
Developing a framework for make-or-buy decisions

A framework for
make-or-buy
decisions

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Abstract *The make-or-buy question represents a fundamental dilemma faced by many companies. Companies have finite resources and cannot always afford to have all manufacturing technologies in-house. This has resulted in an increasing awareness of the importance of make-or-buy decisions. This paper reports on the development of a make-or-buy framework to address the make-or-buy decision for either a specific individual part or family of parts. Firstly, a literature review of the principal make-or-buy approaches is discussed. Secondly, the development of a make-or-buy framework is described and the framework is explained and illustrated using case studies. Thirdly, the operationalisation of the framework is outlined. The paper concludes with a discussion of its contribution to both the academic understanding of the subject, and the improvement of industrial practice.*

Introduction

The make-or-buy question represents a fundamental dilemma faced by many companies. Companies have finite resources and cannot always afford to have all manufacturing technologies in-house. This has resulted in an increasing awareness of the importance of make-or-buy decisions. Although the strategic implications of make-or-buy have been discussed for many years, make-or-buy decisions are often made purely on the basis of cost. However, during the last decade more emphasis has been placed on providing a more practical structured guidance on make-or-buy decisions. In recent years, a number of approaches (Venkatesan, 1992; Welch and Nayak, 1992; Probert, 1997; McIvor *et al.*, 1997; Cox 1997) has been proposed. Although these approaches have been helpful in shaping the make-or-buy strategy, they seem too highly aggregated to help in addressing specific make-or-buy decisions in a holistic, practical and structured manner. This research aims at addressing this gap by developing and operationalising a framework which captures relevant factors to be taken into account in make-or-buy decisions.

This paper reports on the development of a make-or-buy framework to address the make-or-buy decision for either a specific individual part or family of parts. Firstly, a literature review of the principal make-or-buy approaches is discussed. Secondly, the development of the make-or-buy framework is described and the framework is explained and illustrated using case studies. Thirdly, the operationalisation of the framework is outlined. The paper concludes with a discussion of its contribution to both the academic understanding of the subject, and the improvement of industrial practice.

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Principal make-or-buy approaches

Make-or-buy has been an important issue for many decades. Due to its multi-disciplinary nature, it has been approached from different perspectives such as economics (Poppo *et al.*, 1995), purchasing (Shore, 1970), operations research (Balakrishnan, 1994), accounting (Bassett, 1991) and strategic management (Venkatesan, 1992). From the literature review two main streams were identified. The first stream aims at answering the make-or-buy question from a cost viewpoint (Raunick and Fisher, 1972; Levy and Sarnat, 1976; Bassett, 1991; Ellis, 1992; 1993; Balakrishnan, 1994; Poppo, *et al.*, 1995; Padillo Perez, 1995). The concept of transaction cost plays an important role in many of the models mentioned above. The transaction cost theory can be traced back to Coase (1937) and to Commons (1970). Williamson (1975) has been responsible for the revival of this concept and for its introduction into organisational theory (Buttler and Carney, 1983). The second stream approaches make-or-buy from a strategic perspective, acknowledging other factors in addition to cost. The idea of make-or-buy being an issue that goes beyond cost factors is not new. Ford and Porter (1915) emphasised the importance of strategic factors for make-or-buy decisions. Furthermore, Culliton (1942), Higgins (1955), Moreley (1966), Jauch and Wilson (1979), Ford and Farmer (1986) also discussed the strategic implications of the make-or-buy decision. Jennings (1997) provides a broad picture of make-or-buy by offering a series of generic guidelines to approach make-or-buy based on five areas: business environment, cost, core and peripheral activities, technology and supplier relationships.

In the last decade, various authors have developed a number of tools and approaches for addressing make-or-buy strategy (Welch and Nayak, 1992; Venkatesan, 1992; McIvor *et al.*, 1997; Probert, 1997; Cox 1997). These approaches are summarised in Table I.

Although these approaches are useful in shaping the make-or-buy strategy, they seem too highly aggregated to help in addressing specific make-or-buy decisions.

Venkatesan (1992), McIvor *et al.* (1997) and Cox (1997) provide an insight into make-or-buy strategy from a resource based perspective.

