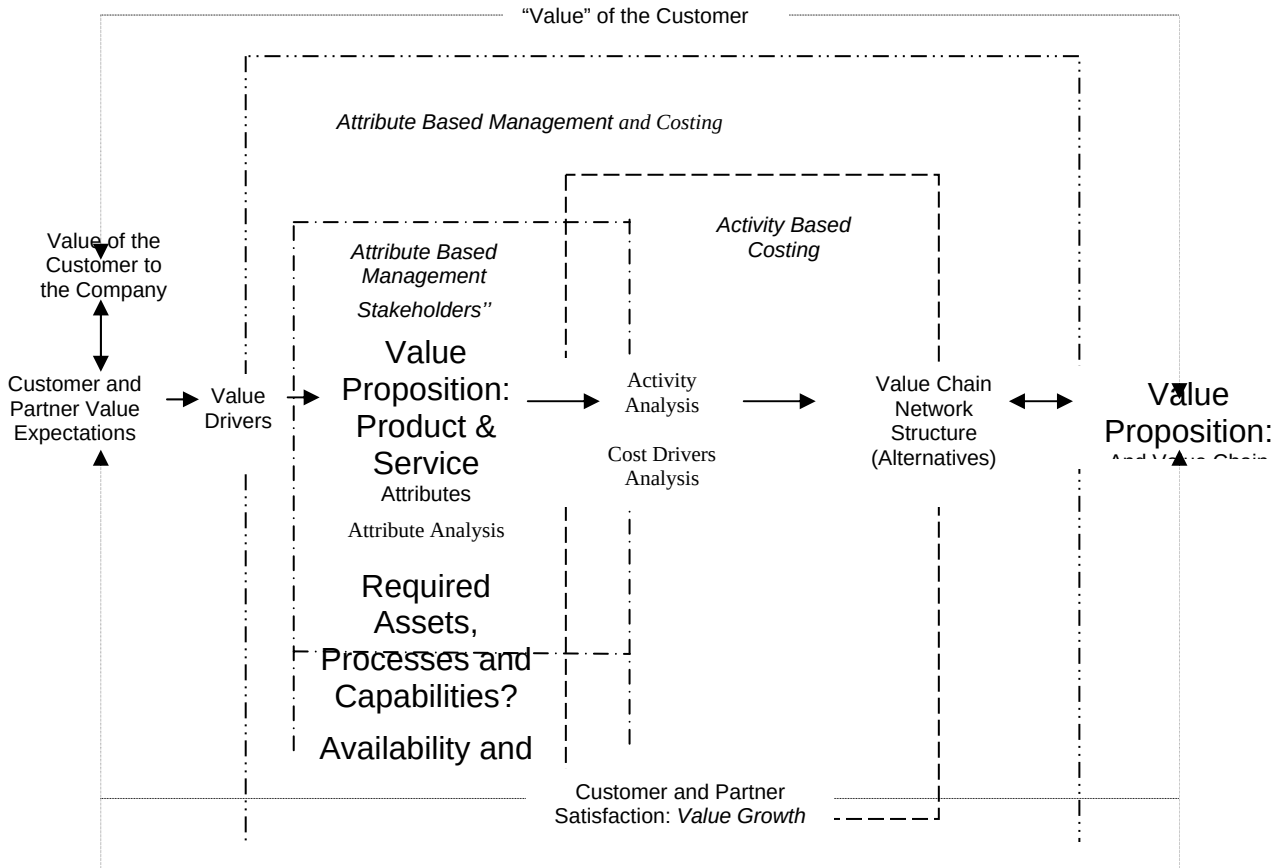

Fig 7: Activity management and costing and activity based costing in the value chain network

Activity based costing (ABC) recognises the activities and the drivers that cause costs to be incurred. Smith (2005) comments;

> *"the essential characteristic of an activity-based costing system is the differentiation between volume driven costs and non-volume (activity) costs. Direct costs (labour and material) are not a problem in this respect, but overhead costs necessitate the adoption of some assumptions before they can be allocated to individual products. This especially true where no volume-based relationship can be established."*

The traditional approach of allocating overhead costs to production departments and then to product lines via volume based overhead rates is replaced by the ABC methodology of introducing intermediary cost pools. The overhead costs are charged to *cost pools* and then to "product-services" through *cost drivers.* Smith realistically points out that an ABC system is essentially an historic system, and as such may not pick up on the changes to a value proposition that may be required for successful implementation. He suggests a strategic approach to the choice of cost drivers, consistent with strategic objectives. This suggests that *ABMC* (attribute based management and costing) may be more relevant; it offers an opportunity to identify the *attributes* of *value drivers* and to explore a range of cost alternatives and control issues across inter-organisational process boundaries using the cost driver framework suggested by figure six. Figure seven identifies the importance of decisions for customers *and* partner organisations; the consideration here is that unless their 'value' expectations are met the project will almost certainly under-perform, or most likely fail.

