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advantage and repeat business**

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Product Customisation:
An Empirical Study of Competitive Advantage and
Repeat Business

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Abstract: Empirical evidence is presented from 24 UK based manufacturing companies, all offering a degree of product customisation, with most having a significant Engineer-to-order (ETO) element. The majority of the companies are SME's, with the associated limited managerial resources. The evidence addresses the issues of competitive advantage, including a detailed investigation of the strategic importance of repeat business. It contrasts its results with those generally found in the literature and concludes that there are significant differences in the order winners/ qualifiers. In particular, the evidence suggests that customisation is an order qualifier rather than an order winner; as it is increasingly unlikely that competitors will only offer a more standard product. Thus alternative order winners are needed and often price becomes the most significant factor, rather than being a mere order qualifier. Four different types of repeat business are then identified and the strategic importance of repeat business is discussed. It is indicated that for some ETO companies, repeat business is perceived to be an important method to reduce costs and achieve business stability. However, a number of the other companies studied saw repeat business as infeasible and hence need to find other ways to reduce costs and improve company performance measures, such as lead times. Future research to extend this work into a longitudinal study is proposed. Issues to explore are how the importance of repeat

business has changed, and how the companies have evolved in terms of the degree of customisation offered versus that offered by their competitors.

Keywords: Manufacturing strategy; Engineer-to-order / Make-to-order; order winners / qualifiers; competitive advantage; Repeat business customisation.

INTRODUCTION

The increasing competitiveness in markets and the trend towards customers demanding more customisation of products highlights that understanding how Make-to-Order (MTO) and Engineer-to-Order (ETO) companies win orders is an important and significant area for research. Such companies are usually organised as a jobbing process. Authors such as Hill (2000) asserted that the choice of a jobbing process is associated with high quality, high cost products, for which the order winners include unique design ability and the order qualifiers include price. However, research published in Amaro *et al* (1999) on mainly engineering companies in Denmark, the Netherlands and the UK showed that for many jobbing companies the ability to customise is in fact an order qualifier, and that price is increasingly becoming an order winner. Furthermore the research also indicated that as price and hence costs are becoming more important to jobbing companies, they are searching for ways to reduce their operating expenses. This is particularly difficult in this sector as these firms are not always able to adopt the processing efficiencies of the mass production or even the mass customisation companies. Typically, they operate on a MTO or ETO basis, producing a unique item for each customer. The difference can be akin to the bespoke tailor, which makes any item in any material and any size, versus the mass customisation jeans manufacturer, which can make any size, but only jeans in a set range of colours and materials.

It was suggested by Amaro *et al* (1999) that one way in which such ETO and MTO companies seek to reduce costs is by trying to attract repeat business from the same customers. As most of the companies were SME's, with limited management resources, such companies are trying to supply standard products and customised products with the same infrastructure and management procedures. This is contrary to ideas advocated by

operations strategists such as Skinner (1974, as discussed in Hayes (2002)) and his 'manufacturing sins'.

This paper presents the results of an empirical study of 24 ETO/MTO companies exploring the issue of competitive advantage and the importance of repeat business for companies of this type. Little has been written about the latter issue in the literature, indeed it is not an issue that is usually associated with ETO companies. The research questions included:

- When is pure customisation just a qualifier for companies offering purely customised products? Or, instead, when does it become an order-winner?
- Do companies offering customised products favour "repeat business" as a means to reduce their business cycles and therefore increase their efficiency and profitability?

Before the case study evidence is presented, the paper first presents a brief review of some of the key literature references in this area, and then describes the research methodology employed to collect the data. This is followed by the presentation of the case study evidence, and discussion of the evidence, which seeks to answer the above two research questions.

LITERATURE REVIEW

An excellent, extensive, review of the manufacturing strategy literature has recently been presented by Dangayach and Deshmukh (2001). They categorise the literature in this area into two basic types – process and content. The latter is then broken down further into research which addresses: manufacturing capabilities; strategic choices; best practices; trans-national comparison; performance measurement and literature survey. The research presented in this paper falls into the strategic choices category, as it seeks to determine the types of strategic choice that are successfully undertaken in modern ETO/MTO manufacturing companies. Dangayach and Deshmukh (2001) point out that most of the manufacturing strategy literature is cross sectional, though there have been some recent attempts to look at specific sectors of industry such as machinery or metal working. No recent articles that look at the ETO/MTO sector are identified apart from the paper by Amaro *et al* (1999), which is used as the basis for the further research presented in this

paper. Thus this paper seeks to fill a gap in the literature by addressing strategic choices in a specific sector of industry, which has received little previous attention.

