Demand Chain Management: An integrative approach in automotive retailing

Professor Peter Hines ¹ (corresponding author)
Professor Riccardo Silvi ²
Monica Bartolini ²

¹ Lean Enterprise Research Centre
Cardiff Business School
Aberconway Building
Colum Drive
Cardiff, CF10 3EU
UK

² Bologna University
Forlì Campus
P. le della Vittoria, 15
47100 Forlì (FC)
Italy
Demand Chain Management: An integrative approach in automotive retailing

Abstract

Recent reviews of the Operations Management research literature have shown a surprising little shift towards empirical methodologies from traditional modeling solution methods. In addition, there is generally a lack of empirical testing and validation of manufacturing strategies. Coupled to this fact is that empirical work is rarely carried out in an inter-disciplinary manner, with the complete combination of OM, marketing, strategy, lean thinking and accounting approaches particularly poorly researched. Fully cross-functional integrative empirical research is required to help support the understanding of the applicability of OM practices within industry. This paper explores such an integration of approaches developed within the Lean Thinking, Strategic Cost Management, Marketing and Policy Deployment areas. In order to investigate the approach a single automotive retailer is used as an instrumental case. The results of the study show that the new approach stands up well as an integrative approach that can prove highly beneficial results. However, the pilot work also identified a number of limitations that are the basis of further refinement and testing of the method.
1. Introduction

Ever since the pioneering work of Jay Forrester in the 1950s academics, consultants and practitioners have been searching for the ‘holy grail’ theory, method or solution that will cure all of their supply chain ills. Theories or approaches have come from systems dynamics, time compression, lean thinking, business process re-engineering, agility, mass customisation and the virtual organisation (respectively: Forrester, 1961; Stalk & Hout, 1990; Womack & Jones, 1996; Hammer, 1990; Kidd, 1994; The Economist, 2001, Davidow & Malone, 1992).

Previous debate has often attempted to show that one approach is superior to another and that a new approach answers all previously unanswered questions. In doing this, such research has provided many insights into the improvement of both the internal operations of companies and the wider network of customers and suppliers. However, almost invariably work has been attempted from a functional rather than process basis (Schonberger, 1986; Ostrenga & Probst, 1992) and in most cases has concentrated on finding the most efficient or effective way to sell the products or services produced (Porter, 1985; Towill, 1996), often relying on modeling solution methods (Scudder & Hill, 1998; Pannirselvam et al, 1999). Attempts to integrate the real demand or customer perspective into supply chain thinking, although not unknown, are far too rare (Christopher, 1992; Womack & Jones, 1996, Archer & Wesolowsky, 1996).

In addition, in many previous approaches researchers have attempted to develop an appropriate solution to the improvement of the real case supply chain based on a specific methodological approach, which often leads to predictable solutions. For instance, advocates of Systems Dynamics Control Theory invariably suggest the elimination of a distribution tier (Towill, 1996), whereas followers of the Parallel Interaction school may be required to adopt a supplier development and
co-ordination approach (Wilding, 1998). There appears to be a significant danger here that solutions are not being tailored to particular Supply Chain requirement but more to the prescriptive solutions of particular approaches. Thus, the key determinant of the solution may be the method chosen and not always the actual supply chain dynamics. What is called for is an integrative approach that seeks to gain a more holistic and contingent decision making approach.

2. An Integrative Approach

In order to develop such an approach the authors have attempted to draw from four complimentary management areas, namely: Process Based Lean Management, Strategic Cost Management, Marketing and Policy Deployment. However, presently none of these approaches with their respective toolkits, on its own, is capable of a truly holistic approach. Each has its own strengths and weaknesses (Table 1).

The Lean Management approach relies on five key principles: ‘Understanding Customer Value’, ‘Identifying the Value Stream that Adds this Value’, ‘Creating Flow of Product and Information’, ‘Using Customer Pull’ and in so doing ‘Seeking a Wasteless Perfection State’ (Womack and Jones, 1996). In order to implement such a Lean System a series of tools and approaches have been developed which primarily fall into two categories: diagnostic/analytical and implementation (Bicheno, 2000). Within the diagnostic/analytical area are the Value Stream Mapping Tools (Hines and Rich, 1997; Rother and Shook, 1998; Hines and Taylor, 2000). The implementation toolkit includes a wide variety of tools drawn from the Just In Time and Total Quality / Six Sigma schools (Shingo, 1989; Ishiwata, 1991). Although the Lean paradigm is widely accepted in manufacturing industry, it has yet to make a major impact away from the shop floor and particularly outside manufacturing firms. In addition, it does not presently have a widely accepted, rigorous customer focus approach, nor a good way of measuring financial
benefits, although research is ongoing in both these areas (Hines et al., 1998; Brunt et al., 1998). Indeed, there is a general lack of material in the OM literature specifically linking production performance to appropriate costing systems (Fullerton and McWatters, 2001).