Venkatesan (1992) and McIvor *et al.* (1997) address make-or-buy from a traditional resource-based view by focusing primarily on existing internal resources. Venkatesan (1992) suggests the identification of “strategic” sub-systems (sub-assemblies) and families of products (manufacturing technologies), while McIvor *et al.* (1997) in a more generic way, refer to “core activities”. These two models follow a similar logic flow. Both authors suggest that “non strategic sub-systems” and “non core activities” should be outsourced. Venkatesan (1992), however, suggests a more detailed breakdown of these sub-systems (sub-assemblies) into product families (manufacturing technologies). Here, he proposes to take into account additional considerations such as investment, capacity, cost and assets capability among others. Although the latter provides a more comprehensive account of the factors to be taken into account, these factors are considered one at a time with “yes” and

Authors	Year	Key points
Welch and Nayak	1992	<p><i>Strategic sourcing model (SSM)</i> Conceptual framework to support managers in accounting for strategic and technological factors The model consists of three main dimensions: significance of process technology for competitive advantage, maturity of the process technology across industry and process technology position versus competitors</p>
Venkatesan	1992	<p><i>Strategic sourcing process</i> This process aims to make sourcing decisions consistent with a strategy in highly engineered products. The approach is based on three principles:</p> <ul style="list-style-type: none"> • Focus on those components that are critical to the product and that the company is distinctively good at making • Outsource components where suppliers have a distinctive comparative advantage, greater scale, fundamentally lower cost structure or stronger performance incentives • Use outsourcing as means of generating employee commitment to improving manufacturing performance
McIvor et al.	1997	<p><i>Conceptual framework for evaluating make-or-buy decisions</i> This model is a generic framework based on three main criteria:</p> <ul style="list-style-type: none"> • Core competencies • Capabilities (internal versus external) • Cost (internal versus external)
Probert	1997	<p><i>Strategic make versus buy decisions</i> The methodology proposes four main phases of analysis:</p> <ul style="list-style-type: none"> • Initial business appraisal. This phase addresses issues related to the direction of the business and the customer preferences • Internal/external analysis. This is the heart of the review. Most of the information needed to make the decision is generated at this stage. Details of the company's internal performance as well as the competitors' performance are collected • Generate/evaluate options. Having the information from phases one and two, make-in and buy-out options are analysed • Choose optimal strategy. Considering the different options generated in phase three, the optimal strategy is chosen <p>The methodology provides a competitiveness/importance matrix that focuses on the assessment of manufacturing technologies</p>
Cox	1997	<p><i>Asset criticality theory</i> This approach assists in the identification of the resources within the supply chain that are or can be of critical importance to the business. "A critical asset is that supply chain resource or combination of resources which is of such importance to the process of value appropriation and accumulation, that the possession of it gives its owner or controller the power to define and allocate value throughout the supply chain." The author suggests that the identification of "critical assets" can be undertaken by:</p> <ul style="list-style-type: none"> • Creating a typology of supply chains • Developing a typology of resources within the supply chain

Table I.
Summary of recent
make-or-buy
approaches

“no” answers. In practical situations these answers are not always clear cut and factors often need to be traded-off in order to reach a decision. However, no view on how this could be done is suggested. Cox (1997) takes a different view with respect to the traditional resource based perspective. He expands on the idea of “critical” internal resources to the identification of “critical assets” within the entire supply chain. Although Cox (1997) touches on a number of issues relevant to make-or-buy such as ownership, control, skills, technological resources among others, his approach is more relevant to developing make-or-buy strategy at a corporate level rather than to addressing specific make-or-buy decisions.

In contrast to the approaches discussed above, Welch and Nayak (1992) and Probert (1997) address make-or-buy from a technological perspective. Welch and Nayak (1992) provide a three by nine matrix to position process technologies taking account of three dimensions of maturity of the process technology across industries; significance of the process technology; and position of the process technology relative to competitors. The authors suggest a number of sourcing strategies based on the position of the technologies within the matrix. However, some of the strategies suggested, (“marginal make” and “marginal buy”), seem to require further investigation if decisions about particular technologies are to be made. Similarly to Welch and Nayak (1992), Probert (1997) proposes a competitive matrix to assess process technologies as a central part of his make-or-buy approach. Although Probert’s (1997) approach to developing make-or-buy strategy addresses a number of issues such as the business strategy, the assessment of technologies and the costing process, most of his work is centered around the importance/competitiveness matrix. This is a three by three matrix that appears to be helpful in the positioning of technologies with respect to their importance to the business and their competitiveness. Some generic sourcing strategies are also suggested. The positioning of the technologies seems useful in identifying clear “make” and “buy” decisions, however, similarly to Welch and Nayak’s (1992) matrix, there seem to be some gray areas which need further investigation. Some of the suggested strategies might require further investigation and the incorporation of additional considerations if decisions about specific process technologies are to be made.