The concept of order winners (OW) and order qualifiers (OQ), explained in depth by Hill (2000), is however questioned by other authors such as Spring and Boaden (1997). They suggest that this OW/OQ concept makes use of the trade-off model that was first introduced by Skinner (1969), but which is now a concept that is questioned by many other authors. For example, Kathuria (2000) presents empirical evidence that contradicts the traditional trade-off model. In contrast, Boyer and Lewis (2002) present empirical evidence that suggests that trade-offs remain. Thus this is an issue that is still under discussion and more empirical evidence is needed to further the debate. This paper further explores the trade-off concept within the context of the OW/OQ concept and asks whether the latter leads to meaningful managerial implications.

Other publications relevant to the research presented here include a literature review on the 'resource based view' of competition by Gagnon (1999) and a recent paper on customisation by Spring and Dalrymple (2000). The former stresses the importance of ensuring that operations capabilities are used to drive the strategic planning of companies, rather than allowing a market-based lead which assumes a completely adjustable manufacturing function. The latter uses four case studies along with a thorough literature review on the topic of customisation to build a novel model of the customisation process. This paper builds on research of this type by further exploring the customisation capability to assess the type of competitive advantage that it brings.

Taxonomies of Non Make-to-Stock companies

Before proceeding further, it is also necessary to clarify the definition of the ETO/MTO sector, as used in this paper. Amaro *et al* (1999) presented a new taxonomy for non Make-to-stock companies with 17 different categories, explaining why it was felt to be necessary to develop a new system. In this paper, an abridged version of that taxonomy is used to classify the types of companies that are studied. This decision was taken in an attempt to make this paper self-explanatory without the need to repeat a significant part of the previous paper. In addition, the abridged version is sufficient to pick out the key

characteristics of the companies that are relevant to competitive advantage and the nature of repeat business discussed in the following sections. Two key aspects of the original taxonomy used here are:

- The titles ETO, MTO and ATO (Assemble-to-order), where these titles indicate the amount of work carried out after the order has been placed. For ETO, the design, manufacture and assembly of the product takes place after the order is confirmed. For MTO, the basic design is already in place, and though there may be some modifications to the design, most of the work after the order is confirmed is in the manufacture and assembly of the product. Note that in this case, the design can be supplied by the customer or by the MTO company. In the ATO sector, it is just the assembly of the components that is carried out after receipt of a definite order, the components are produced to stock in advance.
- The nature of the customisation carried out by the company. The first three categories are as defined by Mintzberg (1988). Firstly, there is pure (p) customisation, which entails producing a new design. Secondly there is tailored (ta) customisation, which entails the modification of an existing design. Thirdly, there is standardised (stan) customisation, where the customer can pick from a set of design options. In addition, a fourth category is used, which is described as 'none'. It is needed for those MTO and ATO companies that choose to await a customer order, even though they produce a standard product with no customisation options. This is in contrast to customisation companies that cannot complete ahead of the customer order as no two orders are alike.

Thus the following categories are used:

ETO (p),

MTO (ta), MTO (stan), MTO (none),

ATO (stan), ATO (none)

In addition, it has been postulated that a firm can be a 'Repeat Business Customiser' (RBC), negotiating business as a series of orders by contract, or a 'Versatile Manufacturing Company' (VMC), negotiating each order separately. These definitions are discussed in detail in Amaro *et al* (1999), and explored further as part of the evidence on repeat business issues in this paper.

METHODOLOGY

The data was collected from the 24 companies via semi-structured interviews. All of the companies were based in the North West of England and the sample is therefore a convenience sample. This methodology was chosen as issues of competitive advantage are complex and it was felt that a postal survey would not be well answered. In addition, the larger postal survey is generally better for discovering 'what' is happening rather than 'why'. It is important to try to understand 'why' so that the relevance to other companies can be determined clearly. Thus rich data was collected from which it would be possible to derive some managerial implications.

The interviews were structured via a questionnaire, but plenty of opportunity was given for interviewees to add other relevant information. Where possible, several managers were interviewed, including the Managing Director, the Sales Manager and the Operations Manager. Where this was not possible, bias introduced by the perspective given was carefully considered in analysing the data. Summaries of each interview were typed up and sent to the interviewee with any outstanding questions marked. This was followed up by a telephone query to clear up any such outstanding issues. Good feedback of this type was received from most, though not all of the companies involved. Thus, the data analysed is as accurate as was possible.

Part of the questionnaire asked the interviewee to score Order Winners and Order Qualifiers. However, this data did not provide any useful analysis. The main reason for this was that the comments given by the interviewee often did not correlate well to the scores that they had given. When asked during the feedback about the contradictions, they were unable to resolve them, confirming a comment made by previous authors such as Spring and Boaden (1997) that company managers find the concept of OW and OQ hard to grasp. Therefore, the analysis below is qualitative rather than quantitative in nature.

A pilot study was carried out in one company, before the research was carried out in earnest. As this did not lead to any issues that could not be resolved through a follow up telephone call, the data for this company is as complete as for the other companies. Therefore, it is included in the set of 24 companies discussed below.

