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The logistics implications of the emerging business model

By

David Walters and Jeffrey Newton

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ABSTRACT: In what may eventually be called the fastest recovery from a recession in modern business we should be considering the lessons emerging from the 2008/9 financial crisis which witnessed the demise of corporate giants and unprecedented government responses. We have seen all three 'business directions' (strategy, structure, and implementation) undergo change. Historically dominant companies have migrated from industries in which they were acknowledged leaders and have been replaced by organisations that were hitherto unknown in circumstances that take us beyond Friedmen's (2006) 'Flat World' towards one that is perhaps becoming 'concave' – in which connectivity and interaction become even easier.

KEY WORDS: ***Fixed assets; working capital; technology; new product development***

AUTHORS: David Walters and Jeffrey Newton

CONTACT:
Institute of Transport and Logistics Studies **(C37)**
The Australian Key Centre in Transport Management
The University of Sydney NSW 2006 Australia

Telephone: +61 9351 0071
Facsimile: +61 9351 0088
E-mail: itls@sydney.edu.au
Internet: http://www.itls.sydney.edu.au

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1. Introduction: Features of the new business model

Business operates everywhere in an environment that is increasingly dynamic and challenging. Markets have globalised, technology has become all embracing, and relationships with suppliers, customers and competitors are undergoing constant change. New business models are emerging, ones in which 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. **Figure 1** illustrates the "new business model" and identifies the significant features.

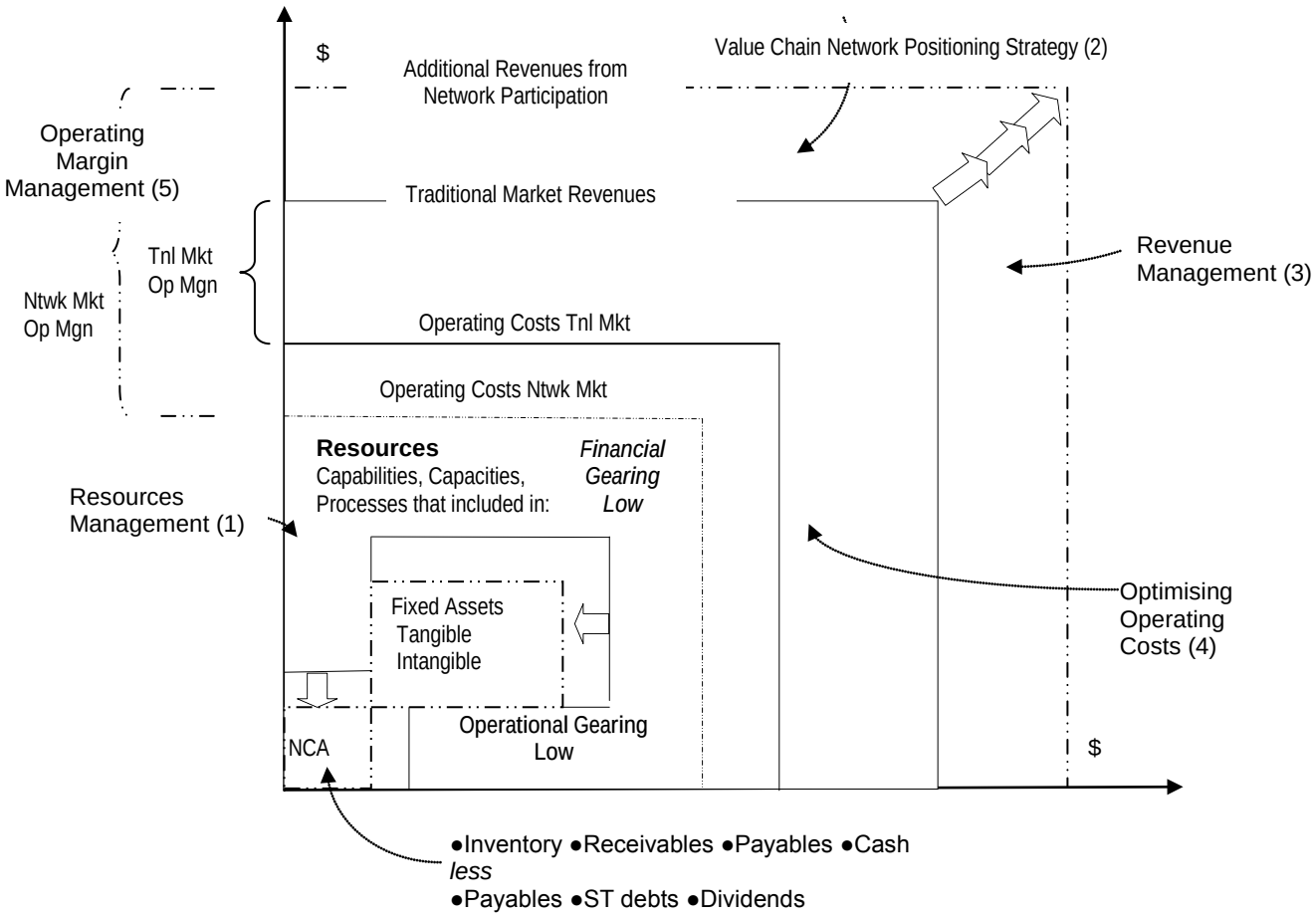

Figure 1: Characteristics of the new business model

1.1 Resources management

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 and to use resources inside and particularly outside the boundaries of the traditional corporation more effectively becomes a mandatory skill for management". As suggested by Normann *op cit* the contemporary approach to managing resources is to leverage partnership resources rather than invest. In this context; assets, capabilities, capacities, and processes are regarded as resources that are necessary to compete in a market.

1.2 Value chain network positioning strategy

The essence of the value chain network is that it is a coordinated network of assets, capabilities and processes that have been identified as the most relevant to a specific market opportunity. The decision confronting the firm; not only is it necessary to match specific skills and resources with opportunities within the value chain but it follows that the attraction of them is very likely to shift and to change as the business environment changes. Successful value chain partners work together with other partners each of who offer complimentary expertise – assets, processes capabilities and capacities. Millennium (a US based pharmaceutical organisation) is such an example; the CEO, Mark Levin describes how Millennium identified how value generation in the industry was 'migrating' downstream and how the Company has pursued the opportunities offered in a rapidly changing business environment by integrating the expertise of Millennium with those of other organisations. Millennium's approach is one requiring constant appraisal of market opportunities and a clear knowledge of the current 'worth' of the firm's abilities. See Champion (2001). Roberts (2004) discusses organisational design and performance management. He suggests that for many firms an important element of designing the organisation for greater performance is to focus the firm only on those processes that can create the most value.

Roberts discusses the role of the "value chain organiser" demonstrating that this role may involve the 'organiser' in performing an additional and important role within the value chain processes, such as product design marketing, and distribution (as does Nike) or, as in the case of Benetton (fashion) managing the information and logistics flows, and the marketing processes. In both cases the 'organiser' manages a complex set of relations with other value chain participants and coordinates activities among them. He identified an application of the model in electronic manufacturing services. Solectron and Flextronic are very large organisations with business valued at; "tens of billions of dollars a year, but they have no products of their own". Roberts also makes reference to computer manufacturers who are beginning to out-source logistics, order fulfilment, and post-sales service, and even the design and manufacture of their low-end products. **Figure 2** illustrates value chain network positioning