By considering the value drivers as attributes of a value proposition we can identify the tangible and intangible customer needs content of a product-service. Smith suggests four generic value drivers; cost, quality, time, innovation. Clearly these are important but may direct the focus for resolution towards internal resources and do not reflect those drivers that becoming "deliverables" in more recent business models. Furthermore ABM (activity based management) models do not appear to consider the relationship that may exist between the potential for enhanced customer responses (*tangible* (cash flow and profitability) and *intangible* (customer loyalty and relationship longevity)) when considered against the costs of alternative delivery systems. The business model that is gaining rapid adoption in industries finding competition difficult has been outlined by Roberts (2008); these identify specific market segments *and* the customer needs (value drivers). Roberts, reporting comments made by senior executives in the textile, clothing and footwear industry, suggest additional 'drivers'; for example, "*fitness for purpose"* (meeting detailed specifications – such as those required by the military for armoured clothing), "*time-to-market"* and "*response time"* expectations (meeting the customers', customer's lead times), flexible and agile responses. Robins and Sons (a women's fashion shoes producer) operates a cellular, manufacturing system with a mobile multi-skilled labour force that enables the organisation to meet a two week lead time as opposed to the six months that is typical from off-shore suppliers. *Innovation;* Victoria Carpets have invested $40 million to ensure they are competitive with smaller production run sizes – allowing the Company to respond to customer expectations for shorter lead times on small volume orders.

Furthermore extending the analytical capability of the *ABMC* model permits the exploration of the impact of enhancing customer added-value (added value being defined as the value added to a customer and which is not available to a value network organisation when a producer member leaves the network) and the impact this may have

on potential revenue, and profit increases for the value chain network; Slywotzky and Morrison, op cit.

Fig 8 modifies the conventional activity based costing analysis model to enable the analysis to be managed