Strategic Cost Management is well equipped to address the major shortcoming of a lack of financial measures, as it has the stated objective of using cost information, often gathered from several heterogeneous sources, to define and create a competitive advantage (Shank and Govindarajan, 1993a,b). Within Strategic Cost Management, managers look for ways to leverage the industry value stream in unique ways that reduce the cost and complexity of completing transactions. The key contribution of the approach is that it takes an external view of cost and raises the understanding of how company activities can be better leveraged and aligned with the market to improve performance (McNair et al., 2001b).

In particular, Strategic Cost Management provides an innovative perspective on the way that choices of task environment can affect costs structure. It focuses its attention on the distribution of activities within the whole system, in order to reconstruct the value generated overall by the industry and grasp how value is distributed between the different companies (Shank and Govindarajan 1993a,b).

A recent development of the Strategic Cost Management tools (McNair et al, 2001a, 2001b) provides an innovative framework to describe a company’s cost structure in a form compatible with the engineering business process analysis, typical of a Lean Management approach. In summary, it allows the researcher to capture the potential relationship between customer/market requirements, defined as an array of value attributes with unique customer weightings, and the firm’s economic and activity structure. This model assumes that the resources available to provide products and support internal operations are channelled into
a number of processes, or activity streams, that result in any number of outcomes. Although the nomenclature is slightly different from that used within Lean Management, a similar view is taken of process-based value adding and waste viewed from a customer (or consumer) perspective. Thus, in contrast to Activity Based Costing, Strategic Cost Management provides a useful distinction between the activities based on their respective value to the customer (Ostrenga and Probst, 1992) through a process based orientation.

Strategic Cost Management assumes that in order to analyse cost behaviour you need to explore the causal relationship between the use of resources and the root causes of their consumption within key processes (Ostrenga and Probst, 1992). As a result the application of Strategic Cost Management can help firms and wider Supply Chains to enable change rather than inhibiting or mis-directing it, as often occurs with many more traditional accounting approaches (Johnson and Kaplan, 1987).

There is therefore a good deal of convergence between the Lean and Strategic Cost Management approaches. Both also are starting to rely more heavily on understanding customer needs. As a consequence, moving to a “total firm perspective”, a third role should be played by various marketing tools, through the identification of the key attributes in the eyes of the customers and the assessment of their respective weighting (Wayland and Cole, 1997; Green and Srinivasan, 1990; Lancaster, 1971). This will aid company’s efforts in designing and improving processes. Thus the description of the customers’ value profile becomes strategic as it the basis of understanding how to create a competitive advantage. It involves the direct participation of the management but, most of all, of the customers, moving from an internal focus towards an external one. However, by combining the three approaches we are able to connect the marketing approach to the operations of the business. Hence, we can move to a marketing philosophy focused on matching the needs of the customer with the
ability to deliver value, instead of expanding the number of product variations as a means of increasing market share (Turney and Anderson, 1989).

It is our contention here that an integrated or holistic process-based approach is the most effective way to drive companies towards a competitive advantage. As a result the research team faced the challenge of developing marketing, cost, and operations approaches, tools and languages in order to be able to speak to one another. In addition it was necessary to integrate these different approaches in order to guide the direction of a company or wider Supply Chain. The approach chosen to do this was Policy Deployment. Policy Deployment may be described simply as an approach to focus the operations of a whole company according to a set of expected results by the use of a rigorous set of guidelines for the achievement of these targets. Policy Deployment is generally regarded as a westernised, and often simplified, version of the Japanese Hoshin Kanri approach (Akao, 1991). In its simplest form (Hines and Taylor, 2000), it involves a firm codifying its strategic direction, aligning a set of Key Performance Indicators to this and then checking that all its improvement activities are designed to produce optimum results by being directly alignment with the achievement of these results.

3. Methodology

The methodology used in this research was an Action Research driven case study approach (Yin, 1989). This case approach is required because of the need for a very flexible and holistic research design (Hakim, 1987), that involves a combination of different methods in order to deal with the complexity and variety of data (Hartley, 1994, Yin, 1989). In particular, the present work uses the case study as an “instrumental cases” (Stake, 1998), where the case facilitates the understanding of some more general issues. This realist approach was chosen as the conceptualisation of a theoretic research model was simple; however, the
novelty of the research was how to implement such a set of diverse approaches, an empirical testing called for by many in the OM literature (for example: Anderson et al, 1989; Smith & Reece, 1999).

A single pilot case study of an automotive retailer based in Wales was developed during the first six months of 2001. The choice of a single case study is mostly related to the complexity of this kind of analysis, as it involves a time-intensive global approach to a company (including its market) and the combination of several techniques and methods, such as the use of secondary data, observational techniques, interviews and surveys. In total this research involved approximately two hundred and fifty man days of field research.