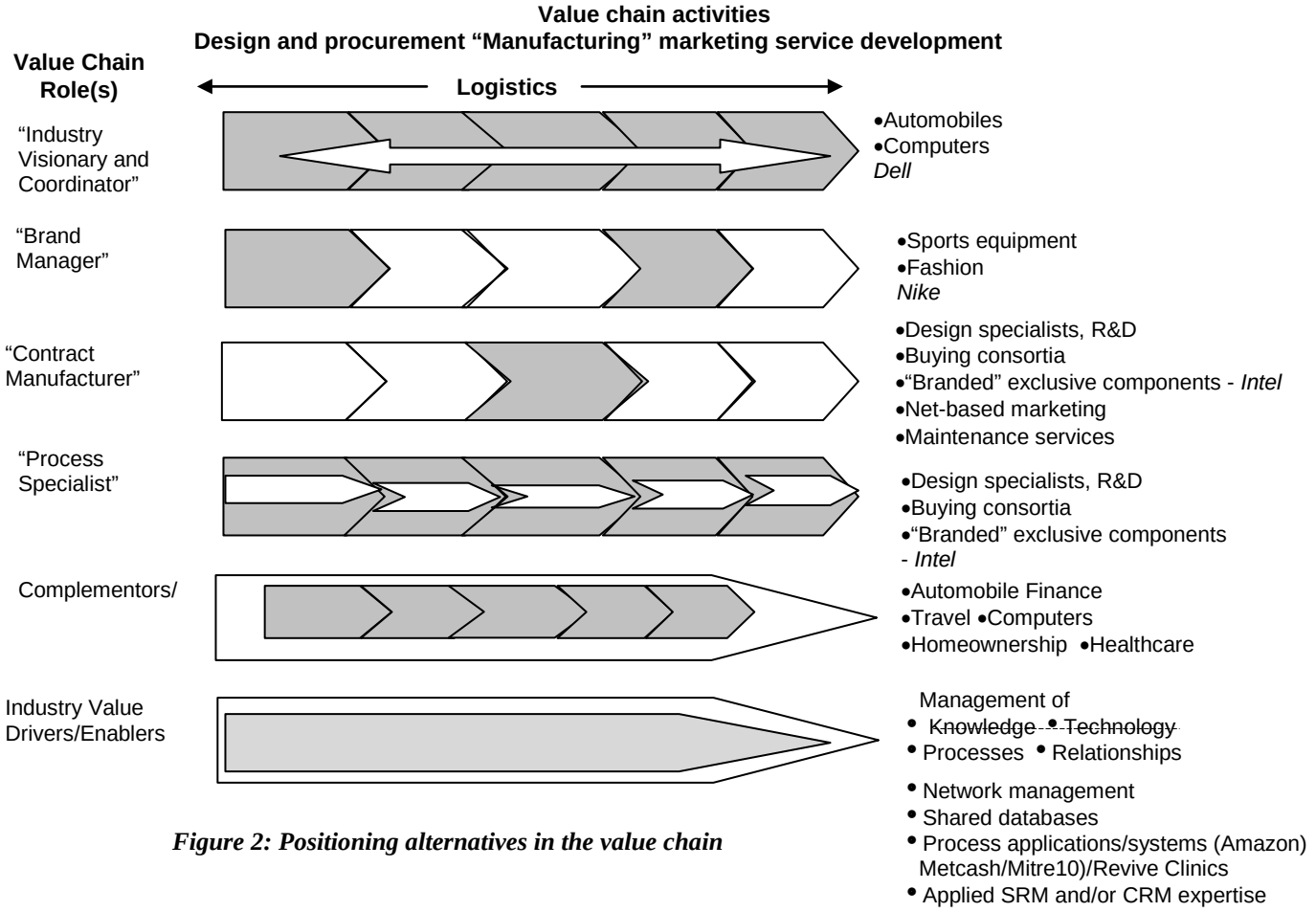

Figure 2: Positioning alternatives in the value chain

1.3 Revenue management: Network partners

Revenues have been increased in networks by identifying opportunities to import successful processes and activities from other industries and to apply them to new market segments. An example demonstrating this development is MinuteClinic, who has introduced a value adding component in the healthcare value chain network by introducing a complementary component – not a service that is directly competitive and threatening to others. MinuteClinic offers a relatively low-cost, conveniently accessible method of identifying and treating a range of common ailments by the application of *quick service auto-maintenance processes* to healthcare. See Champy (2008). The development of relationships with users having specialist needs (in this case employers wishing to offer healthcare benefits to employees (and at the same time reduce their absenteeism)) and with healthcare professionals who saw MinuteClinic as a means by which they could concentrate on more serious (and higher revenue generating) needs.

An additional value added service in the healthcare industry was provided by DHL Exel Supply Chain, part of the world's leading logistics company, who launched in Australia; DHL Pharmacy Supply, the direct to pharmacy pharmaceutical distribution business. Supported by a five-year contract, DHL Pharmacy Supply offered the industry a 24 hour pharmaceutical distribution service to community pharmacies across Australia. Using its comprehensive distribution network and partners, DHL Pharmacy Supply is contracted to deliver Government-subsidized Prescription Benefit Scheme (PBS) medicines from pharmaceutical manufacturers to approximately 5,000 pharmacies throughout metropolitan, regional and rural areas of Australia. (www.ferret.com.au November 11, 2006)

1.4 Optimising operating costs

Large manufacturers use their purchasing power to obtain cost savings in the early stages of production by purchasing inputs on behalf of their contract suppliers – this enables them to have some control over the pricing of component inputs from suppliers by creating 'economies of scale' that their suppliers do not otherwise have. *Phillips Electrical* (consumer durables) and *TomTom* (GPS products) are two organisations pursuing this strategy. Both organisations no longer manufacture or assemble their products, preferring to use management expertise to oversee 'outsourced manufacturing'; both organisations share the 'value added'.

1.5 Operating margin management, added value and EVA - The notion of economic profit

Kay (1993) discussed the notion of added value as a measure of corporate performance as "the key measure of corporate success" and defined this as:

"Added value is the difference between the (comprehensively accounted) value of a firm's output and the (comprehensively accounted) cost of the firm's inputs. In this specific sense, adding value is both proper motivation of corporate activity and the measure of its achievement".

Kay calculates added value by subtracting from the market value of an organisation's output the cost of its inputs:

Added Value equals Revenues less (wages and salaries, materials, capital costs)

Added value in this context includes depreciation of capital assets and also provides for a 'reasonable' return on invested capital; it is the economists' notion of economic profit (or residual income). Calculated this way added value is less than operating profit (NOPAT), the difference between the value of the output and the value of materials and labour inputs and capital costs. It also differs from the net output of the firm: the difference between the value of its sales and material costs (not labour or capital costs). It has the important benefit of being easily quantified and capable of being used for comparative purposes

Stern and Stewart (1996) introduced EVA (economic value added), a concept very similar to Kay's added value but deducted taxation from the result. EVA is net operating profit after tax (NOPAT) less a capital charge for the invested capital employed in the business.

It is noticeable that some large and capital intensive industries are favouring integration of critical inputs; Chinese steel producers are negotiating with minerals producers to ensure stability of availability and prices; currently this is about partnerships but a number of acquisitions have been attempted. Given that the strong currencies of major suppliers have a major impact on costs the ownership of the inputs does offer some control over input prices.

Coca-Cola and Pepsi are seeking greater control over distribution (McKay:2010) reports on the recent acquisition of its largest distributor, Coca-Cola Enterprises North American operations and accounting for 75 per cent of Coke production sold in the US and all of its Canadian volume. PepsiCo was close to finalising the acquisition of its two largest independent bottlers. Market analysts predicted Coke and Pepsi's acquisitions; "would strengthen the industry in North America by streamlining costs and spurring more flexible distribution of new drinks".

Computer hardware and software companies are also following this trend, Oracle announced plans to purchase Sun Microsystems; microprocessor manufacturers are also making selective acquisitions. Harold Sirkin (2010), global head of BCG's operations practice suggests volatile commodity prices, supplier financial pressures, and the quest for revenue growth are challenges resulting from the recession (cited by Ben Worthen, Cari Tuna: 2009). Clearly there are a number of motives to be served by these moves but maintaining margins is fundamental.

2. The changing business environment

The 'noughties' saw a number of developments in the business environment. The relentless move towards globalisation peaked and has been modified to reflect the sourcing and consumption opportunities of the expanding BRIC type economies. The enthusiasm for outsourcing has been dulled by the increase in labour rates and related costs throughout Asia and exacerbated by massive product recalls in the automotive industry. We are observing transformational structure moves by very large organisations as they question decades of activity in traditional product-markets. Other major organisations are identifying new segments in existing markets and are undertaking product and production process redesign to position themselves in these market opportunities. While they all have implications for logistics and supply chain management space prevents a comprehensive review of them. Some of the more interesting developments are reviewed here.

2.1 Flows of capital and flows of trade

Timmons (2010) suggests there has been a fundamental shift in global business towards emerging markets (the BRIC countries) and has identified some complications. She argues that because Western companies and countries are debt laden (as well as being concerned about their futures) and companies in the emerging market countries are "swollen with cash" and "a new enthusiasm for deals has already emerged in India, China and other developing countries".

Experienced financial markets managers suggest the recent intensive activity is an indicator of a shift in global business. They argue that western economies are expected to show very slow rates of growth for some time to come. In these markets there are companies for sale (including raw materials companies) and there are companies with cash (or access to cash) and many of the emerging market countries (India and China) have large domestic banks capable of financing very large deals. It is noted that these 'deals' are not without risk; two acquisitions by the Tata Group, Jaguar/Land Rover and Corus Steel have produced disappointing results and have led to a more careful analysis of potential mergers and acquisitions. One market manager suggested that companies are focusing on acquisitions that can help them sell to consumers in emerging markets where consumption is growing, rather than in Western markets where demand is relatively weak. The Kraft acquisition of Cadbury was attractive because it gave access to countries such as India.

2.2 Some implications for logistics and supply chain management

These developments are interesting and we may witness a reverse of the flows of raw materials outbound and added value products inbound. Currently there is considerable interest by Chinese manufacturing companies in acquiring Australian mineral producers (exchange rate fluctuations are given as a dominant reason) however, should some of these happen it is not unreasonable to expect that limited levels of manufacturing may occur in Australia (and other minerals supplying countries) as energy prices continue an upward trend and the costs of transporting the relatively low cost coal and iron ore increase and impact on the costs of production; it is reported that China is experiencing significant increases in labour costs and both these cost increases (transportation (two-ways) and labour costs) will have a significant impact on profitability.