THE CASE STUDY DATA

The characteristics of the 24 companies studied are presented in Tables 1, 2 and 3 below. Table 1 describes the company in terms of turnover and number of employees in 1996, as this is the year in which the data collection commenced. It is noted that the majority of companies could be described as SME's, with 18 out of the 24 having a workforce of less than 150 employees and an annual turnover of less than £24million (Anonymous European definition of an SME, 1996). Table 1 also describes the main business area, where this can be a manufacturing capability such as precision sheet metal components (e.g. companies B and C), or more commonly a type of product such as doors, windows or a type of industrial machinery. In all the latter cases, there is a degree of customisation involved in the manufacture, none of the companies studied produced entirely standard products. In fact, data was initially collected from 28 companies, and four were removed from the study as they did not have a significant degree of customisation in their business.

[Take in Table 1]

Table 2 categorises the companies using the abridged taxonomy described in the previous main section of this paper. In the second column, the main business type is given, this refers to the type of business which is most common. In the third column, any other business type is also listed. This shows that 15 out of the 24 companies have some degree of ETO (p) activity, even though it is only the main business line for 7 of those 15 companies. Note that many of these companies operate in several markets at once, either with the same product that can be customised or standard, or by supplying several types of product. The fourth column seeks to identify the % of ETO activity within the business. It is noted that this is not a static figure and many companies found it difficult to answer this question. However, the information provides an indication, which is sufficient for comparison purposes. Finally, the fifth column indicates whether the company operates as an RBC or a VMC firm.

[Take in Table 2]

Table 3 indicates which companies compete against competitors which offer the same level of customisation; the companies who compete against competitors offering less

customisation and those who have a range of competitors, some offering less customisation and some offering the same. Note that none of the companies studied had competitors offering more customisation. This factor was expected to be significant in terms of determining competitive advantage as discussed in the following section.

[Take in Table 3]

DISCUSSION OF CASE STUDY EVIDENCE

The qualitative data is discussed in three sections:

- competitive advantage including the issues relevant to OW and OQ;
- repeat business and
- additional insights.

Competitive Advantage

Many of those interviewed began by declaring an overwhelming sense that everything is important, including price, design ability, delivery speed, delivery reliability, quality, flexibility and customisation. Hence, this would lead to the conclusion that no competitive priority can be neglected and modern manufacturing firms cannot afford to adopt the trade-off stance. However, when questioned more deeply, patterns emerged, relating to the type of competition and the degree of customisation that the firm offered.

Firstly, it is noted that of the seven companies, A-G, for whom ETO (p) is the main line of business, 5 had competitors offering the same degree of customisation, whilst the other 2 had competitors with the same or lesser degrees of customisation. For these companies, customisation does not figure as a key order winner, in fact in some cases, such as company E, customisation is not even considered as an OQ. Hence, all of these companies support the theory that where competitors offer similar levels of customisation, other OW factors must be found. Companies A, D, F and G state that price is a key order winner. For example, the Operations Manager in company G stated that: “at the end of the day, price is the most important thing when contracts are fought for”, thus the company “will invariably win orders on a price basis”. Company A noted that though price is a key OW, this is only the case for the less sophisticated customer; for more sophisticated clients,

price is less important and such clients may then try to squeeze the company on price through negotiation. Similarly, company F felt that price and customer relationships were key to winning business. If a long-lasting and trust based relationship exists, then “if the company happens to offer a higher price, it might be offered the option to adjust its price to the competition and so win the job”. It was also noted that the buyer is not only interested in the cost of the initial purchase. If the company can offer a unique technical solution that can reduce the long term running cost of the equipment, then this may also be the OW. This suggests that design ability is then important, but in a manner that is linked to the long term cost of the solution for the customer.

Companies B and C both claimed that their key OW was the ability to offer the whole package to the client: to take “an original customer’s requirement and to turn it into a final finished product”. In fact company C claimed that the OW had already evolved beyond price and that as companies were now competitive on this factor, yet other newer competitive advantages had to be found.

Company E saw price as being an important OW, but only as part of an overall package, in which the company scored highly on price, quality and service. It was felt that its advantage was “being good at all these things” consistently. However, it was also stated that technical ability was an important competitive advantage and the company was not clear about which factor was most important.

Overall, this evidence suggests that the world of the pure customiser is very competitive and that customisation alone is not sufficient to win business. Instead, other factors are now becoming important, and price is often one of the key issues.

For most of the remaining companies for which the competitors offered the same level of customisation, the type of customisation on offer is either MTO (stan) or ATO (stan). These companies are O, Q, S, T, W, X. For these companies, it is more difficult to identify a pattern in the OWs and OQs that were claimed by those interviewed. However, again none of them suggested that customisation was an OW. Instead, companies O and X included price, with the former also suggesting that delivery speed and reliability are important for their MTO (stan) business, but less so for the MTO (ta) and ETO (p) sector. Company X is smaller than its competitors and is therefore able to compete on price for low volume orders that the larger competitors do not want. However, the competitors

could undercut them on price if they did want this business in the future. The company also has two other key advantages: it currently offers larger mixers than the other manufacturers and smaller customers prefer to work with smaller companies as they feel that they will receive a higher quality service. Company Q claimed that the long term relationship with the client was key. Company T suggested that quality and service are more important, though the company has to be competitive and provide value for money. For company W, the design was seen to be key, as it has the highest speed machinery and the greatest range of pattern attachments. However, they acknowledged that smaller companies sometimes try to enter the market and undercut on price, but they rarely succeed as they do not have the efficiency of the larger organisation. This company appeared to have a degree of business confidence based on operating in a small market, with few clients and few competitors, in which it has a good reputation at present.