As it is necessary to have the full (and time consuming) involvement of the management, the selection of this case has been based primarily on the company’s willing to take part in the study and their expectation of gaining from such an Action Research approach (Wass and Wells, 1994). In fact, this propensity guarantees a very full access. The firm had become aware of the potential of Lean Thinking as one of its senior staff members was attending a diploma level course on the subject. However, the problem the firm faced was that it was unsure as to how to proceed in implementing such an approach. At the same time, the firm was also selected as it had a traditional accounting systems and had identified a need for change. A limitation of this research is that the detailed findings relate to the particular case company alone. The findings, in terms of the specific improvement activities that the firm should take are likely to have a wider applicability in the industry, but inferences from a single case need to be made with care (Yin, 1989). However, inference on a more general applicability of this type of research approach can be made with more surety.
3.1 The Research Approach

The starting point for the research was to understand the firm’s existing business strategy and general policy. This was undertaken with the four most senior managers in the business and was facilitated by the research team primarily using a process, rather than expert facilitation approach. This was undertaken over a series of on- and later off-site 2-4 hour sessions. These were well received by the firm but even these short sessions caused some dislocation to normal operations due to the great reliance the firm placed on its two most senior staff. This approach sought to: establish the Critical Success Factors for the firm, review and/or define the appropriate Key Performance Indicators, define the key business processes and to understand which processes need detailed analysis and improvement.

In order to understand the customer view, a structured interview form was developed. The primary purpose of this was to establish which factors the customers thought were important in the service that was provided to them by the dealer and how good the dealer was in satisfying them. This was developed by gaining the views of the staff at the dealer and then testing with ninety five face-to-face validation interviews with customers in the dealer. Again the staff at the dealer were very co-operative as the research was viewed by them as of central importance in gaining competitive advantage for them. During this validation stage the questionnaire was modified slightly both in terms of the factors or Value Attributes chosen and a change from a fixed total scale for the Value Attributes to a Likert type scale. The latter change, although somewhat compromising validity, was felt necessary in order to improve response accuracy and response rate when the questionnaire was subsequently sent as a postal questionnaire to customers. One thousand five hundred and twenty postal questionnaires were sent to existing customer and 502 usable responses were received representing a 33% response rate. Cluster analysis was then carried out on these questionnaires (Green and
Srinivasan, 1990) Although this approach has certain limitations in terms of the distance metric and linkage algorithm chosen (Wass and Wells, 1994) it was felt appropriate for customer segmentation, at least at an indicative level. Once this indicative clustering had been carried out using SPSS 10.0 software, it was found that most of the population fell in one cluster. The cluster analysis was carried employing casewise Hierarchical Cluster Analysis, asking for a single solution with a maximum of five clusters. The Hierarchical Cluster Analysis method is particularly suitable where there is a limited number of cases as here. For clustering, the Between-Group linkage (default) method was employed and, as a measure, the Squared Euclidean distance (default) method. The results showed that a single important group represented more than 90% of the cases meaning that there was one main cluster.

In order to understand internal process activity, the three primary processes that had been identified (New Cars Order Fulfilment, Used Car Order Fulfilment and Servicing, Figure 1) were mapped using the Value Stream Mapping toolkit (Rother and Shook, 1998; Hines and Taylor, 2000). The very minor areas relating to crash repairs and spare part over-the-counter sales were excluded as they represented under 1% of total turnover. This mapping work was facilitated by the researchers using a process, not expert, facilitation approach as the researchers did not want to create too much un-necessary reflexivity (Wass & Wells, 1994). However, a limitation was that the staff at the dealer initially saw the research team as experts, rather than process facilitators, an impression that the research team had to work hard at changing. The mapping involved three different internal expert groups, one for each process together with one of the senior managers acting as a research champion. In order to understand the process costing, one of the authors worked closely with the firm’s accounts clerk in a series of semi- to un-structured interviews.

Once this data had been recorded, the final stage was to validate the business strategy and develop an improvement plan. This work was undertaken in
2-4 hour off-site sessions involving the researchers and the senior managers in the dealer. Again the primary task of the researchers was to be process facilitators, although their role did change here, at times, towards expert facilitation. However, in order not to invalidate the neutrality of the main research team, this latter role was taken by another university (and automotive industry) expert who joined these sessions. The result of these final sessions was a set of action plans appropriately correlated back to the earlier defined Key Performance indicators.

4. Results

4.1 Business Strategy Formation & Policy

At the start of this activity it rapidly became apparent that the retailer had a well thought out business strategy and understanding of their policy position. However, the first problem was that this strategy was not codified, nor necessarily disseminated to the staff in the dealer. Secondly, the researchers identified that this strategy had been highly influenced by the car manufacturer who supplied all of their new cars.