In summary, although the approaches reviewed above are helpful in shaping the make-or-buy strategy, it appears that none of them are designed to address specific make-or-buy decisions by trading off relevant factors. This suggests that the main gap in the literature is the lack of a practical and structured approach that assists in trading-off relevant factors for addressing specific make-or-buy decisions.

Framework development

In order to build a comprehensive make-or-buy framework that captures relevant factors to be taken into account in such decisions, input from theory and practice has been considered. First, a literature survey on make-or-buy and

a number of significant related “clusters” of work was carried out. The review included vertical integration (Porter, 1980; Harrigan, 1983), transaction cost economics (Coase, 1937; Commons, 1970; Williamson, 1975) and strategic sourcing (Watts *et al.*, 1992; Ellram and Carr, 1994) literature. From the literature review key factors to be considered in make-or-buy decisions were identified and grouped into categories. These were captured into a preliminary framework, which was discussed and iteratively modified seven times as a result of the input received from interviews with academics and industrialists and in-company case studies. This process is described in more detail in this section. The framework has been developed in accordance with guidelines proposed by Miles and Huberman (1984). It is a one-page graphical representation, which allows the researcher to work with all the information at once and to identify inter-relationships. It has been developed in several iterations. As information has been collected and the knowledge of the domain of study has become more robust and integrated, the framework has been modified by adding and subtracting information. Input from theory and empirical research has been key for building a framework, as Miles and Huberman (1984) highlight, these two are helpful in identifying overlaps and contradictions between theory and practice.

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Data collection methods

In order to gain a better understanding of make-or-buy, to discuss the preliminary framework built from theory and to get new ideas for the development of the framework, a number of interviews with academics and industrialists and in-company case studies was undertaken. This section considers the details of the interviews and the case studies. The interviewees, the design of the interviews, the analysis of the transcripts and how the findings were incorporated into the framework are described. Additionally, the details of the case studies and how the findings were incorporated into the framework are presented here.

Interviews with academics

The interviews with academics assisted in broadening the view of make-or-buy and discussing new ideas for the development of the framework. A number of academics with relevant background on the research was initially approached. Four academics from the fields of manufacturing management, purchasing and supply chain management, strategic management and IT management (from the University of Luton, the University of Bath, Nottingham Trent University and Oxford University respectively) were interviewed. Semi-structured interviews were conducted. The interview with each person lasted about 60 minutes and they covered the following issues:

- details of the interviewee;
- areas related to make-or-buy;
- triggers for make-or-buy;

- factors to be considered;
- current make-or-buy approaches;
- strengths and weaknesses of current approaches;
- relevance of a practical make-or-buy approach;
- suggestions for building a practical approach; and
- discussion on the preliminary framework.

The sessions were audiotaped and transcribed. The interview transcriptions were analysed to extract information on the issues of interest, which were then incorporated into the framework for further discussion with the industrialists.

Findings from the interviews with academics

The main findings from the interviews are as follows. First, it was highlighted that input from practitioners was essential for the framework development. This input was obtained from the interviews with industrialists and in-company case studies. Second, advice on desirable characteristics of the framework was provided. This included the need for it to be easy to understand, easy to use and clearly show the inter-relationship between the key elements. These characteristics were taken into account for the framework further development and operationalisation. Additionally, further investigation on the inter-relationships was addressed during the in-company case studies. Finally, key issues to be incorporated into the framework such as cost, control, know-how and future market requirements were also identified. These factors were compared to the ones already contained in the preliminary framework and added if they had not been considered.

Interviews with industrialists

As one of the main aims of this study is to create a generic practical, make-or-buy framework, a better understanding of make-or-buy decisions in a broad industrial context was required. In order to do so, seven companies from a wide range of industries and sizes were interviewed. Table II provides details of the seven UK manufacturing companies interviewed. Semi-structured interviews with middle managers from the areas of engineering, purchasing and

Company	Sector	Turnover (£)	No. of employees
A	Aerospace	4bn	42,000
B	Power tooling	250m	1,500
C	Domestic appliances	50m	700
D	Electronics	25m	150
E	Instrumentation	10m	100
F	Instrumentation	8m	180
Company G	Instrumentation	7m	80

Table II.
Companies' general
information

manufacturing were conducted. This helped to provide a more comprehensive view of the make-or-buy issue. The interview with each person lasted about 60 minutes and covered the following issues:

- details of company;
- triggers for make-or-buy decisions;
- factors to be considered;
- how make-or-buy decisions are made (steps and people involved);
- how the cost comparison between the internal cost and the external price is undertaken;
- relevance of developing a structured practical approach;
- desirable characteristics of a structured approach; and
- discussion of the preliminary framework.