Interestingly, company S supported the claim of company B, that the OW and OQ are changing over time, or at least becoming more stringent. All its competitors are good on price and quality now, so it needs to find a new way to compete. Hence important factors include flexibility in terms of capacity adjustment or good personal relationships with clients.

For the MTO (ta) companies, two had a competitor offering the same degree of customisation, companies I and J. Of the remaining companies in this sector, K and L had competitors offering the same or lesser degrees of customisation, whilst companies H and M had competitors offering less customisation. Here a difference in the way they compete can be clearly attributed to the nature of their competitors. Company L claimed that there is a need to offer something which your competitors do not offer. So customisation is offered where their competitors do not offer this, or technical superiority is offered where they are competing against a similar level of customisation. For company M, customisation is the clear OW for the MTO (ta) part of their business. Company H also sees their expertise as the main way to win orders. They offer a consultancy service which advises the client on the best type of door, and so it is their design capability which is particularly pertinent. They aim to offer competitive though not necessarily the cheapest prices, thus suggesting that price remains an OQ. These conclusions contrast with Companies I and J, for which customisation is not an OW. For J, it is seen to be

reputation, delivery reliability (not speed), and after-sales service. For I price is more important as an OW than an OQ, but it never loses business on the basis of price, as it is always willing to adjust prices (though never at a loss).

For company K, competitive advantage still depends on the nature of the competitors, but it is now the size of the competitor as well as the degree of customisation that is important. If competing with a company of similar size, then it can be that price is a key OW. However, if the competitor is larger, then it is necessary to find an alternative competitive edge such as by offering more customisation or flexibility. Thus they perceive that they can charge a premium for true ‘specials’, as this is something that their competitors do not offer. As discussed above for company A, company K also felt that the sophistication of the client is important, with less sophisticated clients being more interested in price.

The remaining companies with competitors offering the same or lesser degrees of customisation are companies P and U, offering mostly MTO (stan) and ATO (stan) respectively. Company P acknowledged that it is difficult to keep a steady flow of work, hence there is a tendency to cut prices when they really want an order. In general, however, price is important for their MTO (stan) market, but less so for their more customised business. Here it is the technological solutions that matter more, and it is here that the competitors offer lower levels of customisation. For company U, price is not seen to be an OW, instead quality and design capabilities are key. This is a small company, winning more small projects than large ones as does not have the economy of scale necessary to win large orders. So again company size is important.

The remaining companies with competitors offering less customisation are companies N, R and V. All of these companies stated that customisation is an OW, along with other factors such as flexibility, design and after sales service.

Of course, some companies also felt that the winning of orders was not necessarily based on good decision criteria. For example, companies G and I both pointed out that sometimes “national prejudice” is a factor that affects decision makers in the client organisation, with some buyers for company G biased towards German products, whilst others are biased towards British products.

Repeat Business

As discussed in the earlier literature review section, the term 'Repeat Business Customiser' (RBC) was introduced by Amaro *et al* (1999) to refer to companies which negotiate business as a series of orders by contract. This was introduced alongside the term Versatile Manufacturing Company (VMC), which referred to those companies that negotiate each order separately. Thus in the RBC case the nature of the repeat business was to attain a series of orders for the same customer for the same product. However, during the analysis of the empirical data for this study, it became apparent that repeat business was also an important strategic objective in several of the companies categorised as VMC's. In this case, the nature of the repeat business could be one or more of the following three types:

- the repeat sale of a product initially designed for one customer, but then also sold to one or more other customers. If this type of repeat occurs on several occasions, then the company could be in the business of evolving its product lines from highly customised products to much more standard products.
- repeat business for the same customer, but for a different product. Thus the company is benefiting from long term relationships from customers, which can lead to future orders, albeit with a fresh need to design and manufacture the product.
- repeat business for the same product for the same customer. This may seem similar to the RBC case, but here the number of similar orders is very small, and each product is generally ordered separately.

Figure 1 summarises these categories of repeat business, giving the labels R, V1, V2 and V3 Type, for ease of reference throughout this section. Table 4 then indicates the type of repeat business in which each company is involved. Note that not all VMC's are included in Table 4, as it was noted that some of these companies indicated that they do not experience any repeat business at all at present. In addition, the discussion focuses on repeat business of customised products, particularly ETO(p). Thus, if the repeat business only relates to products categorised as MTO or ATO, then these companies are excluded from the discussion below. The following paragraphs describe the company evidence for these types of repeat business and discuss strategic attitudes to repeat business, indicating

when it is felt to be realistic / desirable to increase levels of repeat business rather than sticking to the one-off highly customised production.