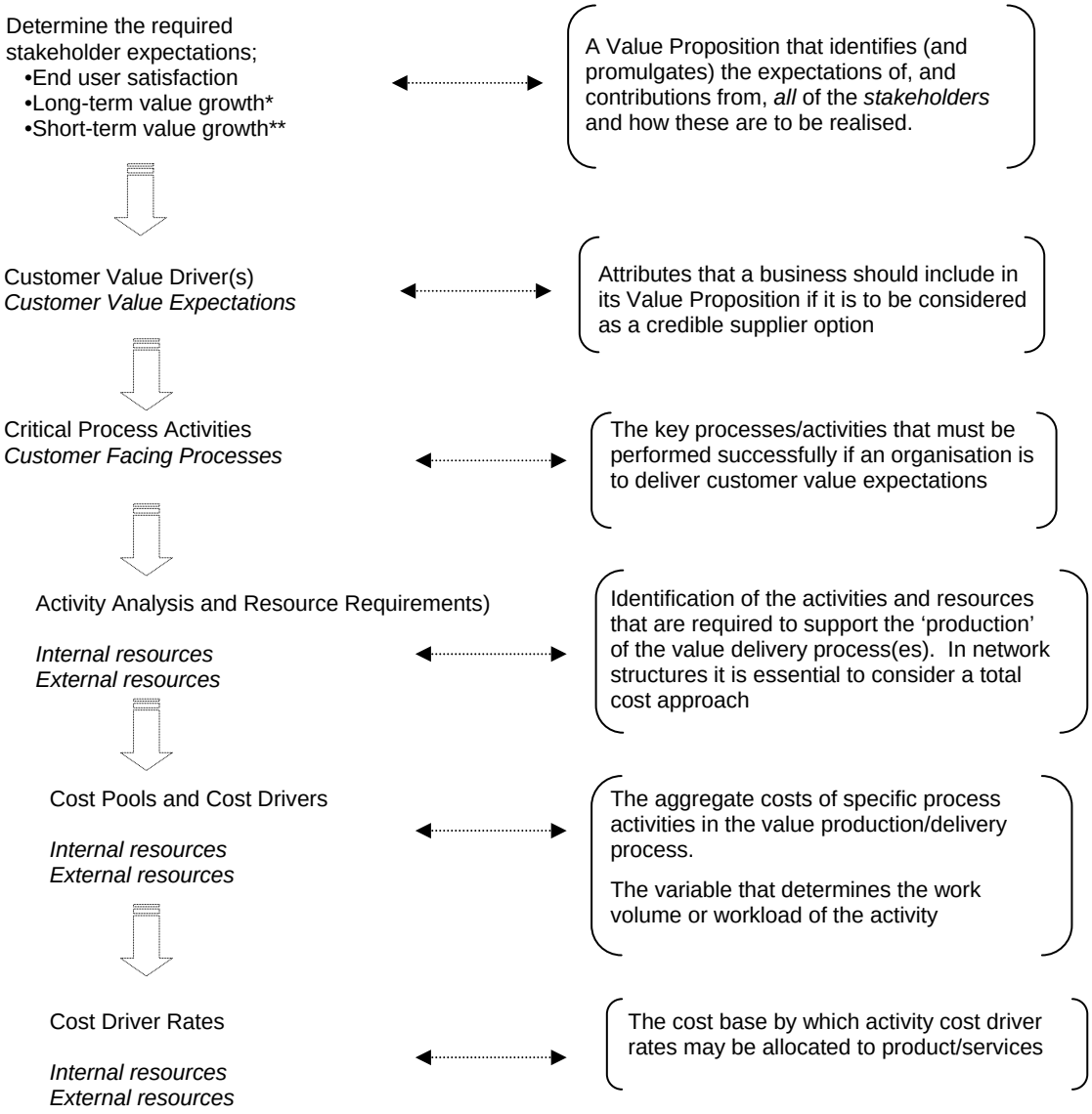

Fig 8: An attribute/activity based management process

*End-user satisfaction measured by Capacity utilisation x Customer satisfaction

**Long-term value growth measured by - CFROI objectives

***Short-term value growth measured by- EVA x Market Share

5.1 Identify customer expectations and their value drivers

5.1.1 Understanding Customer Short-Term Intentions

Critical processes activities to meet value drivers

In this example it argued that customer expectations/value drivers will identify the *critical process activities/customer facing processes* as:

- Modular construction simplifies assembly and reduce plant investment
- Product platforms reduces assembly *and* inventory management costs
- Modular designs simplify maintenance costs
- Use existing and proven proprietary components increases end-user customers' confidence in the finished/assembled product.

Activity analysis and resource requirements will include:

Activity analysis

- The design of modular based equipment using standard industry components
- Product component designs will use shared platforms
- JIT (just-in-time) and/or VMI (vendor managed inventory) services
- Technical liaison engineers

Resource requirements

- R D and D investment in platform technology
- Plant investment; platform technology and JIT response process management

This component of the analysis will involve an appraisal of internal sourcing and investment and an appraisal of available external partnerships to identify an optimal solution. Issues to be considered and resolved include investment requirements, availability of an 'external' solution, the time-to-market expectations, and control and dependency constraints

Operational cost drivers

- Access to assets, processes and capabilities management
- Organisational and inter-organisational production facilities and networks
- Organisational and inter-organisational processes management

Cost pool activities: operational cost drivers

- Access to assets, processes and capabilities management
- No of existing patents, brands etc to be accessed
- No of specialist processes and activities to be negotiated and monitored

- Organisational and inter-organisational production facilities and networks
- No of shared inputs
- No of shared specialist and non-specialist facilities etc
- No of negotiations concerning shared resources
- No of quality control checks

- Organisational and inter-organisational processes management
- No of customer enquiries (existing/new)
- No of customer orders processed
- No of orders to be assembled
- No of "mixed orders and delivery requirements"
- (agile/flexible response requirements)
- No of deliveries
- No of order progress enquiries
- Delivery frequencies and time requirements
- Inventory location (relevant to customer locations) and service levels

The comparison between "in-house" and "networked" customer response options is an important concern. As these are operational issues there are both cost and control issues to be addressed. Clearly the cost external options will be accompanied by time and control considerations such as quality consistency, delivery reliability etc from partner organisations and these will need to be reviewed.

Operational cost driver rates (managed internally)

- Access to assets, processes and capabilities management to meet customer expectations
- Design and development hours required to modify production facilities
- Design and development hours (and investment) required to provide specialist processes
- Opportunity cost of time delays

- Organisational and inter-organisational production facilities and networks management to meet customer expectations
- Scheduling downtime caused by change over processes
- Capacity utilisation cost decreases

- Organisational and inter-organisational processes management to meet customer expectations
- Cost of maintaining supplier liaison staff
- Cost of supplier visits

Operational cost driver rates (external networks)

- Access to assets, processes and capabilities management to meet customer expectations
- Cost of sourcing
- Executive hours required to negotiate a patent (brand) agreement
- Hours required to adapt specialist processes to "fit" into the company's value proposition

- Organisational and inter-organisational production facilities and networks management to meet customer expectations
- Supplier liaison visits

- Loss of production time (productivity) due to delivery delays
- Increased frequency of quality control checks

- Organisational and inter-organisational processes management to meet customer expectations
- Cost of maintaining supplier liaison staff for specialist applications
- Cost of supplier visits for specialist applications
- Reworking and reverse logistics costs

6. Concluding comments

Managing across inter-organisational boundaries is becoming an essential part of relationship management in the "new economy". In the emerging business models competitive advantage is based upon *managing processes* that facilitate rapid and flexible responses to 'market' change, and ones in which new *capabilities* are based upon developing unique relationships with partners (suppliers, customers, employees, shareholders, government and, often, with competitors).. The business model has often taken second place to strategy in management thinking and focus. Normann (2001) discusses "a new strategic logic". He suggests that:" …managers need to be good at *mobilizing*, *managing*, and *using* resources rather than at formally *acquiring* and necessarily *owning* resources. The ability to reconfigure, to use resources inside and particularly outside the boundaries of the traditional corporation more effectively becomes a mandatory skill for managements". Given these now well established business model characteristics it is incumbent upon management accounting to develop a new and more relevant structure and methodology to accommodate the value chain network.

This paper does not presume to offer answers to these issues but it does raise some questions that the discipline should begin to ask.

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