As with the academic interviews, the sessions were audiotaped and transcribed. The interview transcriptions were analysed to extract information on the issues of interest and incorporated into the framework.

Findings from the interviews with industrialists

From the analysis of the interviews a number of issues was noted. First, the principal reasons for undertaking make-or-buy decisions such as price competition, lack of capacity, skills shortage, need to increase responsiveness, need to increase quality and need to reduce time to market were identified. Second, the main factors considered for make-or-buy decisions such as total acquisition cost, complexity, technologies and skills were captured. Both the triggers and the factors identified during the interviews were compared with the ones comprised in the preliminary framework and added if they had not been considered. The incorporation of additional factors into the framework, led to a constant reflection on the way they were grouped. Emphasis was given to avoid overlaps and to make sure that the headings of the various categories were representative of the factors comprised within each group. Third, key characteristics for a practical framework and process were highlighted. These included the need for an approach to be easy to use and generic enough to cover a broad range of industries. The general applicability of the approach was addressed by covering a wide range of industries during the development of the framework. Additionally, this will be further addressed during the operationalisation of the framework. Finally, key issues with regard to the decision making process such as steps followed, people involved and difficulties encountered during the process were recorded. Although none of the companies interviewed had a structured approach for addressing make-or-buy decisions, the relevance of such an approach was highlighted. Problems such as the control of documentation could be addressed by having a structured approach. Additionally, the involvement of a multi-disciplinary team as an important constituent in

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the decision-making process was mentioned by all interviewees. This was also regarded as a key issue to address the lack of commitment, which was mentioned as a common problem by several interviewees. The findings discussed in this section helped in enhancing the understanding of practical make-or-buy decisions, and were also relevant for the further operationalisation of the framework.

In-company case studies

The 11 interviews carried out with academics and industrialists provided a sound basis for understanding the make-or-buy issue and a valuable input for the framework. However, in order to create a robust framework and to assist in its further operationalisation, two issues needed to be addressed. First, a better understanding of how make-or-buy decisions were being made in practice was required. Second, a better understanding of the inter-relationships among the various elements captured in the initial framework was necessary. In order to do this, three in-company case studies were carried out. In order to find industrial collaborators, a number of companies were approached. The companies that participated in the initial interviews were contacted together with companies suggested by academic contacts. The main criteria for selection were that the companies had recently made a make-or-buy decision on a specific part or family of parts, that the mix of companies selected provided a wide range of industries and sizes and that the cases illustrated different types of decisions (outsourcing and insourcing). Three companies that had recently made make-or-buy decisions showed interest in the research. They were approached and they agreed to participate in the study. Details on the companies selected for the case studies are shown in Table III.

The case studies were undertaken in order to document the make-or-buy decision making process for previous decisions. The three issues analysed in these cases were injection moulding, dished ends (metal forming) and cable assemblies. The decision process was mapped. Attention was given to record the following issues: triggers for the decision, factors considered, factors missed and people involved. The case studies were carried out using multiple sources of evidence such as semi-structured interviews and documents (letter, memoranda, project proposal, progress reports). This helped to provide validity and reliability to the cases (Yin, 1994).

Company	Sector	Turnover (£m)	No. of employees	Decision
A	Power tooling	250	1,500	In-sourcing injection moulding
B	Process equipment manufacturer	120	2,500	Outsourcing cable assemblies
C	Specialised fluid distribution vehicles	9	120	Outsourcing metal forming

Table III.
Case studies' general information

Proposed framework

The framework presented in this section has been developed iteratively using inputs from theory and practice, as described above. The framework aims to provide a graphical representation of why make-or-buy decisions are made and to show relevant dimensions to be studied in approaching make-or-buy decisions (see Figure 1). In contrast with the existing approaches, the framework provides a holistic view of make-or-buy and captures in a structured manner relevant factors to address make-or-buy decisions of individual parts or families of parts. With reference to Miles and Huberman (1984), this framework appears to meet their key issues for building a comprehensive framework. In addition, it takes a first step towards providing performance measures for the assessment of the business benefits delivered by individual make-or-buy decisions.