[Take in Figure 1]

[Take in Table 4]

Table 5 summarises the percentage of repeat business for the ETO(p) type of customisation, also indicating preference towards increasing this percentage and the impact that repeat business is perceived to have upon manufacturing lead times and profitability. As indicated earlier in Table 2, companies B, C, D and E are all RBC companies, the first three having 100% ETO(p) activity, whilst E has 90%. In each case, they are in the business of producing components for a larger manufacturer, with large contracts negotiated as a series of orders over a long period. Hence they all exhibit clear ‘R’ type repeat business. The case study evidence for companies B, C, D and E suggests that the repeat business nature of their work is of strategic importance. For company B, this is particularly pertinent as it is only for repeat orders that they typically make a profit. For new orders, it was stated that they only break even with a 0% profit margin as it was suggested that the aim at this stage is to win a longer-term contract. Despite the lack of profitability, the company stresses the need for new orders for new products, stating that ideally the company wants to attract at least one new customer per year, with at least one new product per month. The MD referred to the “natural wastage of customers”, claiming that “any company needs to get new businesses (new customers/ new products) each year otherwise it will die”.

[Take in Table 5]

In contrast to company B, the Managing Director of company C stressed the need for repeat business rather than the need for new business. He stated that when the objective is to grow the operations, there must be a balance between new business and repeat business. In addition, he stressed that the bigger the company gets, the more it needs consistency, which only comes from repeat business. The strategic objective here is to increase the percentage of repeat business from 50% to 70%, retaining 30% of new

orders as needed to develop new long term contracts, not to produce one-off batches unless this was seen as a special requirement for an existing customer. The reason for stressing the importance of repeat business in this case was due to the efficiency gains achieved. In this case, the customers provide a forecast of their requirements for the next 2/3 months. Even though this is subject to change, these forecasts enable the company to make batches of products and to carry some stocks of raw materials or products (either at the final or part processed stage). Thus they are able to supply their customers on a JIT basis, assisting customers in minimising their inventories.

Similarly company D stated the advantage of repeat business from a company efficiency point of view. For example, long-term contracts with one client can lead to the purchase of specialised tooling. This can be problematic when making the initial investment for a small company, but has long-term benefits. As for company B, a significant proportion of new business is felt to be of strategic importance especially for expansion prospects. Thus the stated aim to decrease the percentage of repeat business to a slightly lower value than the stated 80%. Thus all three of companies B, C and D require a balance of new and repeat business, the former providing long term stability whilst the latter provides company efficiency gains and prospects for growth. Although the preferred percentage of each type of business varies, all of them state a desire for a majority of repeat business, ranging from 70 – 90%.

For company E, the costs of tooling are such that it cannot make anything on a one-off, as it is too expensive to invest in the tooling. Therefore all of its ETO (p) business is for large volumes on an RBC basis for a twelve month period or more. Set-up times can be particularly problematic here (often taking 3 to 5 days), and hence the levels of repeat business are perceived to be essential to enable the company to make products in batches and stock items to meet orders. Thus this company provides an extreme example of an 'R' type RBC company, for which only repeat business is perceived to be viable.

From Table 5, it can be seen that there is not a clear pattern amongst companies B to E in terms of the lead time or profitability differences between repeat orders and new orders. Company B was the only one of these companies that quoted a reduced lead time for the repeat orders. Thus there are a variety of reasons for the strategic importance of

repeat business for these companies, which do not always include lead time or cost reduction.

For companies F, J, N, O, P and U, with relatively low levels of repeat ETO(p) business, a desire was expressed to see an increase in this aspect of their work, either by attracting more business from the same customer (V2 Type) or by converting some one-off special products into products that can be sold in a tailored customisation or standardised customisation manner to future clients (V1 Type). For example, company F, with the use of CAD design, is able to produce modified designs very quickly, thus reducing lead times and costs. The reduction in costs can either be converted into increased profits or into a lower price for the customer to improve the chance of winning the order. Usually a compromise is reached, leading to slightly more profitable repeat orders. Similarly, company J saw advantages in reduced costs through repeat business. However, for company J, when selling the same machine more than once there is often such a large time gap between the two orders that it is necessary to upgrade the machine design. Hence it may be regarded as a new product rather than a repeat from a design and cost point of view. For company O, the reasons for wanting more repeats were due to increased profits and lower levels of engineering works. However, in this case the company Managing Director felt that it was unlikely to be feasible to increase the percentage of repeats above the 15% quoted. Thus for all three of these companies, producing capital goods, the strategic importance of repeat business is due to the increased ability to control lead times and the improved profitability.