2.3 The global/regional decision for automotive and consumer durables manufacturers

The 'nineties' and the 'noughties' saw a large expansion of the major European and North American automotive manufacturers in Asia. Initially these companies were attracted by the potential for lowering their labour costs. As these resource markets expanded they have become massive consumer markets with the growth of local incomes such that now the PRC is the world's fastest growing market. More recently the Indian automotive market has been expanding rapidly. However, this has been accompanied

by market led product and manufacturing process design. The launch of the Nano by Tata identified a need for product and service design to reflect local requirements and capabilities. The significance of these developments has not passed without comment.

Industry week (*www.industryweek com January 13, 2010)* reported the concern of the world's top car makers that China and India could pose a significant competitive threat in coming years. While the globally competitive nature of the automotive industry requires mass economies of scale, these are becoming apparent in Chinese and Indian manufacturers. India's Tata Motors the Nano mini-car to the Detroit Science Center and Build Your Dreams Motor (BYD) brought its four-door electric e6 straight to the floor of the auto show. Both countries are becoming increasingly important markets in the global sales strategy of top automakers. Executives from the once large automotive manufacturers suggested that Chinese automakers buying brands like Volvo are accessing a valuable distribution network, critical technology and "instant credibility", with China surpassing the United States in total sales volume last year and Indian sales expected to double by 2016."

Clearly the current global model of the industry (**Figure 3)** requires re-thinking as disposable income, consumer expectations, and local manufacturing capabilities and capacities expand. While the model respects some regional differences the focus of the model is far more "production-centric" than it is "customer-centric" and has favoured the 'mass economies of scale' that the industry has based its development on in recent years.

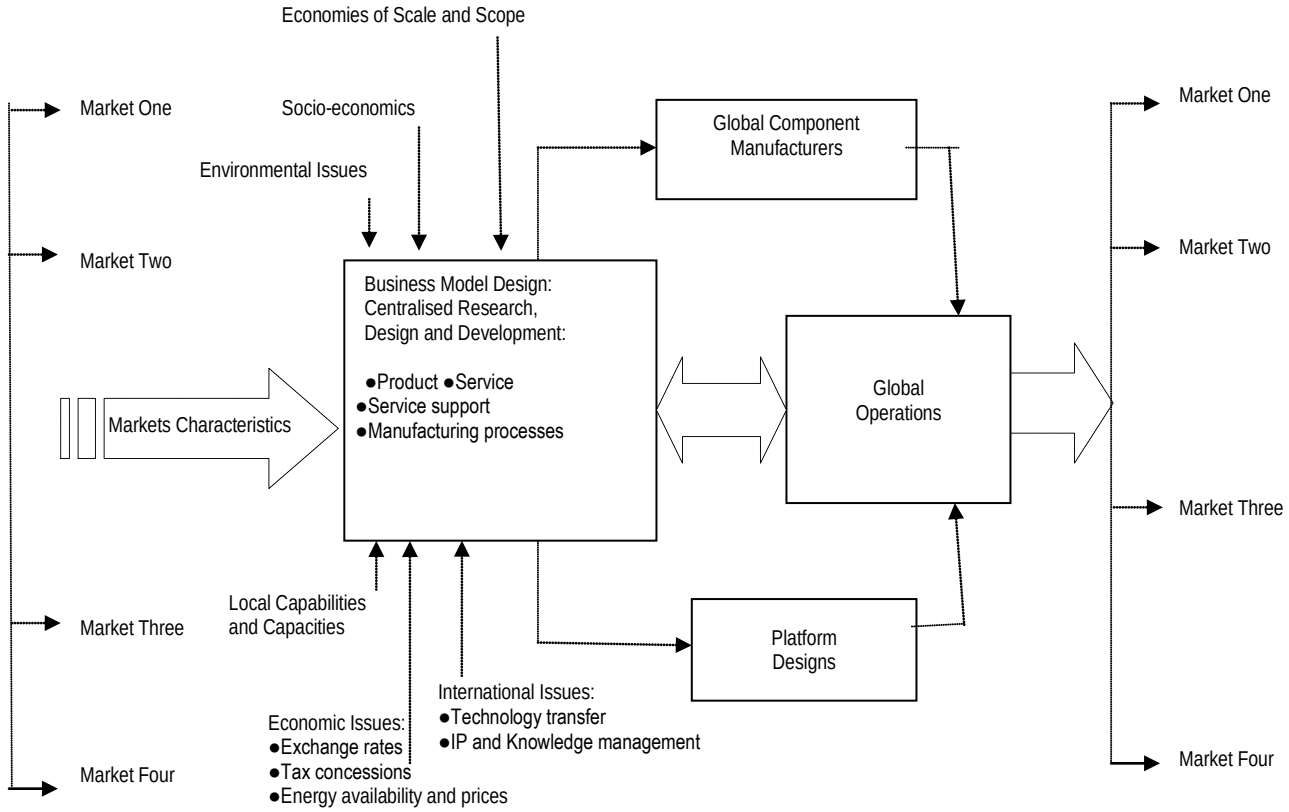

Figure 3: International operations business model automobiles and consumer durables

There is increasing activity in these markets. Fiat intends launching a new small car designed for India in two years, joining the gaggle of foreign auto makers targeting the fast-growing market. Fiat India Automobiles, a joint venture between Fiat and India's Tata Motors, said the launch in 2012 was part of its strategy to capture a tenth of Asia's third-biggest automobile market in the next five years. "The small-car segment is seeing phenomenal growth. More than three-quarters of all sales are small cars, with India-based Maruti Suzuki the overwhelmingly dominant producer with a 55% market share. Toyota, Volkswagen, Renault, Ford and General Motors have all unveiled cars, or plans for cars, designed to capture a significant share of the Indian market. The project "is an important step for the India market because Fiat has a lot of technology for small cars. We want to bring it (the technology) back to India". (*www.industryweek.com January 06, 2010)*

"Volkswagen is poised to buy a large stake in Suzuki, whose mini-cars dominate several emerging economies and comprise more than half the vehicles on the road in India which may lead to the German carmaker sinking more than 300 billion yen ($3.8bn) into Suzuki. Analysts have been speculating for some months that Suzuki represented one of the most attractive automotive assets in Asia for a potential buyer. Suzuki, with its strong pedigree in motorcycles and scooters, has sought to make its mini-cars and vans the first vehicle that drivers choose as their economies shift from two to four wheels. A number of South-East Asian nations, including Vietnam and Indonesia, are considered to be close to the "tipping point" at which a nation of motorcyclists becomes a nation of motorists. Despite its success in the mini-car niche, Suzuki found itself in the wrong alliance three years ago when General Motors, its previous partner, began to stumble. Volkswagen, meanwhile, has a long-established focus on emerging markets, having broken into China some years before its Japanese rivals. If Volkswagen does buy Suzuki -- and, critically, its Indian Maruti Suzuki unit -- the combined group would be close to matching Toyota in scale." (*Bloomberg February 19, 2010)*

It is interesting to see how the global model has responded and can become regional. **Figure 4** shows some of the significant changes.