The external environment, on which the company has little or no influence, usually activates triggers for the make-or-buy analysis. For instance, increased price competition in the market place usually forces companies to reduce costs. The triggers are the reason(s) for undertaking the make-or-buy review and can be easily identified by asking why is the decision being made. In this case, the cost reduction trigger raises the make-or-buy question. The framework suggests four areas to cluster relevant factors for make-or-buy: technology and manufacturing processes, cost, supply chain management and logistics, and support systems. Within these areas a number of factors are suggested. The performance measures are closely linked to the triggers. They aim at providing some criteria to evaluate the extent to which the targets suggested by the triggers are achieved. For instance, if the trigger is cost reduction, cost saving should be the key performance measure. However, other measures such as flexibility and quality should not be neglected. Finally, the arrows coming out from the performance measures to the external environment show that make-or-buy is not a static issue. The performance measures for these decisions feed back into the external environment and possibly activate other triggers that raise again the make-or-buy question.

An illustration of the framework using case studies

This section shows how this framework and its content seem to match the considerations of the decision at the three in-company case studies. The cases are described using the framework. The elements in the external environment which activate the trigger(s), the triggers themselves, the factors and the performance measures considered in each case are discussed in this section.

Case A

Company and environment

Company A, a manufacturer of power tooling (see Table III), was facing severe price competition from products coming from the Far East. This led to increased cost reduction pressure, principally for the outdoor market.

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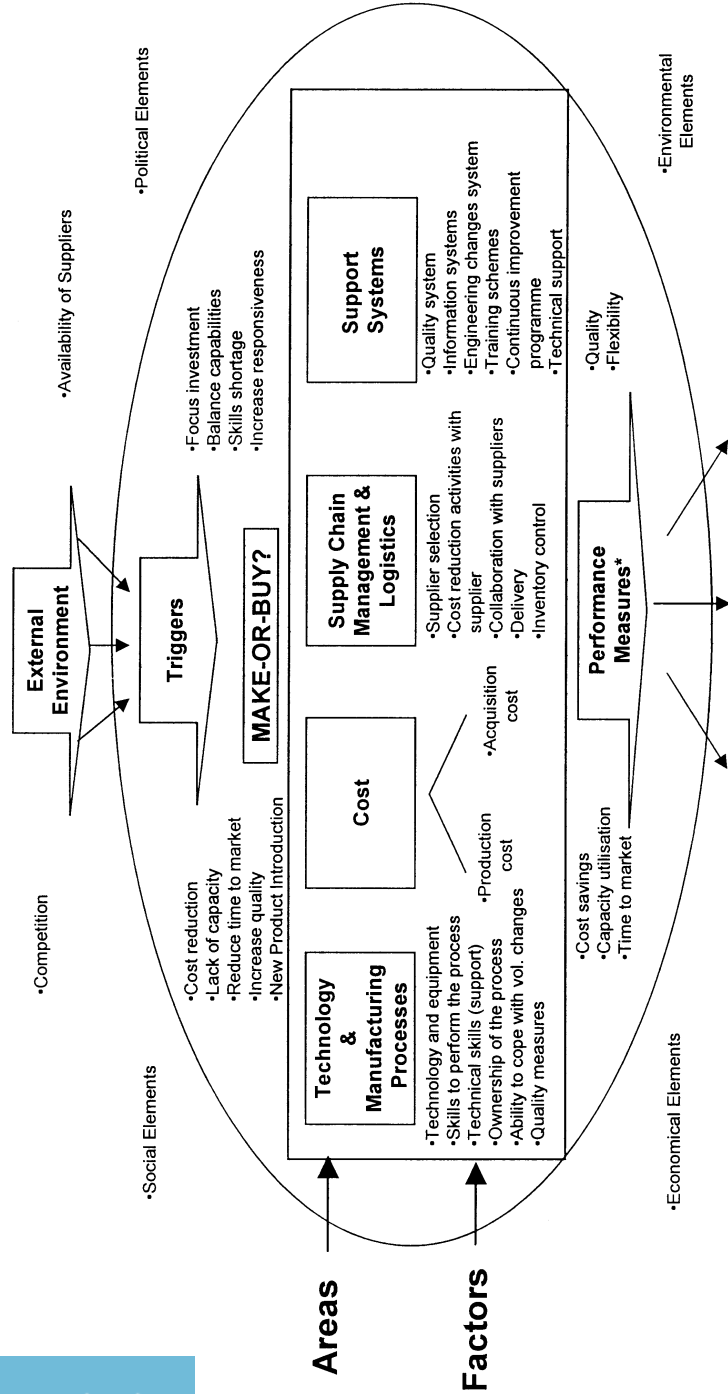