In contrast, the Managing Director of company N claimed that it is difficult to estimate the difference in profit between new and repeat orders, but that profits are possibly slightly higher for the new orders. Despite this, a desire was expressed to develop a standard range of products from customer specific orders, increasing the level of repeats to a much higher percentage than the 10% quoted. The reasons given are however still cost related, as design and engineering employees are seen as overhead costs. The engineering design of a new product is clearly much higher than for a repeat order, and hence higher levels of repeats will lead to a bigger turnover to absorb the same overheads, hence reducing the cost burden in relative terms. However, the desire to increase the level of repeats is seen as problematic in practical terms due to the difficulty associated with

combining the volume and the specials business. Thus consideration is being given to the development of a separate workshop for the repeat volume part of the business. At present, customised production gets priority because these contracts are perceived to be of higher importance to the company.

Similarly the sales manager of company P stated that repeat orders do not necessarily lead to a higher profit. Instead, the main advantage is that for a repeat order “the risk is taken out of the job”. For new jobs, the estimation process has a high risk as the company is not so sure about the costs as the machine may prove to be more difficult to build than expected. Hence the company is more able to control costs with repeat orders, leading to greater control of other aspects of the management process including lead times.

For companies A and G, the nature of the capital goods they supply is such that repeat business is very unlikely as the equipment lasts for many years and hence a customer would only purchase another if they expand their operation. However, for company A, there are occasions when a client modifies its plant or wants to install some new machinery. Thus the company values repeat business from the same customer, but for different products (V3 Type). The Managing Director stressed: “you still have to sell to them, to keep in touch with them”. It is no good just expecting them to come back for the next order, clients are visited regularly to ensure that company A is considered for future orders. However, this type of repeat business does not lead to any cost or lead time savings. Thus, for both company A and company G, other means to drive down costs must be found. Similar issues arise for company I, for the ETO(p) part of the business, giving further evidence of the possibility and perceived importance of ‘V3’ Type repeat business. However, much of the business for company I is for MTO production with standard components and hence costs are brought down in the usual way for manufacturing a standard product.

For the remaining VMC companies with an element of ETO(p), the issue of repeat business has a much lower strategic priority. For example, for company H, there are very few repeats and the company has no intention of changing this. The perception of the Marketing & Sales Director is that the company “sells its expertise, which is the one unique thing the company has and that no other door manufacturer has”. It was acknowledged that to grow might mean to generate volumes by moving into the standard

door market. However, this was seen as a separate venture, which could lead to the setting up of a second company. There was a strong perception that mixing the production of standard and special doors was not a good idea and that it is better to commit resources to the production of special doors for major projects. Similarly, the Sales Manager of company K stressed that the company's aim is to take advantage of the niche market offered by making special machines. The number of competitors in this market is very small, and a recent contract was quoted in which there were no competitors for the order. In this case, the price can be high to offset the level of risk involved in determining the method of manufacture etc. In this ETO (p) market, there is little scope for repeat business, but this is a situation, which the company is not trying to change. Although only two companies expressed this less favourable attitude to the strategic importance to repeat business, this evidence demonstrates that some companies still aim to sustain long-term viability depending heavily on one-off or small batch production, despite the risks involved when determining the prices to quote for products that have never been produced before.

Other Insights

The case study evidence also provides some very tentative evidence of the movement of companies along the line of the taxonomy presented in the earlier literature review section. For example, company H has experienced growth by developing a separate standard doors business, which is perceived to have a very different strategic position to its specials business. Company R has a policy of making one-offs into standards, relying often on its customers to come up with the ideas for new product designs. Company U has moved in the opposite direction, having initially offered a standard product, they are now involved in customisation. In this case, it was suggested that the onset of mass customisation has killed the market for the more standard product.

In addition, for one of the companies studied, the importance of competitor analysis was seen to be key to their success. In particular, this company, K, indicated that personnel went as far as getting real quotes from its competitors and this led to a better understanding of the competition than was apparent in most of the other companies studied.

Finally, the evidence suggested that several companies operate in more than one market at once. For example, company M offers both standards and specials and it was suggested that it is strategically important to keep a foot in both markets.

CONCLUSION

The first important conclusion from this empirical study confirms the importance of competing on a price basis when tendering for incoming orders, and that being able to offer unique design ability is often just an order qualifier. This suggests a change in the manufacturing environment, whereby as more and more companies gain the ability to customise goods efficiently, the customer is able to choose between a group of ETO companies when asking for bids. This in turn means that customers then make the final choice on other factors, which may include delivery speed and reliability, but as companies become more competitive on these issues too, then price also becomes a more important factor in determining the outcome of the competitive bidding process. Thus this research confirms the notion that price is increasingly becoming an order winner for jobbing companies as well as for the producers of more standard products.