In order to codify the strategy, the researchers facilitated a discussion using several strategic development tools including SWOT, Environmental Scanning and Growth Vectoring. Together with a related discussion it was possible to define a set of Critical Success Factors for the dealer (Table 2). The factors are a mix of external (market facing) criteria and internal efficiency and effectiveness areas. As these had been established as important areas to address, the next facilitated workshop sought to see how well the existing (implicit) strategy was being deployed into the business by the existing measures. The reason for this is that, in general, individuals and departments in a business tend to focus on how they are measured rather than business strategy when making strategic and operational
decisions (Dimancescu et al, 1997).

The existing set of measures (the most important of which are shown in the first column of Table 3) had largely been influenced by the retailer’s supplier of new cars. However, it was necessary to check whether this set of measures would help drive the right behaviour in the dealer. This alignment was checked using symbols for direct, indirect and negative relationships and is illustrated in Table 3. The results show that the existing measurement set is likely to be very good at helping keep the franchise, developing long term profitability and keeping customers happy. However, as there were few direct correlations in the other columns of the table, it was felt that the existing measures were far less likely to encourage external influences, a correct balance between the channels and a growing market share. A cynical observer may be led to the conclusion the existing manufacturer-induced measures were good at helping achieve what the manufacturer wanted, but less good for the retailer. Indeed, ‘other outside influences’ may distract from the manufacturer’s message, keeping the retailer focus on the new car value stream, rather than used cars or servicing, which is more profitable for the manufacturer and growing market share at the expense of another franchise same-brand dealers would do little for the manufacturer. This finding validated the dealer staff’s suspicions. This incident does, however, illustrate the effect of power on supply chain relationships (Cox et al, 2000).

The discussion around these measures also suggested that there was no single very good measure of market growth, an inadequate measurement set for people issues and that the existing measures reflect internal efficiency rather than wider external or customer focus. As a result a number of new measures were added:

- Market Share (Local Region versus National Average)
- Retention Rate for New & Used Car Sales for First Service
- Retention Rate for New Car Sales for Service after three years
- Service Parts Absorption (a profitability measure)
• Overall Channel Effectiveness Measure for each Channel
• ILU Measure of Staff Skills & Competencies

These measures reflect customer-focused areas, the interaction between the three key business processes and internal effectiveness. The Overall Channel Effectiveness measures reflect a development of the Overall Equipment Effectiveness measure used so successfully by lean manufacturing firms (Rich, 2000).

Targets were then developed for each of the retained existing measures and the newly introduced ones (Table 4). This was achieved through process facilitation by setting initially a five year vision for each measure, defining an initial benchmark and then creating targets for each intervening year. However, at the point of writing, the ILU measurement approach had not been fully developed and so targets could not be assigned. The staff felt that this was helpful in helping to set firm direction for them.

4.2 Customer Understanding

This part of the study sought to understand what the customers really wanted from the retailer from the three key business processes responsible for delivering new and used car and after-sales service. As a result it helps to validate how sensible the existing business strategy is and whether it is related to true customer needs. In addition it can also help suggest how this strategy may be achieved.

From the results of this research element, it is clear that new and used car buyers seem to have very similar requirements. The Mann-Whitney Test confirms that the two groups differ in a significant way in only a few attributes (in particular, for price, payment terms, order-delivery lead time, and dealer facilities). Results
are shown in the relevant value attributes profile of the nine main factors based on a 1-5 Likert scoring scale (Figure 2). There are some minor differences between the two sets with used cars buyers being more price and payment term conscious. New car buyers are more focused on the retailer’s staff, facilities and after sales service.

If we consider that the dealer reputation, the staff, the facilities and the service are directly controlled by the dealership (at least, much more than product characteristics, price, payment terms and brand), these findings suggest that the analysis and development of the internal processes (especially after sales service) might prove beneficial. In fact, the staff and the service activities are main determinants of the process flows investigated through the Lean Management tools. Moreover, the entire service process could become the target area for continuous improvement programmes, with strong impacts on time, quality and costs. Thus this marketing analysis is starting to shape the future direction of the firm by highlighting the strategic role of servicing in the customer’s choice of a dealership.

Cluster analysis of these results showed that it was not possible to split the customers into many significant clusters, as they already represent a specific homogeneous group: customers of the same strong brand. Indeed, over 90% of the customers could be seen to be in the main cluster. In addition, no significant differences were found depending on the final use of the car or the reason for its purchase. Thus, in order to obtain a real understanding of the different car segments it would have been necessary to extend the survey to the entire car buying market, a survey beyond the scope of this work.

Therefore it is possible to compare only two significant clusters. While the biggest one (over 90% of customers) tends to give a higher importance to every attributes and, in particular, to the dealer reputation, the staff and the after sales
service (areas that the firm can control), the second largest cluster (5% of customers) gives greater precedence to product characteristics and the price (areas that the dealer cannot greatly influence). This consideration again supports the proposition that a better management of the internal processes can affect the perceived customer value.