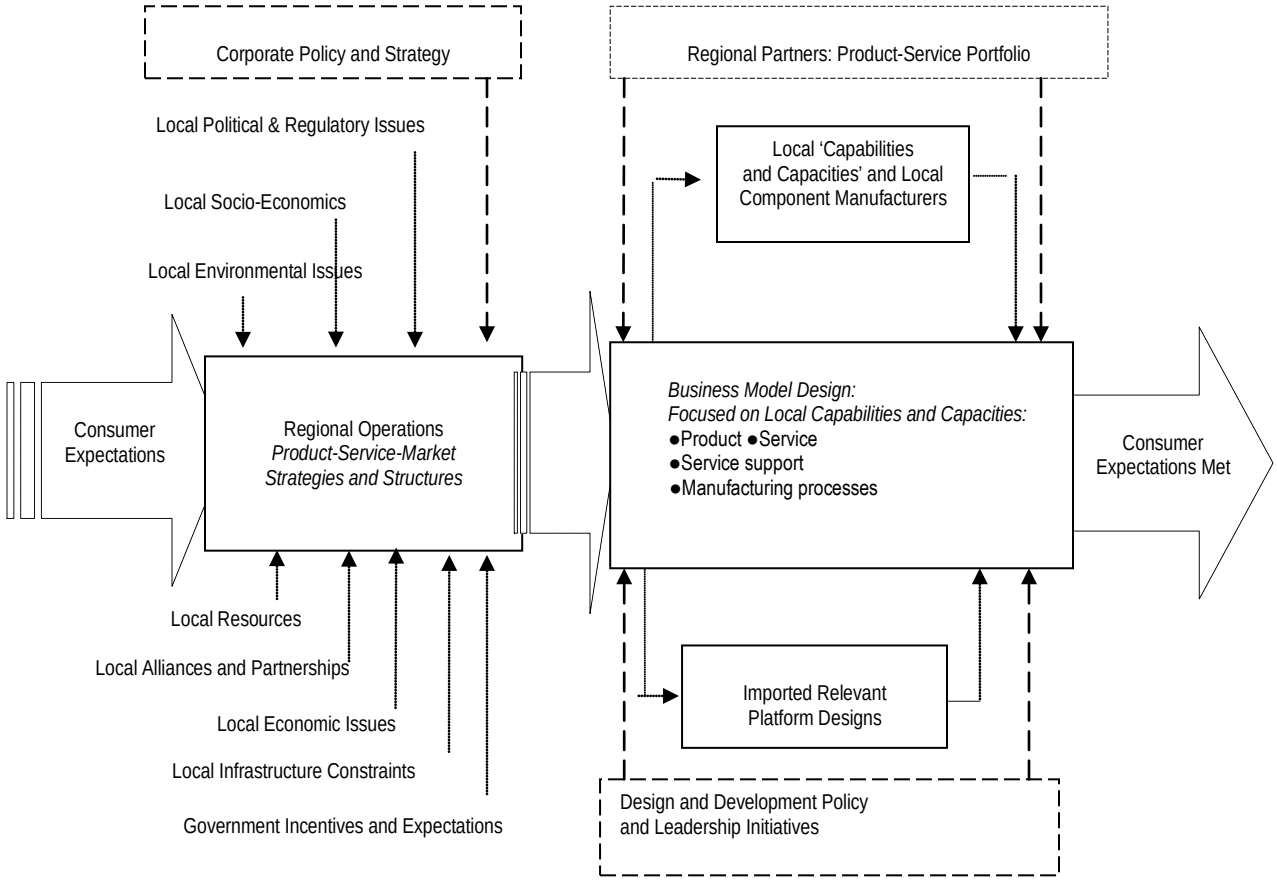

Figure 4: Regional operations business model automobiles and consumer durables

The evolving regional model is suggesting that RD&D may continue to take place in the existing 'home bases' of the major manufacturers but strongly influenced by local market expectations, manufacturing capabilities and capacities and government requirements. Government requirements can be both expansive and constraining. Nissan has reached an agreement to manufacture the new Micra in Thailand, government incentives include breaks on taxes and duties; the Thai Board of Investment says the ninety percent reduction in duties on imported parts and materials will reduce manufacturing costs per unit by US$3000. The vehicle sells for about US$10000. To qualify Nissan has to use substantial amounts of locally manufactured components and to expand production to at least 100000 units within five years. When it is considered that some seventy five percent of the cost of a vehicle comprises parts, then procuring some eighty to ninety percent of the parts locally (where labour costs are relatively low) will have a significant impact on costs and pricing. Simms (2010) suggests that small vehicles' margins are small, even negative, but the vehicles generate revenues from servicing and parts sales and potentially creates customer loyalty and long-term customers.

Another influence will be electrically powered vehicles. Here there is evidence of a considerable amount of intra-industry collaboration. A partnership between Renault-Nissan Alliance and Project Better Place will result in electric vehicles being mass-marketed in Israel. Renault will supply the electric vehicles, and Project Better Place (based in Palo-Alto, California) will construct and operate an 'electric recharge grid' across the entire country, the Israeli government will provide tax incentives to customers. Electric

vehicles will be available to customers in 2011. Renault's electric vehicles will be equipped with lithium-ion batteries. A network of battery charging spots will be operated by Project Better Place. Customers will be able to plug their cars into charging units in any of the 500,000 charging spots in Israel. An on-board computer system will indicate to the driver the remaining power supply and the nearest charging spot. Nissan, through its joint venture with NEC, has created a battery pack that meets the requirements of the electric vehicle and will mass produce it. Renault is working on development of exchangeable batteries for continuous mobility. The entire framework will go through a series of tests starting this year. Renault is working on development of exchangeable batteries for continuous mobility. The entire framework will go through a series of tests starting this year. Israel is an ideal test market since 90% of car owners' drive less than 70 kilometres per day, and all major urban centres are less than 150 kilometres apart, allowing electric vehicles to cover most of the population's transportation needs. (www.industryweek.com January 5, 2010)

There are numerous reports of existing and new market entrants emerging (as individual manufacturers or as partners in collaborative networks). Many are established in the industry the others coming from contributing technologies. China's largest independent carmaker Chery Automobile produced its first plug-in electric car this week, the latest Chinese automotive company to produce an alternative energy vehicle. The all-electric car, S18, can go up to 150 kilometres (93 miles) on one charge and has a maximum speed of 120 kilometres (72 miles) an hour. The battery can be fully charged within six hours using a 220-volt home outlet, while 80% of the battery can be charged within 30 minutes.

Another Chinese car maker, the BYD Co (a company that Warren Buffet has considerable investment in) began selling its plug-in electric hybrid car in China in December. (*Agence France-Presse*, February 20, 2009).

Volkswagen and Toshiba recently unveiled an accord to jointly develop electric drive units and other elements that VW said will allow it to become the first manufacturer of an affordable, mass produced electric vehicle. The two groups are also planning the development of battery systems for the next generation of electric vehicles, The drive units and "accompanying power electronics" would be used in VW's planned New Small Family of vehicles that are still in the concept stage. VW said it aimed to be the first manufacturer to provide "an emissions-free, affordable and safe large-scale production electric vehicle." Research into lithium-ion battery technology was now being conducted by VW and further potential technological partners alongside Toshiba. The VW CEO called the partnership with Toshiba "a major step forward toward the development of series production electric vehicles for our customers." (*Agence France-Presse*, 20 February, 2009).

An interesting move towards component consolidation was announced by Renault/Nissan and Daimler in which the companies said they had agreed to develop Renault-Nissan engines for use in the Smart and Renault Twingo, to be adapted and modified with Mercedes-Benz characteristics for new premium compact cars. The Renault Clio was one of the most successful small cars of the last decade. Under the plans, the next-generation Renault Twingo, Smart "fortwo" and a new Smart four-seater will be engineered using jointly developed architecture and will include an electric version with a launch slated for 2013. The companies, which anticipate combined savings of four billion euros (US$5.34 billion) over the first five years of their cooperation, will share existing diesel and gasoline engines while jointly developing technology for new electrical versions. (*Agence France-Presse* April 7 2010).

McKinsey & Co. came out with new research in January 2010, suggesting that electric vehicles, including battery-electric and plug-in hybrid electric cars, could make up as much as 16% of new car sales in New York City alone, by 2015, or as many as 70,000 cars. Since electric vehicles represent an entirely new technology compared with the current automobiles on the road today, automotive manufacturers will need to forge new supplier relationships and create a new set of quality checks as it pieces together the integral components. This requires a fundamentally different approach to manufacturing operations, allowing manufacturers to adapt quickly to evolving market demands and requirements for electric vehicles by

implementing new production processes across a *distributed manufacturing network*. Cost will be a key piece of the puzzle when it comes to their ability to claim success. The manufacturing process will be a fundamental driver of this challenge. Industry analysts suggest that U.S. manufacturers have the potential to halve manufacturing costs in as little as five years. Reducing oversupply, sourcing parts globally and increasing efficiency through their processes and product supply network can help all U.S. automakers reach this tall order. (IndustryWeek, 7 April, 2010).

2.4 Some implications for logistics and supply chain management

General Motors is a typical example of changes that occurred to large automobile manufacturers towards the end of the recession 2008/9 recession. **Figure 5** uses the model developed as figure one to explore the impact of the recession on the Company. It will be remembered that GM was made technically bankrupt and was released once having convinced the US Government of a sound business plan. Some of the features of the plan were in current practice. For example; develop/leverage co-operative partnerships to develop product-technology and workforce reductions had been planned. However more radical moves to reduce costs and to regain competitiveness were expected and these included; reducing costs by importing a significant percentage of vehicles from manufacturing plants in low-wage countries (i.e. Mexico & China), reducing the number of manufacturing locations (47 to 16 plants was originally quoted) but this number has since been reduced, sale of the European Opel activity (eventually rescinded as it was an intangible asset that developed small vehicle R&D), reduce number of Brands (4), and to reduce distributor network significantly. As well as plant rationalisation supplier arrangements were also to be reviewed followed by a reduction in their number.