Figure 1.
Make-or-buy framework

Triggers

From the analysis of the case it was clear that the main trigger for the make-or-buy review was cost reduction. In looking at the product cost build up the company identified the injection moulded casings as an opportunity for cost reduction. In order to address this issue, a number of discussions was held with the suppliers. However, they were not able to achieve the cost reduction targets set by Company A. As result of this, a multi-disciplinary team was set up to carry out the make-or-buy analysis.

Considerations for the make-or-buy decisions

Technology and manufacturing processes. Within the area of “technology and manufacturing processes”, technology and equipment, and skills to perform and to support the process were critical considerations since the company did not have expertise in injection moulding. The company recognised that it would need to examine the injection moulding and material handling equipment and to hire experienced injection moulding operators. Technical support was also an important consideration. An agreement with the supplier of the equipment would be required to provide technical support to support the process while people were hired. Additionally, owning the process was not only regarded as a way to reduce cost but also as a way to respond faster to changes in volume.

Cost. The total acquisition cost, the in-house unit cost and the suppliers’ prices were key considerations within this area. The total acquisition cost comprised issues such as capital start up, costs for clearing and preparing the site, electricity supply and training among others. The in-house cost estimations were carried out together with the supplier of the equipment. Finally, the supplier price was broken down in order to understand how the overheads were allocated.

Supply chain management and logistics. In this particular case, issues within “supply chain management and logistics” for the raw material were not a concern since Company A already had control of the supply of raw materials.

Support systems. Within the area of support systems a number of issues was considered. First, the need to set up training courses for the operators. Second, the creation of a service network with the supplier of the equipment to provide response to technical queries within agreed time scales. Third, the need to create quality procedures. Finally, the loading of the data of the new parts (e.g. routings) into the MRP system.

Performance measures

As the principal trigger for this decision was cost reduction, costs saving was the key performance measure for the make-or-buy decision. By in-sourcing, 30 per cent cost reduction was achieved. Quality and capacity utilisation were also monitored once the process had been in-sourced. Additionally, although the time to market was not monitored, it was expected to be reduced as they would have more control over the design of the parts.

Company B

Company and environment

Company B, a process equipment manufacturer (see Table III), was facing increased price competition and increased demand.

Triggers

From the case analysis it became evident that there were two main triggers for the make-or-buy review. First, cost reduction as a result of increased price competition. Second, pressure to focus on core activities as a result of a combination of increased demand and constrained resources. This led to considering a make-or-buy review for cable assemblies and a buyer was appointed to carry out the review.

Consideration for the make-or-buy decision

The only factor considered in the decision making was cost. However, the interviewees revealed that a number of problems encountered once the assembly had been outsourced was a consequence of not taking account of important considerations.

Performance measures

No performance measures were set by the company for this decision. However, an independent analysis showed that cost savings had not been achieved and in fact a premium of 15 per cent was being paid. Additionally, quality and the ability to react to changes in volume had also been affected.

Company C

Company and environment

Company C was a container manufacturer for specialised fluid distribution vehicles (see Table III). The company was facing changing and increasingly competitive market conditions. Additionally, capital constraints for investment highlighted the need to focus investment on core activities.

Triggers

From the case analysis it became evident that the main trigger for the make-or-buy review was the need to focus investment on core activities. A multi-disciplinary team was set up to carry out the make-or-buy analysis for dished ends (metal forming).

Considerations

Technology and manufacturing processes. Technology and equipment were key considerations within this area. The supplier possessed advanced technologies for the metal forming process. This allowed them to work within tighter tolerances compared with the ones that could be achieved in-house. Through achieving these tolerances quality could be improved and an operation in the assembly process eliminated.

Cost. The in-house cost was compared against the supplier price. Additionally, the company carried out a cost benefit analysis for upgrading the technology. The analysis indicated that to justify investment, a significant increase in production volume was needed.

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Supply chain management and logistics. This area was not a key consideration in this case since the company kept the control over the supply of steel.