If we consider the customer satisfaction level, a very similar position is seen between new and used car buyers, the former of which is shown in Figure 3. There is a generally lower score for satisfaction than expectation except for payment terms. However, of more importance is the gap between satisfaction and expectations. Given the perceptual nature of data, inferences should be made with care with minor differences treated with some scepticism. However, both for price and after sales service there is a gap in excess of one Likert point and so these could be considered to be the most important gap areas. The dealer has very little control over the former of these but a great deal over the latter.

With regards to After Sales Service (Figure 4), the position is a little different. Here the retailer does not fully meet the customers’ expectation anywhere. Of the nine most important value attributes in this area quality appears to be most critical. The largest gaps are in quality, price, dealer reputation and availability of courtesy car. Arguably, each of these is largely under the direct control of the dealer.

4.3 The Lean & Strategic Cost Management Perspectives

On the basis of the outcomes reported above, the mapping work allowed the main activities inside the new car sales, used car sales, and service processes to be understood. Figures 5 provides an example of the Big Picture map (Rother and Shook, 1998) for the new car sales processes. This map starts with a customer pull in the top right hand corner. The flow of information from the
customer then continues left along the top of the Figure. On the right hand side of the Figure this information is seen to trigger some physical activity such as the sourcing and delivery of the car, which is shown graphically down the left hand side. The physical product is then depicted as moving back towards the customer left to right along the bottom of the Figure. In summary the average total time from order to delivery of each of the processes is: 14.6 working days for new cars, assuming they are sourced from the Area Storage Centre, 12.8 days for used cars and 3.6 days for services.

The Big Pictures Maps represented only the highest level of each process, whereas much more detailed data capture was carried out using Process Activity Mapping (Hines and Rich, 1997). An example of a Process Activity Map is shown in Table 5. These detailed maps of the process, along a well established procedure (Bicheno, 2000), are used to classify each activity step into the following areas: Operation (O), Inspection (I), Delay (D) and Transport (T).

In the normally internally-focused engineering approach, operations are assumed to be the only area that can add value and are generally associated with physical product transformation such as welding two pieces of metal together (Bicheno, 2000). However, in a process based approach in a service or retail arena the method needs to be modified in both language and customer focus. In terms of helping to decide whether an activity is useful or not in the eyes of the customer, we have further classified them into: Value Adding (VA), Future Value Adding (FVA), Supporting Activities (SA) and Waste (W).

Value Adding include activities that are useful for the customer today such as replacing a worn fan belt. Other activities may not add value now but will in the future, such as providing a potential customer with specification details of a car they are interested in buying. Supporting Activities (termed Necessary Non Value Adding in the engineering literature: see Bicheno, 2000), are necessary within the
current process, but do not directly add to customer value and might include checking a variety of sourcing options for a given car. These activities are perhaps “inefficient” rather than wrong and are the target of improvement, reduction or replacement, perhaps in the medium to long term. Activities described as Waste are completely non-value adding and should be the target of short term elimination. An example may be trying to find a pen when one is not readily available when taking a telephone order. This is not only wasteful, but may be highly annoying to the customer. This new language was also more closely aligned with that used within Strategic Cost Management (McNair et al, 2001a).

Consequently, starting from the picture provided by the very detailed Process Activity Map and the cost information already available from the firm’s accounting system, it has been possible to obtain the cost of the activities inside every department. Table 6 shows an example from the Service & Parts department.

The activities reported are the same as those described in the Big Picture Map (Figure 5). The profile of Value Adding, Future Value Adding, Supporting Activities and Waste provided by the detailed Process Activity Mapping for each main activity can then be applied to the macro-level, as shown in Table 7. As can be seen, the value profile of the activity “Car collection & Work division” (Table 5) is reflected by the respective distribution of the labour cost between VA, FVA, SA and W in Table 7.

Table 8 presents the time and labour cost related to each of the three processes under study. In each case “Delay” represents approximately 98% of the time within each process. This 98% figure is very similar to that in other manufacturing firms and their supply chains (Hines et al, 2000). Indeed, as the 98% result is found so often, it may be possible to define a “98% Delay rule” for unimproved internal or external supply chains. Of the remaining time,
approximately half is for Operation in each process and half for other activities. This result shows that each process has considerable scope for time compression. However, in the case of new cars, a considerable part of the Delay is caused by the customer themselves (and thus could be excluded from consideration in a time compression programme). Thus, the Delay time can be subdivided as follows: 49% Customer Delay, 23% Dealer Delay and 27% Manufacturer Delay.

In terms of Value Adding (present or future) both the new and used car processes show a result of just over 50% meaning that only half of the labour costs associated with these processes is valued by the customers. In the case of the service process this value-adding figure falls to a quarter, meaning that there is considerable scope for process improvement here.