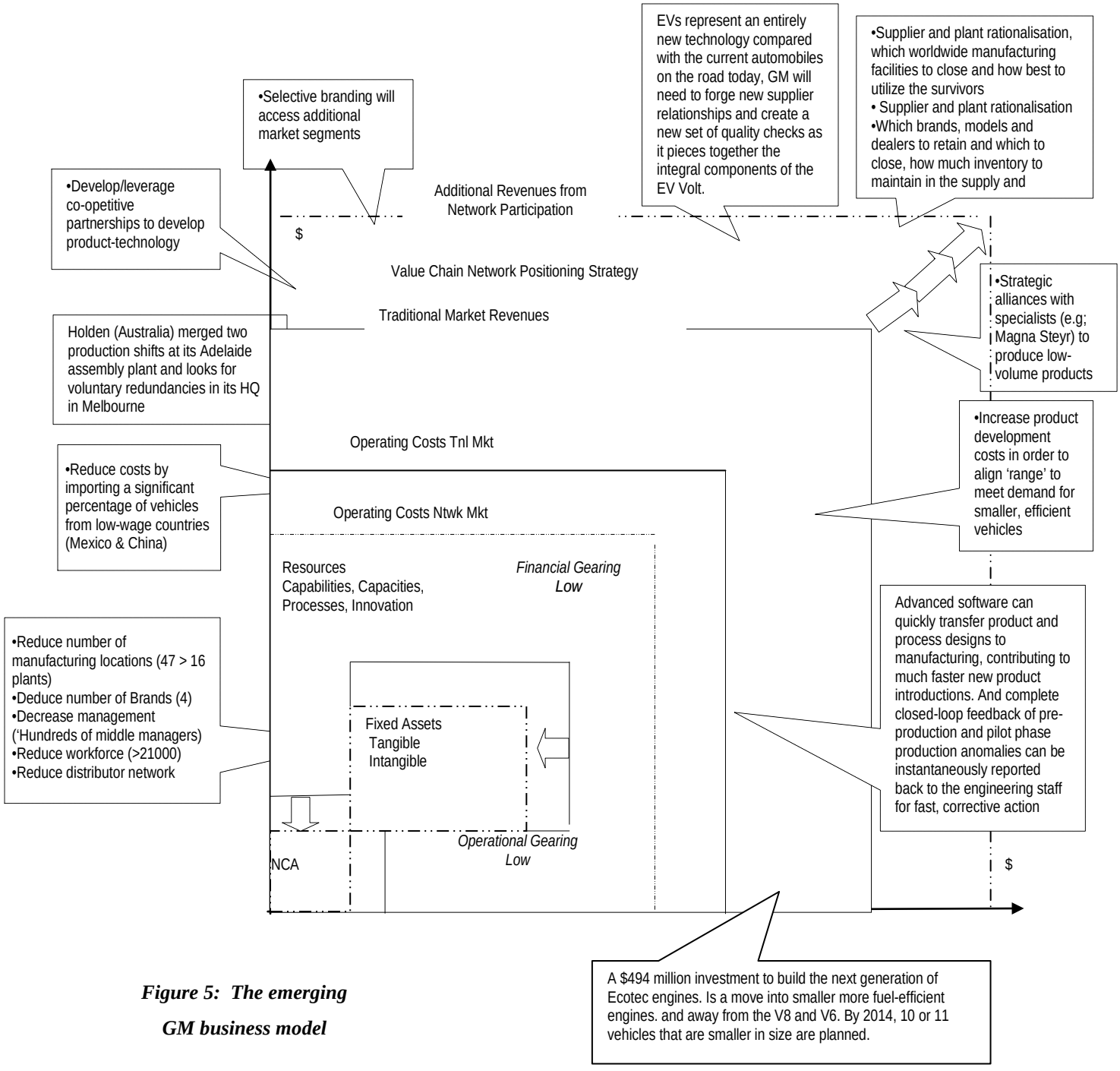

Figure 5: The emerging GM business model

Clearly many of these actions will reduce costs by reducing inventory locations plant and distributor inventories. However importing vehicles and service parts will add to the inventory in the short run and the level of working capital investment may increase before showing significant reduction.

The advent of the alternative powered vehicle will very likely be accompanied by an increase in inter-industry collaboration as auto manufacturers and the electrical power industry work together on interchangeable batteries and on the "refuelling" problems to ensure longer range possibilities for the vehicles. Service parts inventories will include relevant accessories. The McKinsey report (op cit)

suggests this is an opportunity to review industry manufacturing processes and to encourage "global sourcing"; given the recent Toyota experience this will have to be accompanied by a QA process that is acceptable to the entire industry – difficult if not approaching impossible. The notion of system standardisation (for example, interchangeable batteries) is an opportunity that should be seized upon; cost savings from producing components that do not differentiate the individual products but rather add to user convenience offer huge savings in production costs and therefore market selling prices.

2.5 The "fifteen/fifty" solution or "reverse innovation" to take advantage of 'emerging market' opportunities

In addition to the global/regional decision 'brown and white goods' consumer durable manufacturers are confronted with opportunities from 'emerging markets'. The fact that many of the more 'sophisticated' market of the global organisations which have softened in recent years has prompted companies such as General Electric and Panasonic to re-think their product-market strategies. They (and other similar organisations) have reviewed the needs and the capabilities and resources of the 'emerging markets' and have evolved strategies in which their existing product ranges have been modified to meet the essential needs of these markets and so they may be manufactured locally. GE is active in healthcare markets in China and India, where the demand is for low cost, limited feature equipment that simplifies the use. Both GE and Panasonic have recognised the decline of their businesses in western markets and are planning a future in the emerging markets, albeit they require very different manufacturing and marketing approaches. **See Figure 6.**

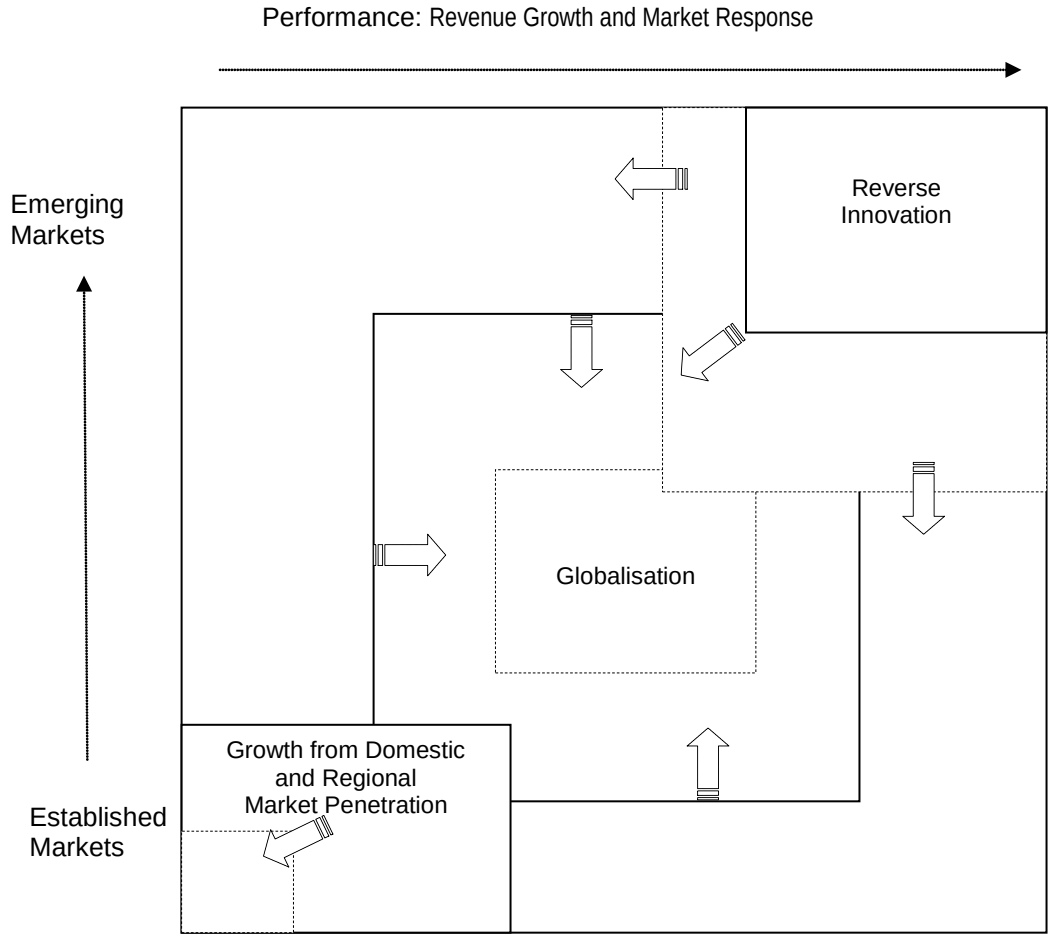

Figure 6: "Reverse Innovation" is being practiced by a number of large (global)

Local Growth Teams (LGTs) have been appointed to manage identified opportunities; objectives and strategies become 'customised' to meet local (realistic) possibilities and constraints. They localise/shift decision making to sourcing/consumption markets and their structures reflect the realities of local circumstances in planning processes and are tasked with the responsibility of developing relevant product-service strategy'. Their aim is to offer a 'fifty percent solution' at fifteen percent of the cost of a one hundred percent solution; in other words the product is redesigned to offer only the essential features, those essential characteristics that are required for effective use recognising market needs that are less sophisticated. Furthermore, the redesign process takes account of local manufacturing capabilities and capacities. Dedicated LGT's study the product-service users to understand the market's needs and practices.' They consider local processes, procedures as well as current products, practices and applications. The 'teams' assess attitudes to change and where necessary train end-users for product-service use. Coincident with the introduction of the equipment a program of training in its use and application accompanies the distribution of the product. Following introduction of the 'new' product, follow-up on use and users of the product-service is conducted using a pre-set range of test measurements.