Support systems. Within the area of support systems Company C recognised that they did not have the systems (e.g. works instruction, engineering changes, continuous improvement) in place to control the manufacture of dished ends.

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Performance measures

The two key performance measures in this case were costs savings and quality. As a result of the make-or-buy exercise, the company achieved significant cost savings and improved their quality.

Discussion

The three cases presented above have been described using the framework. Case A and C seemed to have applied the thinking behind the framework and were both successful. They took into account a number of considerations, which are captured in the framework, and they both appeared to have achieved significant benefits. Additionally, interviews in both companies revealed two key issues that were associated with the success of the decision. First, the involvement of a multi-disciplinary team in the decision-making process. Getting input from various areas of expertise seemed to have helped in contributing to the robustness of the decision. Second, the structure and documentation of the decision-making process. Company A and C carried out the process in a structured manner and to a great extent documented the process in minutes and project briefings. These documents proved useful in clarifying and addressing issues encountered during the outsourcing process. Both the involvement of a multi-disciplinary team and the documentation of the process will be addressed during the operationalisation of the framework.

Company B, in contrast to the two cases discussed above, did not follow any structure. Additionally, the only consideration for the decision was cost. The interviews revealed that several problems were encountered once the cable assemblies had been outsourced. These problems appeared to be associated with the fact that important considerations had not been recognised during the decision making. Quality and delivery problems were encountered as a result of underestimating the skills to perform and to support the cable assembly operation. No formal supplier selection was undertaken. The supplier capabilities or supply chain management practices and logistics measures (e.g. delivery) were never assessed. The information such as drawings and bills of materials (BOMs) provided to the supplier was not reliable (not up-to-date). Additionally, a lack of control over the engineering changes led to loose control over the design of the parts.

The interviewees commented that the problems encountered could have been significantly reduced by having a structured approach and by involving more people in the decision-making process. The lack of involvement of manufacturing in the decision was regarded as one of the main pitfalls.

The cases suggest that the framework is comprehensive. It captures the key considerations highlighted in the cases. Additionally, it provides a structure for these various considerations, which is likely to help in better understanding make-or-buy decisions by identifying the triggers of the decision, the factors and the performance measures to be considered. However, further testing of the framework will be addressed during its operationalisation.

Operationalisation of the framework

The framework detailed above provides a comprehensive account of relevant areas and factors to be considered in make-or-buy decisions. However, it is necessary to make a trade-off between these areas and factors in order to reach a decision. In order to do so, a process which helps in comparing in-house and supplier capabilities using the elements within the framework is proposed here. The process is shown in Figure 2.

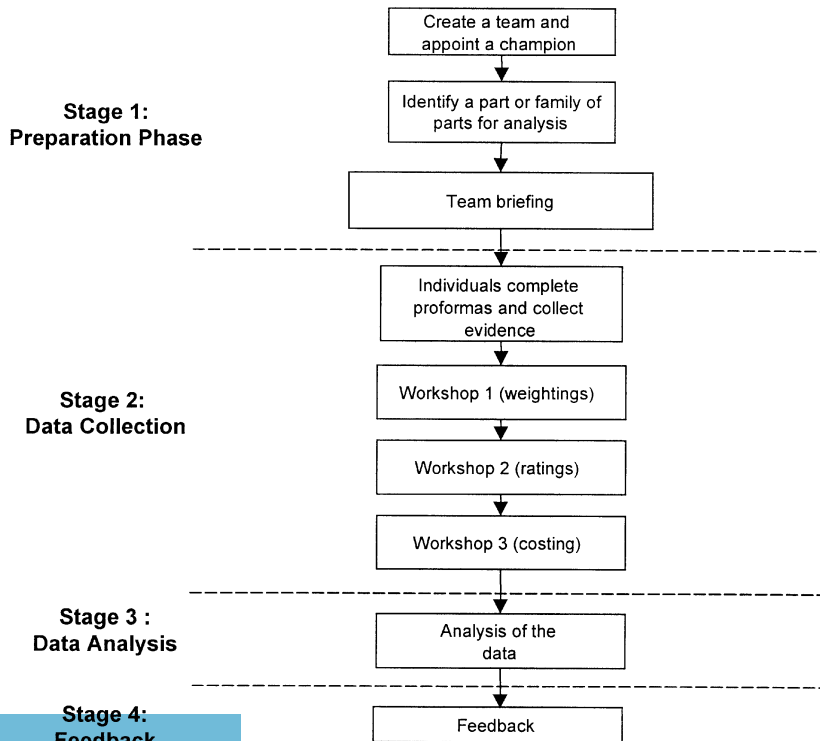


Figure 2.
Make-or-buy process

Stage 1. Preparation phase

The preparation phase entails selecting a multi-disciplinary team and the part for analysis. This stage covers the important aspects of participation and point of entry as specified in Platts (1994).