Other Value Stream Mapping tools can explore this position further. The Delay Filter Map (Figure 6), for instance, shows the percentage of incoming cars that are delayed due to the manufacturer (20%), internal delays (2%) between different departments (PDI: Pre-delivery Inspection and Valeting) and the percentage of cars delivered late to the customer (15%). The Quality Filter Map (Figure 6) shows that there is a serious issue concerning incoming quality of cars (mainly due to minor damage such as dents or what the staff called “undulations”) and that around a sixth of cars are returned with warranty claims. In addition, one in twenty cars have to be returned for further rework after repair or servicing. Figure 7 illustrates the seasonal nature of sales due to the UK registration system and Figure 8 shows a new tool, the Sales Acquisition Funnel derived from the Product Variety Funnel (Hines and Rich, 1997) which demonstrates the percentage of customers retained at each stage of the sales acquisition. This highlights the key importance of getting customers seated or behind the wheel on a test drive. The reason why there are more customer at the negotiation point than at the test drive stage is that not all customers take a test drive.
drive before starting negotiations.

Further detailed analysis also allowed for the description of other sub-processes such as Car Movements, Job Card Management and Quality Inspections. This detailed approach aims to increase the rigor of the research, as it highlights “...when an activity involves hand-offs from one department to another, and when an activity is highly fragmented, involving people from several different departments performing various or even the same aspects of the activity” (Kaplan and Cooper, 1998, pp. 141).

The cost analysis attempted to estimate the global process costs (Figure 9), matching the Big Picture information (Figure 5) and the department activity cost profiles (Table 6). In this way labour costs can be assigned to the different areas of the process to generate a type of Process Based Costing. Using this data it is also possible to compare the cost of a single vehicle sold. Taking into account unused capital and labour (especially sales staff) capacity it is possible to simulate the effects on unit costs and on the operational margin of a volume increase. Figure 10 provides an example. While the first row shows the operational internal cost of a single vehicle sold with reference to the actual number of sales, the second and the third ones consider a 10% sensitivity analysis around this figure (within current capacity limits).

Although this approach was time consuming for the researchers and staff involved, it was well received and a very high level of access was maintained throughout, although research activity involving the dealers’ staff was curtailed at busy times.

4.4 Business Strategy Validation and Action Planning

At the completion of the operational level data capture and analysis, the
researchers, with a university industry expert, facilitated a strategic level discussion with the firm’s senior managers. This initially involved feeding back the large amount of data that had been captured (only a fraction of which is presented here). After this various opportunities were identified in terms of: Creating Value in the eyes of the customers (VC), Waste Reduction from the existing processes (WR), Developing the firm’s Infrastructure (In) and External supply chain change (Ex).

The details of these different programmes are given in Table 9. It should be noted that a major focus here, particularly in the Waste Reduction area, is in the service processes, particularly where it interacts with the other processes and causes a bottleneck. The two primary bottlenecks where the processes interact are in the service bay and valeting.

In order to validate the targeted strategic plan (Table 4) it was then necessary to see whether the different improvement projects were likely to deliver the required results. The results of this are shown in Table 10. On the left hand side are described the various Key Performance Indicators (KPIs) and for simplicity only the current and three year targets for each. The different proposed improvement projects (in the four above categories) were assigned across the top. Each of these was assessed by the whole team on a subjective 1-5 scale for ease of implementation based on technical difficulty and size of task. Each potential project was then assessed on a zero to three star scale as to how likely it was to deliver results against each KPI. In the case of Administrative Expenses, several of the programmes were judged to create a negative impact as expected under the targeting model (Table 4).

At the conclusion of this process the chart was sense checked for validity. The senior staff from the dealer felt that it was appropriate and that subsequent projects would indeed deliver within a three year period. In order to turn this rough
cut project plan into a more detailed time phased implementation plan, each project was assigned a timescale: Just Do It (JDI) - within 1 month, Short Term (ST) - within 3 months, Medium Term (MT) - Within 18 months and Long Term (LT) - within 36 months.

In order to complete the planning phase the researchers took this outline plan and estimated the Profit Potential of this activity using the earlier financial and simulation information. The term Profit Potential was borrowed from McNair (1994), where she used it to describe the amount of resources a firm can generate by reducing or eliminating supporting activities and waste. In this context, we will take a broader definition of Profit Potential to include the results of any activity (either on the demand or supply side) that can change the propensity for profitability of the focal company whether it is under their direct control or not. Four categories of Profit Potential were defined (Figure 11), each of which would have a contribution to increase the value to cost ratio customer proposition. In Figure 11 a simple plot of Customer Perceived Value against Cost (including waste) is given. Any proposition that provides more perceived value than the cost of providing it will be above the diagonal line. As a rough approximation, the further the customer proposition lies perpendicular above the line, the better the proposition and the more likely the firm is to be gaining competitive advantage and consequent market share. In this case, the retailer was already increasing its market share and so it may be considered to be starting at point “X”.