Senior management are responsible for controlling the LGTs and mediate when any conflict with global business is likely to occur. They also are responsible for managing resource requirements and allocation by connecting LGT with global R&D and capital sources. They will work with successful LGTs to manage the transfer of the innovation into 'rich countries' developed markets.

2.6 Some implications for logistics and supply chain management

The Panasonic ET-Win business model **(Figure 7)** is an example of a company that has re designed and engineered its product range to become increasingly competitive. The EM-WIN program in emerging markets, Brazil, Russia, India, China, Vietnam, Mexico, Indonesia, Turkey and the Balkans countries is proving to be successful and ales to EM Win markets will exceed sales of conventional product ranges to North America and Europe.

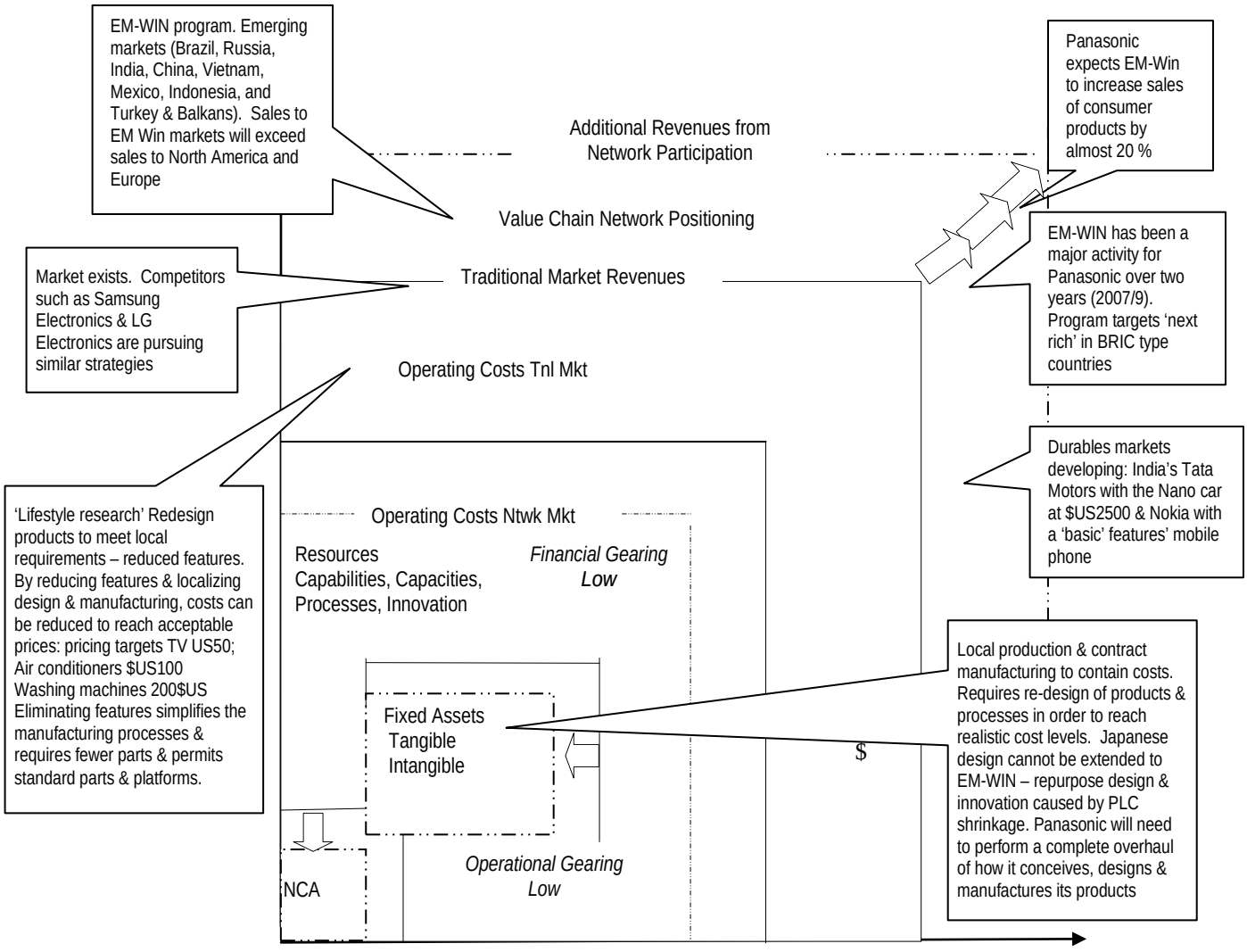

Figure 7: Panasonic reviews product design and price to fit emerging markets
Source: Wakabayashi D (2009) WSJ.com, The Australian, 10 July

Panasonic expects EM-Win to increase sales of consumer products by almost 20 percent.

The company uses local production & contract manufacturing to contain costs. It requires the re-design of products & processes in order to reach realistic cost levels. Japanese design cannot be extended to EM-WIN - repurpose design and innovation caused by product life cycle shrinkage. Panasonic has identified a need to perform a complete overhaul of how it conceives, designs & manufactures its products. By reducing features & localizing design & manufacturing, costs can be reduced to reach acceptable prices: pricing targets are; TV US50, air conditioners $US100, washing machines $US200. Eliminating features simplifies the manufacturing processes and requires fewer parts and permits standard parts & platforms. Markets exist; competitors such as Samsung Electronics & LG Electronics are pursuing similar strategies. And as discussed above the automotive market will be following parallel strategies.

The impact on logistics and supply chain costs are likely to be significant due to the re-engineering of the product range around standard components and platforms. Furthermore Panasonic can move closer to realising the current 'holy grail' of moving demand and the supply response closer as they will be manufacturing *in* the markets rather than servicing them from some distance. In both

industries (automotive and consumer durables) it can be expected that international distribution companies, such as UPS, may emerge as significant in the distribution and inventory management of service parts, particularly so if the automotive industry can agree on standardisation and shared platform technology.

2.7 Technological applications

The impact of *technology management* is often assumed to be limited to the development of ICT led-systems but there is another aspect to technology management, that of assembling capabilities, capacities and processes in unique combinations to meet opportunities. The application of freezing tecnology to agri-business created an opportunity to manage time throughout the life of products that prior to these applications had limited life span saleabilities with significant implications for sustaining price levels. In the opposite direction micro-wave technology is being applied to 'time-short' consumers by compressing processing time on an increasing range of convenience/ready prepared meals.

Technology has significantly impacted the design process for new vehicles in terms of both quality and time-to-market. For example, as GM enters the electric vehicle market, it will work to design the Volt with manufacturing costs in mind from the start. Today's advanced software can quickly transfer product and process designs to manufacturing, contributing to much faster new product introductions. Additionally, complete closed-loop feedback of pre-production and pilot phase production anomalies can be instantaneously reported back to the engineering staff for fast, corrective action. This approach can dramatically reduce the likelihood of a recall while greatly improving the quality of final products. (*http://www.apriso.com/index.htm*)

Other aspects of technology and time management concern DDM (Direct Digital Manufacturing). DDM is the process of using CAD or other data (e.g., 3D scan data) to drive an additive fabrication machine that makes usable parts—from jigs and fixtures to sellable products to replacement parts. DDM eliminates moulding, machining, casting and forming. Instead of material removal or shaping, a company's finished goods are produced by adding material one layer at a time. Other than a few minutes of pre-processing to prepare a production run and some light post-processing to clean up a part, DDM progresses directly from CAD data to final part. Eliminating the upfront and back-end operations common to traditional methods means that there is no extraneous time, cost, or labour.

Due to the elimination of tooling, DDM can save tens or hundreds of thousands of dollars on a single project. Using our own company's FDM additive fabrication process for DDM, Stratasys eliminated about $200,000 in tooling costs for new machines by directly manufacturing 32 components rather than having them produced via traditional means. The savings on one project can outweigh the cost of the machine purchase. Collectively, these benefits translate to efficiency, flexibility, responsiveness and affordability. DDM is a manufacturing process that introduces alternatives in product design, manufacturing methodology and business operations. As an added benefit, many additive fabrication technologies are fairly "green" processes. They have very little waste material as compared with milling processes because only the needed material is used. No unnecessary inventory is produced because there is no benefit to building more product than you need at any time. (2010 Fortus 3D Production Systems - Stratasys, Inc)

Retailing has been 'targeted' for technology application for some time. Sutherland (2010) suggests that another wave of development is yet to occur when 'the best of the digital world is combined with the best of the real world to rejuvenate town centres'. He is commenting on the closure of Borders (book retailers) activities in Britain and suggests that online purchasing has changed the behaviour of book buying. He identifies the next development – the Espresso Book Machine – 'on demand printing. Hotels and airline are offering facsimile editions of the world's newspapers and now the Espresso Book Machine (visit; http://twurl.nl/6hpoyw.) takes a similar approach to the production of books. It can print, glue, bind, cover and trim a quality paper back in about two minutes, at a cost of about one cent a page. The machine occupies no more space than a large photocopier! Another application reported by Sutherland is a pizza delivery chain that is investigating the technology to download and record any DVD of the customer's choice while the pizza is cooking. He suggests;

"there is a great future for shops that combine the best of the physical world with the best of the digital world".