Stage 2. Data collection

The data collection is carried out using a workshop format approach as specified by Platts (1994). Three main workshops are undertaken at this stage. These workshops are designed around the principles of multi attribute decision making (MADM), which is used as a management decision aid for evaluating the make and buy alternatives.

Yoon and Hwang (1995) point out that the first step within MADM is the generation of attributes. In this case the attributes are represented by the areas and factors presented within the framework. Additionally, Miller's (1956) rule for the number of attributes, seven plus or minus two is also observed. Six factors maximum are included within each area.

Second, the weighting of attributes is undertaken. This is covered in workshop 1, where weightings to the make-or-buy areas and factors are assigned. Yoon and Hwang (1995) highlight that not all attributes are equally important. The weightings, therefore, express the relative importance of each attribute. In this case the weightings need to reflect the relative importance of each area and factor to the decision under consideration. For instance "technology and manufacturing processes" does not have the same importance for turbine blades as for cable assemblies.

In order to carry out the elicitation of weightings, a number of weighting elicitation methods will be investigated. The selection of the method will take into account the findings from the empirical research in that the process needs to be easy to use and to understand.

Third, the attributes are rated. This is covered in workshop 2, where the factors within the four make-or-buy areas are assessed for both in-house and supplier options. The rating is carried out using a set of proformas for each area of the framework. These proformas list the various factors which are assessed in a three-point scale for both internal and supplier capabilities. Evidence for the ratings is required to support the assessment.

Finally, the score for each alternative, make or buy, is generated by analysis of the collected data.

Stage 3. Data analysis

To simplify the arithmetic of the calculations, a spreadsheet will be developed in order to provide the following results:

- Final scores for in-house and for the supplier. The highest score indicates the best option.
- Weighted gaps for each make-or-buy area which highlight the strengths and weaknesses of the best option.
- A sensitivity analysis which tests the robustness of the final outcome.

Stage 4. Feedback

Finally, a two-way feedback session is proposed. The researcher provides the team with the results of the study and the participants discuss with the researcher their impressions of the process. The three main criteria for evaluating the process will be feasibility, usability and utility, as suggested by Platts (1994). Feasibility refers simply to whether it is possible to follow the established process. This issue will be addressed by applying the process in a broad range of companies. Additionally, other facilitators will be used to apply the process in order to provide greater confidence in the feasibility. Usability relates to how easy the process is to use. Utility refers to the usefulness of the process in reaching the decision and generating further plans. In order to assist with the evaluation of the process and the framework, a questionnaire which addresses in more detail the criteria presented above, will be used. This questionnaire addresses the following issues: clarity of the process and its individual stages, clarity of the areas and factors, structure of the process, relevance of the make-or-buy areas and factors, confidence on the results of the process, availability of information to carry out the process, appropriateness of the mix of participants, appropriateness of workshop format and facilitator role and usefulness of the process to improve the understanding of make-or-buy and to generate actions. This questionnaire will be completed and discussed during the feedback session to ensure that key issues are captured.

Conclusions

This paper aims to contribute to both theory and practice. The make-or-buy framework presented intends to address the gap identified in the literature by capturing relevant factors to be considered in make-or-buy decisions. It aims to provide a graphical representation of why make-or-buy decisions are made and to show relevant dimensions to be studied in approaching make-or-buy decisions. With reference to Miles and Huberman (1984), this framework appears to meet their criteria for a comprehensive framework. This is supported by the cases which indicated that the framework not only captures relevant factors to be considered but also provides a structure to investigate these various considerations. Additionally, it takes a first step towards providing performance measures for the assessment of the business benefits delivered by individual make-or-buy decisions. Further testing of the framework will be addressed during its operationalisation.

The next stage of this research will be the operationalisation of the make-or-buy framework to provide a tool to assist managers to make decisions in a more structured and consistent manner. During the operationalisation of the framework the following issues will be considered; feasibility, usability and utility (Platts, 1994).

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