The first effect is concerned with “Reduce Internal Waste” by leaning the internal processes. This will lead to a leftward move (arrow 1) in Figure 11 as cost and waste are reduced. The second effect (arrow 2), “Develop Customer Value” adds to the customers’ perception of the product/service provided by the retailer and so represent an upward movement in the Figure. As a result of these two effects, market share should be increased. However, there will also be a secondary
Multiplier Effect, shown as arrow 3 in Figure 11. This Multiplier Effect is due to interaction between the three processes. Thus, for instance, if the dealer increases market share by selling more new cars, a secondary effect, *cet par*, is that it will increase the number of cars serviced. Likewise, retaining more customers for longer by providing a better service is likely to lead to an increased retention rate for these customers when buying their next new or used car. All three of these effects can be regarded as a result of the planned improvement activity.

The last effect “Brand Development” is an independent effect due to the estimated future increase in the manufacturer’s brand into the UK market. This effect, although real, is not caused by the firm’s improvement activity. As a result its benefits (as shown in Figure 11) should be excluded from any analysis of Profit Potential from the planned improvement work. This is an important point as it is often difficult to split this effect, *post hoc*.

The first two sets of improvements “Reduce Internal Waste” and “Develop Customer Value” were judged by the team largely to occur in the 0-18 month period. In terms of the first of these, it was decided, on the basis of conservativism, not to include all possible gains but only 50% of those possible gains available by eliminating “Supporting Activities” and “Waste”. The Profit Potential of these effects is shown in Table 11 and can be seen to be very substantial compared to existing profitability within the dealer.

The third and fourth effects are judged to occur in the longer term (18-36 months), although some of the multiplier effect may occur earlier than this. Again the Profit Potential of these effects is given in Table 11. Taking away the fourth effect, the result of the improvement activity has been simulated to more than double the dealer’s profitability within a three year period. This result clearly was highly motivational for the senior managers at the dealer.
5. Discussion

The primary aim of this research has been to solve a particular problem at a specific car retailer, namely how to develop a framework for implementing a lean approach. In addition, a wider objective was to develop, test and if possible validate an integrative approach that seeks to gain a more holistic and contingent decision making approach that would help answer some of the concerns presented in the OM literature about a lack of empirical testing (Pannirselvam et al, 1999; Ward and Duray 2000). In order to do this a single case study was chosen due to the expected complexity of the research and volume of research time that would be required. The individual results of the case itself will be of interest to students of automotive retailing, and may well have a more ready applicability to other organisations in automotive retailing. However, what we believe is readily generalisable is the generic methodology that has been applied here.

The general approach sought to integrate four distinct research approaches (Table 1) into an holistic methodology that is depicted in Figure 12. This involved developing a business strategy and Policy Deployment approach. This set the direction for change and answered the what question. After this a detailed understanding of customer requirements, process activities and process costing was undertaken and potential opportunities were established, thus answering the how question. These potential opportunities were then matched with the set of desired results in order to develop a highly appropriate implementation framework that more than met the expectations of the dealer. An assessment of the general effectiveness of this approach is provided in Table 12, details of which will be discussed below.

5.1 Integration of Approaches

The first area of discussion focuses on how effective was this integration process
as a research method. It was judged that this pilot study was effective in terms of integrating the language used, the cultures of the research team and the functional specialisms of the researchers as well as providing a strategic framework for the firm involved. An example of the effectiveness of the approach was the evolution of some of the Lean, Strategic Cost Management and Marketing language and definitions to a common lexicon for this service industry case. Specifically the team developed the Value Adding, Future Value Adding, Support Activity and Waste classification. The use of Future Value Adding, for instance, recognised the importance of the future revenue stream to the firm and its marketing connotations, an area absent in the traditional Lean Thinking. Similarly, the change from the engineering term “Necessary Non Value Adding” to Support Activity was both less intimidating to the case firm and less value laden. In addition it allowed for triangulation between the different approaches allowing for a richer and more reliable set of findings.

The other major area for integration was that of the cultural and functional backgrounds of the research teams. The research was carried out in Wales with a research team drawn from the UK (England and Wales) and Italy. The research team from the UK were from a supply chain, marketing and OM background and had a wealth of experience in the automotive industry, although considerably less in retailing. The background of the Italian researchers was from an accounting background and their general industry background ranged from extensive to low. None of the Italian team had a significant research background in the automotive industry. In spite of these differences the research team worked very effectively and was able to adopt a process rather than functional perspective.

This research integration and application did however lead to, or at least highlight, a couple of limitations of the approach. First, as the approach was an Action Research case approach, the researchers were generally leading the research process and on some occasions, acting as expert facilitators. As a result the work
suffers from some reflexivity, which would be a serious concern to fellow researchers taking a less positivist stance than the present team (Wass and Wells, 1994). In addition, there was some concern that a purely Process Based Costing approach did have certain limitations as it did not directly account for the cost of non-productive time, for instance among the sales staff. In addition, to some degree, it conflicted with the organisational structure that existed in the firm which was functional in nature. Consequently, the researchers decided within the case study to rely also on elements of other more traditional overhead allocation approaches (Kaplan and Cooper, 1998).