The second important conclusion is that for many of the ETO SME's studied, some aspect of repeat business is essential to their survival. Whilst it is not surprising that they find this to be a good means of reducing operating expenses, it is perhaps surprising that they are able to achieve this aim in the ETO environment. The types of repeat business vary from a long term contract supplying the same product to the same customer to repeats of one product then supplied to another to sporadic repeat business for a different product to a previous client. Even companies categorised as Versatile Manufacturing Companies (VMC) pursue long term customer relationships in order to ensure as much repeat business as possible, even if this is for a unique product each time.

From a managerial implications perspective, the research reinforces the need to understand competitors as well as customers. Order winning and order qualifying criteria are as much a result of the competitor actions as of the particular market segment that the company is aiming to attract. The results also confirm that there remain a number of manufacturing companies for which the level of repeat business remains low at 15% or

less, and these companies need to seek other ways to reduce their operating costs than those that are available to the mass production and mass customisation industry.

Future research could include a larger survey to further confirm these results and the size of each of these sectors of industry with varying degrees of repeat business, this may be important for the software market in establishing a need for software other than the ERP based systems currently widely available. For example, workload control is designed for companies with a large VMC element and research is ongoing to develop this into a commercially viable alternative (see for example Stevenson *et al*, 2005). In addition, this study could be extended into a longitudinal study to investigate whether and how order winners/ qualifiers have evolved since the initial data collection and whether companies have evolved in terms of the degree of customisation they offer or the percentage of repeat business in their portfolio.

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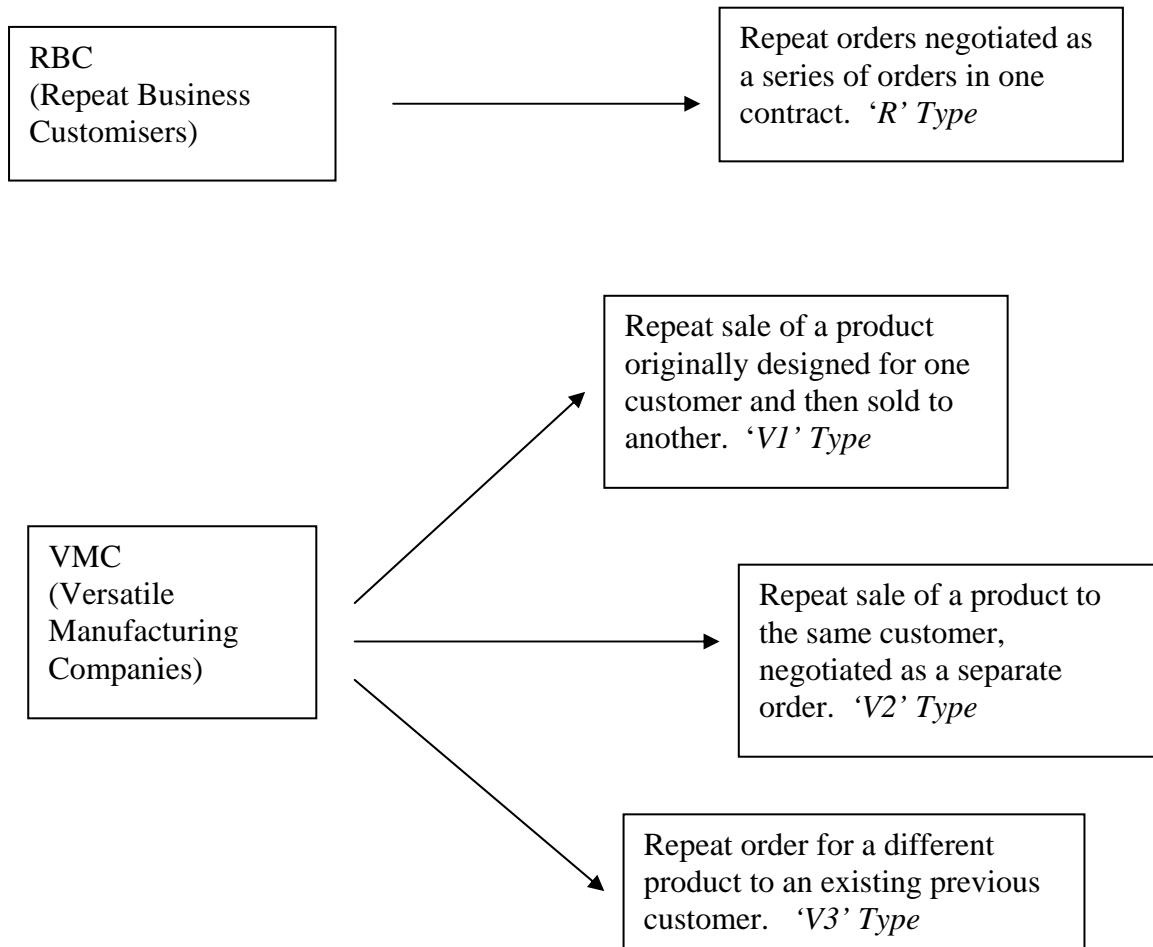