2.8 Some implications for logistics and supply chain management

Increasingly we are observing technology management intervention into the manipulation of time and location. Technology is enabling the acceleration and deceleration of food marketing by using freezing and ambient temperature controls to extend and/or compress selling and consumption of food products. The impact on inventory management is to increase storage, transport and in-store merchandising costs. However these costs are clearly recoverable through the acceptance of price levels by end-user and catering/institutional customers.

The developments in DDM are interesting. While it is an expensive option if the concept is applied to market situations where time and availability are critical value drivers (e g; healthcare equipment and high-tech products) considerable increases in productivity can be envisaged and these, less the costs of storage and, more importantly, obsolescence will create economic value.

The introduction of rapid facsimile print reproduction could revolutionise the distribution of newsprint and particularly books. For example, university book stores could well become a collection of reproduction machines supported by online catalogues developed by the universities and the publishers.

2.9 Offshoring, nearshoring and backshoring

In many ways the "production" process in the value chain network has been influenced more than the other network processes (developments such as globalisation and process technology have changed the business environment). Global activities have until recently created a number of opportunities. The emerging economies have offered low cost production expertise and these have led to many networks identifying low cost/low tax locations suitable for operations (the very recent trend towards increasing energy costs may result in a rethink of this 'advantage). Mortished (2008) identifies some alarming consequences for the ratio of low value commodity products to their transport costs over long distances writing at the time:

"The economics of long-distance supply chains are being rewritten; if it is small and expensive – drugs and sophisticated electronics, for example – fuel costs have little impact, but bulky goods are under the cosh. Furniture, footwear, basic machinery, building materials – this is the stuff that China exports in vast quantities to America and it was very cheap, until now"

And, quoting CIBC World Markets, estimates:

"The freight costs of importing goods into America represented an effective tariff of 3 per cent when the price of oil was $20 per barrel in 2000; it is now more than 9 percent and will rise to 11 percent if oil hits $150 "

How many organisations had expected the current environment of rapidly increasing energy prices, and postulated their impact on transportation costs? Furthermore, of those who had how many had viable response plans in place? As it happens these predictions did not eventuate; however other cost increases have occurred and a trend towards moving manufacturing back to domestic facilities are frequently reported. Furthermore as the PRC economy returns to its growth rate prior to the recession labour rates are increasing at a reported twenty per cent.

Holstein (2010) reports on a change of direction by one major US Company, NCR, suggesting that others are also considering the shift. Like many other large U.S. manufacturing companies, in the past couple of decades the maker of automated teller machines (ATMs) relied heavily on outsourcing to trim factory costs. By hiring Singapore's Flextronics International Ltd. to make much of its equipment in cheaper offshore locations in the Asia/Pacific region and South America, NCR saved hundreds of millions of dollars in plant expenses and be reasonably certain that its ATMs met quality standards. In 2009, the company decided to reclaim responsibility for making one of its most sophisticated lines of ATMs from Flextronics in Brazil and instead manufacture the machines in Columbus, Ga., not far from the NCR innovation centre. The company was concerned that outsourcing distanced its

designers, engineers, IT experts, and customers from the manufacturing of the equipment, was inhibiting the company's ability to turn out new models with new features fast enough to satisfy its client banks.

An additional large organisation that followed a similar strategic change of direction to NCR was American Power Conversion (APC), a global leader in data centre solutions. After the purchase of APC by Schneider Electric in 2007, APC Australia decided to consolidate its local logistics and oversees product assembly operations into a single facility in Sydney and manages them in-house. Prior to this decision, APC's warehouse and logistics activities were managed by a third party logistics provider (3PL) and their assembly activities undertaken in China and Thailand and the final products then shipped to Australia. Gordon Makryllos, Vice President of APC, Pacific stated that "By managing their own warehousing, logistics and assembly operations, APC would have greater control over product delivery and quality. We can demonstrate to our customers how we are committed at every level to delivering quality products and services." (www.apc.com September 16, 2009)

It is worthwhile reviewing the recent past. ***Operational outsourcing*** became significant many years ago as manufacturing expertise and capacity became available outside Europe and North America; it should also be remembered that manufacturing technology became transferable, often being 'refined' such that it no longer required experience to manage and produce output at acceptable levels of quality; and this together with the industrialisation of Asian based labour forces became irresistible to North American and European organisations who viewed cost management as a major element of competitive advantage. A number of variations exist.

Outsourcing (offshoring) a practice of using external production capacity to manufacture all or part or a product in order to reduce labour and/or materials costs. Offshoring consists of transferring some or all internal processes or activities to outside providers to achieve a stronger competitive market positioning by lowering costs, improving access to resources and/or customers. Whereas ***Nearshoring*** uses adjacent low cost, unskilled labour sources to manage costs and reduce supply chain risks; for example US apparel manufacturers using Mexican resources to manufacture product. This can reduce inventory lead times and transportation costs significantly. Holstein is describing ***backshoring*** the repatriation of manufacturing returning control to the organisation *and* providing it with an opportunity to meet the changing customer expectations (time-to-market) at acceptable levels of cost.

However, this is the less interesting of the outsourcing activities that are pursued by companies. What we have been discussing here is operational outsourcing, but as we have seen above (the "fifteen/fifty" solution or "reverse innovation" to take advantage of 'emerging market' opportunities) is persuading organisations to reconsider this decision in light of problems often encountered (poor delivery records, quality issues, and often quantity problems); given these difficulties the benefits obtained from source market low labour costs become a lot less attractive.

Industries, as with end-user customers, have value drivers. Typically these are a combination of knowledge, technology, processes and relationship management. As the importance of these changes over time two important decisions have to be considered. The first is being addressed by NCR and others; the need to be able to exercise more control of manufacturing *and* of design and development. The other is that many organisations are finding that their core markets no longer offer the high margins that are necessary to provide the cash flow required to establish (and maintain) the growth rate expectations of their shareholders; in many instances this is because of fierce competition. General Electric was reported to be considering the sale of its 'white goods' appliance division; reasons given were that the division is no longer the dominant cash generator it once was, that it employed none of its US labour force in its manufacturing, and, it requires more cash to expand its healthcare activities.

Figure 8 identifies two increasingly important forms of partnership structures. ***Strategic partnering*** is used to achieve long-term strategic competitive advantage and growth by *deploying core* expertise/resources of the organisation's own and those of partner organisations in adjacent industries and markets. These may be non-equity alliances but increasingly do involve acquisitions and mergers. ***Transformational partnering*** is used to create 'Vertical and Horizontal Scope' in the value network system through investment in order to achieve long-term strategic competitive advantage and growth

by *jointly developing/accessing new assets* with partners, and the *collaborative application* of processes and capabilities to achieve strategic inter-organisational response capabilities to pursue new product-service-markets. Again this typically involves acquisitions and mergers. **Figure 9** provides examples of all three partnership structures.