5.2 Practicality of Approach

As shown in Table 12, the approach was judged by the researchers and researched to be highly practical. It proved to be very effective in integrating the strategic and operational perspective and focusing internal processes along customer value adding lines. It certainly helped to break down departmental barriers. The feedback from the senior managers in the dealer was very positive. They have adopted the findings as a strategy for the achievement of their Critical Success Factors.

However, as is often the case with such case research, the work was very labour intensive for the researches and managers within the dealer. One of the reasons for this was that, in some cases, it was difficult to obtain reliable data as a number of areas that it was decided were important to the success of the organisation were simply not being measured. This may partly be due to the fact that the dealer, along with most other automotive retailers, is at a power disadvantage to the car manufacturers (Cox et al, 2000). Consequently, what they measure can reflect what the manufacturer wants done rather than what the dealer should do. However, as a result of this work, at least in this case, this problem has been corrected meaning that a subsequent re-evaluation of this case
firm would be considerably easier and quicker. As a result of the researchers’ (double loop) learning curve on using the approach they would also be able to implement the approach in a further case in considerably less time (Senge, 1990).

5.3 Contingency of Approach

An interesting feature of the work is the very high degree of contingency that was exhibited in the research, not only customer and dealer contingency, but also the time and detailed research approach taken in this case. An example of this was that meetings were generally constrained to about 2 hours in length due to the very small number of staff in this organisation and the key role played in the organisation by the two senior managers. This contingency however, means that the detailed findings are specific to this particular case. However, the research team did deem that the general research method illustrated in Figure 12 could be applied in a wide variety of other environments. Indeed, this wider generality of research method is felt to be a strength here and helps to validate that what is termed here the strategic level and operational level can indeed be effectively combined within an empirical environment rather than just at a theoretical level (Pannirselvam et al, 1999; Ward and Duray 2000). Further testing of the approach in other environments is ongoing.

6. Conclusions

The main conclusion from the work is that the integrated empirical research method applied to this case company has, on balance, proved to be a success. It was robust as an integrated methodology, as a practical toolkit and as a contingency approach. The integration of Lean Thinking, Strategic Cost Management, Marketing and Policy Deployment has therefore proved to be effective at both the strategic and operational levels. However, this initial work has suffered from a number of limitations, not least its time consuming nature.
Further research is required in order to try to correct, or at least restrict, these limitations. This should include further integration of other elements of Strategic Cost Management, such as cost driver analysis (Shank and Govindarajan, 1993a, b). Also, of benefit would be longitudinal research on the case firm described here to observe whether they can fulfil the potential of their improvement plans. In addition, further testing of the approach in other automotive retailers, industrial sectors and outside the UK will help to gauge whether the approach can overcome cultural and sectoral institutional barriers (DiMaggio and Powell, 1983; Hofstede and Bond, 1988; Whitley, 1992). Once the approach can be further streamlined it can also be applied to a wider supply chain setting.

References

3DayCar Website: [www.cf.ac.uk/3daycar](http://www.cf.ac.uk/3daycar)


Forrester, J., 1961. Industrial dynamics, MIT Press, Massachusetts


Hofstede, G., Bond, M., 1988. The Confucius connection: from cultural roots to economic growth, Organisational Dynamics, 16(4), 5-21


McNair, C. J., Polutnik, L., Silvi, R., 2001a. Outside-in: cost and the creation of customer value, Advances in Management Accounting, Spring, 9, 1-41


Rother, M., Shook, J., 1998. Learning to see, The Lean Enterprise Institute, Brookline
Shank, J., Govindarajan, V., 1993b, What “drivers” cost?: a strategic cost management perspective, Advances in Management Accounting, 2, 27-45
Yin, R., 1989. Case study research: design and methods, Sage, California
List of Figures

1. Central Dealer Processes
2. Key Customer Value Attribute Scores for New & Used Cars
3. New Car Value Attributes Importance vs Satisfaction
4. Service Value Attributes Importance vs Satisfaction
5. The New Car Big Picture Map
6. Quality and Delay Filters
7. The Registration System Effect on the Dealer
8. The Sales Acquisition Funnel
9. Costing the New Car Process
10. The Impact on the Unit Cost of Different Level of Capacity Utilisation
11. Value and Cost Profit Potential Profile
12. The Research Model

List of Tables

1. An Integrative Approach
2. Critical Success Factors
3. Match with Critical Success Factors
4. Key Business Measures & Targets
5. An Example of a Process Activity Map: Car Collection & Work Division
6. An Example of Activity Costs by Department
7. The Labour Cost of a Typical Service
8. Time and Cost Profiles
9. The Strategic Change Programme
10. Validating the Strategic Targets & Developing an Implementation Action Plan
11. The Profit Potential
12. Review of Research Approach