Figure 1 Types of Repeat Business

Company	Turnover Millions £	No. of employees	Main business area
A	4.5	70	Boiler Plants
B	3.5	86	Precision sheet metal components.
C	5.2	130	Precision sheet metal components.
D	6.0	102	Crankshafts e.g. for medium / large diesel engines
E	19.5	230	Pressed components
F	8.5	100	Bulk conveying / handling systems
G	125.0	500	Roof support and chain conveyors for coal mines
H	4.5	50	Lift doors and specialist industrial doors
I	15.0	175	CNC tube bending machines and machine tools
J	10.0	200	Textile machinery
K	6.3	67	Industrial machines for processing polyurethane foam
L	20.0	257	Switchgears and reclosers.
M	4.5	100	Doors: specialised fire resistant, sound proof etc
N	3.0	48	Industrial machinery for personal hygiene products
O	16.0	147	Industrial machinery: e.g. for wallpaper coverings
P	2.0	15	Industrial Dryers etc
Q	13.8	64	Metal, steel and aluminium roofs and walls.
R	5.0	100	Farm equipment, such as feeding systems, silos etc
S	8.7	105	Forks for fork lift trucks
T	6.0	84	Calender* bowl with 100 different covering materials
U	3.0	56	Windows: specialises in steel frames
V	120.0	590	Industrial machinery: e.g. loaders and mini escalators
W	20.0	300	Tufting machines for carpet industry
X	3.7	28	Site dumpers for using on construction site; concrete mixers

Table 1 – Case study company characteristics

*Calender bowls are used in industrial machines used by paper and textile manufacturers.

Company	Main Business Type	Other business types	% ETO activity	Type of customisation of company
A	ETO (p)		100%	VMC
B	ETO (p)		100%	RBC
C	ETO (p)		100%	RBC
D	ETO (p)		100%	RBC
E	ETO (p)	MTO (none)	90%	RBC
F	ETO (p)	MTO (ta)	70%	VMC
G	ETO (p) & MTO (ta)		50%	VMC
H	MTO (ta)	ETO (p)	45%	VMC
I	MTO (ta)	ETO (p), MTO (stan)	15/20%	VMC
J	MTO (ta)	ETO (p)	15%	VMC
K	MTO (ta)	ETO (p), MTO (stan)	10%	VMC
L	MTO (ta)		0%	VMC
M	MTO (ta)	MTO (none)	0%	VMC/RBC
N	MTO (stan)	ETO (p), MTO1 (ta)	25%	VMC
O	MTO (stan)	ETO (p) MTO (ta)	16%	VMC/RBC
P	MTO (stan)	ETO (p), MTO (ta & none)	> 0%	VMC
Q	MTO (stan)		0%	VMC
R	MTO (stan)		0%	VMC
S	MTO (stan)	MTO (none)	0%	RBC
T	MTO (stan)	MTO (ta)	0%	VMC/RBC
U	ATO (stan)	ETO (p), MTO (ta)	5%	VMC
V	ATO (stan)		0%	VMC
W	ATO (stan)	MTO (ta)	0%	VMC/RBC
X	ATO (stan)		0%	VMC

Table 2 – Case study companies and the degree of ETO activity

Degree of customisation Of competitors	Companies
same	A, C, D, E, G, I, J, O, Q, S, T, W, X
Less	H, M, N, R, V
same or less	B, F, K, L, P, U

Table 3 – Case study companies and their degree of customisation compared with their competitors

Type of repeat Business	Relevant Companies
R Type	B, C, D, E
V1 Type	F, J, O, N
V2 Type	F, J, O, N, P, U
V3 Type	A, G, I

Table 4 – Case study companies and the type of ETO(p) Repeat Business

Company	% of Repeat Orders in the turnover	Preference for more Repeat Orders	Differences between New Orders (NO) and Repeat Orders (RO)	
			in lead times	in profitability
A	None	More	N/A	N/A
B	80-90% (20-25% same product; 60-65% modifications)	Same	NO: 6 wks (or longer) RO: 4wks	NO: at best 0% RO: about 30%
C	50%	More	RO can be forecast & scheduled more easily	Same
D	80%	Less	Same	Same
E	100%	Same	N/A	N/A
F	Small %	More	RO is 20% shorter than NO	RO is 3-5% more profitable than NO
G	0%	More	N/A	N/A
H	Small %	Same	Both 6-8 wks	Same
I	0%	More	N/A	N/A
J	Small, varied %	More	NO: 8 wks RO: 4-6 wks	RO is more profitable
K	0%	Same	N/A	N/A
N	10%	More	RO: about half as long as NO	Difficult to measure, possibly higher for NO
O	15%	More	NO: 30-36 wks RO: 20-25wks	RO is 20% more profitable than NO
P	Small %	More	NO>RO	RO is not necessarily more profitable
U	10%	More	RO is normally 2 wks less	RO reduces 5% of the costs

Table 5: Repeat Business issues for companies with ETO(p) customisation