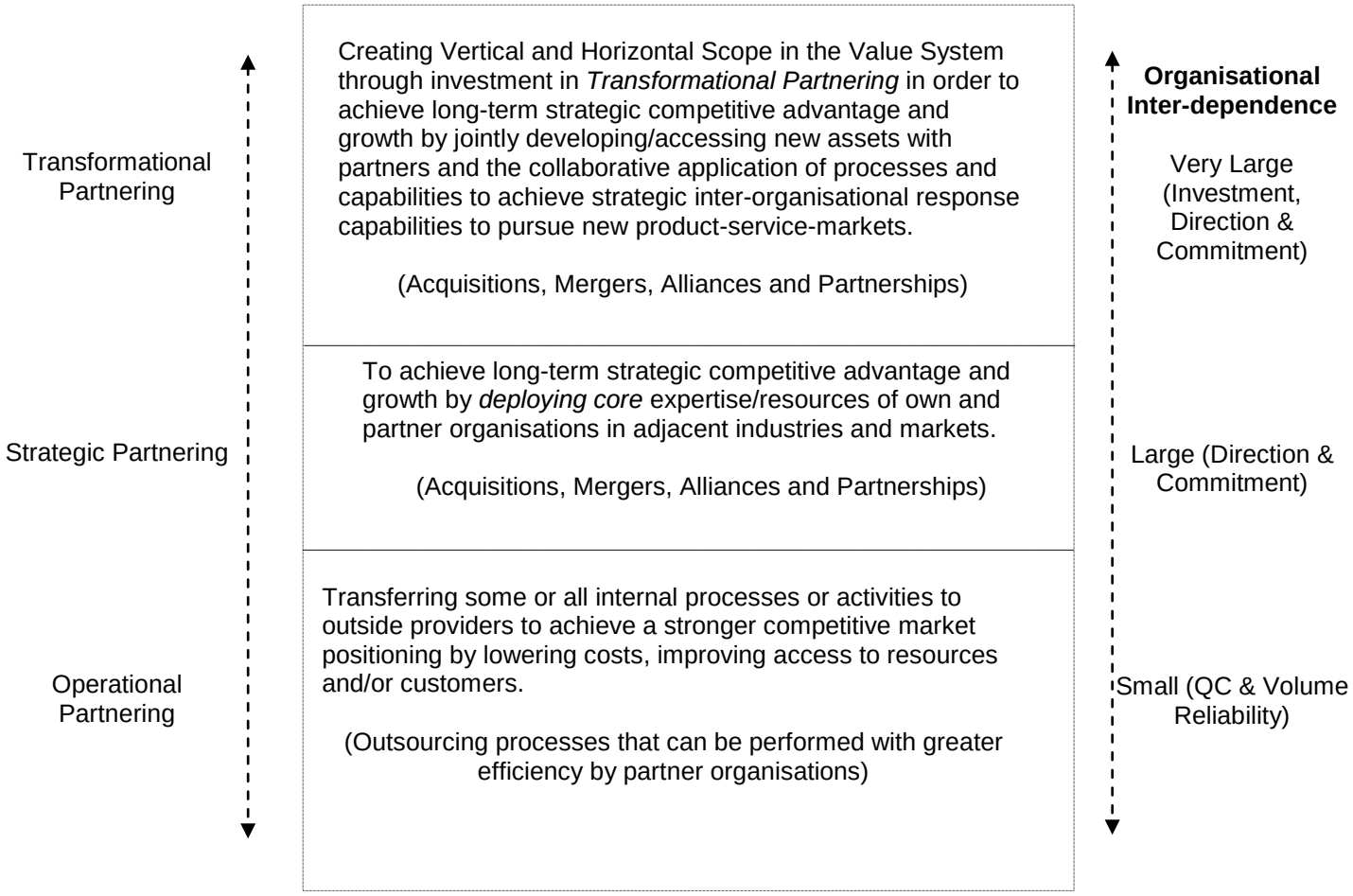

Figure 8: Typology of alliance and partnership decisions

Other recent examples of strategic and transformational partnering include: *IKEA/Skanska* are collaborating on manufacturing and distributing prefabricated apartments. *Caterpillar and BHP Billiton* has announced a partnership to develop driverless trucks designed to increase safety and efficiency within mines. *Metcash (Australia) i*s increasing its customer appeal by expanding its fresh produce ranges via acquisitions and joint ventures; it has been successful in the acquisition of Mitre 10, a cooperative chain of DIY stores, primarily because of its experience in servicing the IGA independent food and beverage cooperatives. *Aventis pharmaceuticals* & biotech *Millennium* (pharmaceuticals) have codified working rules for their alliance. Companies in the aged-care sector are combining to create economies of scale. This is a collaboration of insurance companies, property developers, healthcare equipment and services companies.

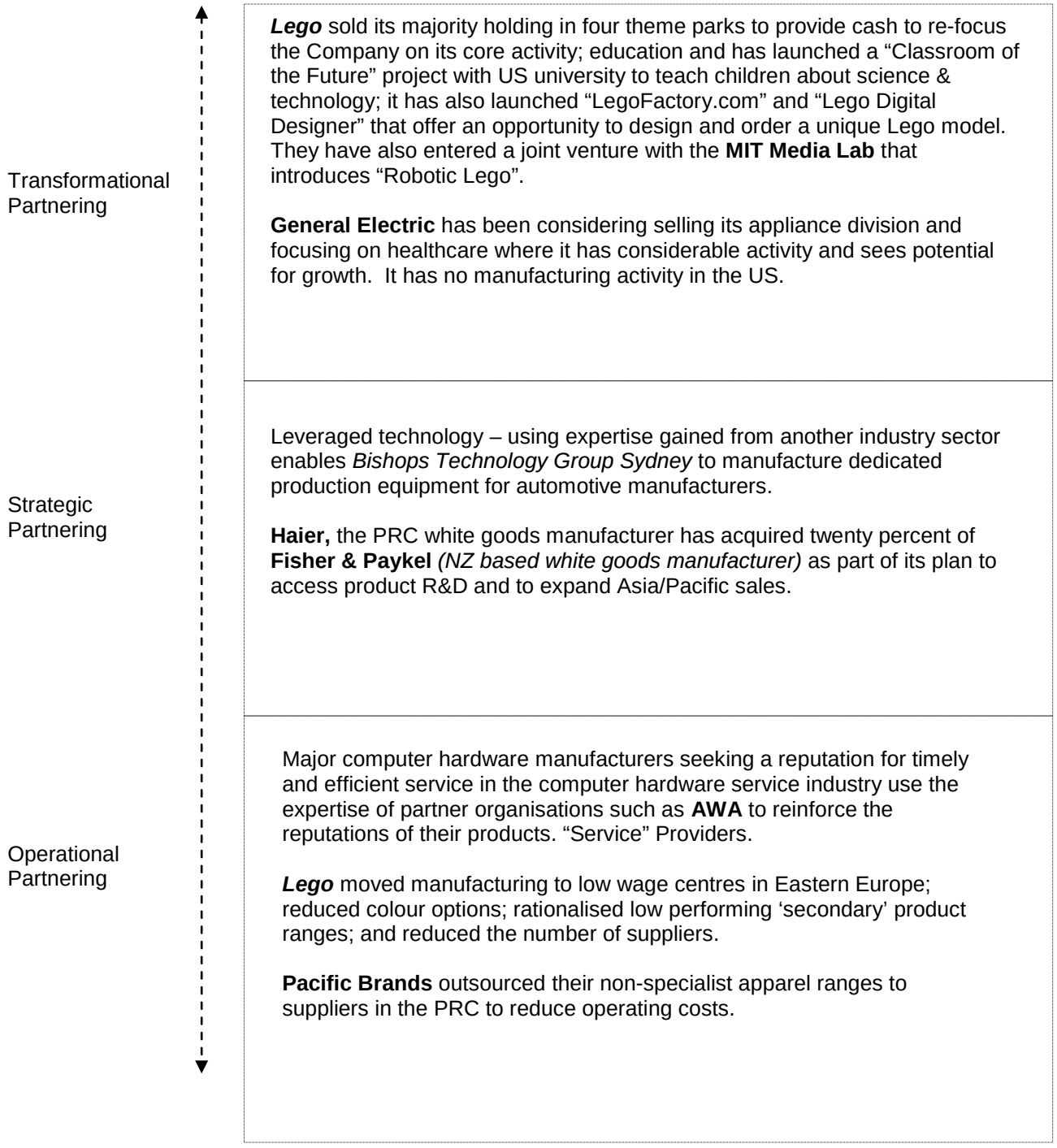

Figure 9: Examples of developing alliances and partnerships

2.10 Some implications for logistics and supply chain management

It is not easy to predict all of the developments likely to evolve from strategic and transformational partnerships. Certainly consolidation of like-for-like facilities will occur; for example we already see extensive co-opetition in the pharmaceutical industry and Metcash will extend its CPFR expertise into Mitre 10 with a potential saving of significant inventory holding. Other developments may well see

the introduction of Logistics and SCM networks that are internet based. And others yet to appear (such as the publishing industry) may be completely digital as Apples iPad promises.

Strategic changes in direction such as those taken by NCR and APC in addition to the factors mentioned above (i.e. consolidation, co-opetition, mergers and partnerships) could eventually have a major impact on the logistics service providers (3PL's) that have made huge capital investments in developing the infrastructure to provide the service to such companies. If the recent decisions of organisations to change direction and reverse their strategies to one that includes backshoring becomes a growing trend, 3PL's, especially those that have made long term capital investment will face major financial issues as they look to not only retain existing customers, but also gain new ones in a changing business environment.

3. Concluding comment

This paper has attempted to offer a summary of the current approaches to business model developments and the implications for logistics management. Findings from the Brookings Institution suggest that in the US fixed asset ownership of large manufacturing and mining companies suggest that fixed tangible assets fell as a proportion of total assets from 67 percent in 1982 to 38 percent by 1992. By 2000 this was reported to be less than 30 percent. This trend tends to confirm the view that there is a move by a majority of organisations to favour the flexibility (even agility) of the virtual organisation. The changes in the business environment landscape has had a major impact for organisations on what value is, how it is created, produced, delivered and how it is serviced. Business model designs that succeed share common features:

- They have high customer relevance
- They are internally consistent sets of decisions concerning scope (products offered and value chain processes performed)
- They have value capture mechanisms or profit model
- A powerful source of differentiation and strategic control that gives investors greater confidence in future cash flows
- Organisational architecture that is designed to support and reinforce the company's business model design

We should leave the final comments to Pebler (2000) who summarised the development of virtual organisation structures and offers a prescription for the future virtual organisation:

"The virtual enterprise of the future will be much more dynamic and sensitive to the need for tuning operational parameters of the enterprise as a whole, including capital spending for both producers and service companies, optimising the whole chain of value creation. The future world will be characterised by knowledge management and collaborative decision-making by way of virtual teams. Virtual enterprises will be empowered by a willingness to do business in more productive ways and by information technologies that eliminate barriers between stakeholders

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