KINGSTON UNIVERSITY

Exploring Outsourcing as a Source of Competitive Advantage

'Thesis submitted in partial fulfilment for the degree of Doctor of Business Administration'

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1.0 Abstract

This research explores how a firm in the electronics industry may achieve competitive advantage through the relationship created with a manufacturing partner when outsourcing manufacturing operations. Semi-structured interviews were carried out with senior decision makers with responsibility for outsourcing in a cross section of companies in the European electronics industry, and with senior executives in contract manufacturing companies based in South-East Asia, to investigate the decision making process and the amount of strategic choice available, and then to investigate what benefits were perceived to have been achieved by the outsourcing firm.

The research questions what extent do decision makers consider competitive advantage when deciding to outsource, what competitive advantages, or partnership value, can be created by and can be attributed to the outsourcing partnership and to what degree competitive advantage has been achieved through outsourcing and how sustainable is it likely to be.

The research found that the decision to outsource was normally made in order to save costs and/or to enable a firm to focus on core competencies. It was also found that expected cost savings were often not achieved and that some key capabilities were irretrievably lost. What some firms did find, however, was that they achieved some level of competitive advantage from working with their manufacturing partner that they did not expect when they made the decision to outsource, these advantages evolved over time and are grouped into three areas, classified as 'values':

- Sourcing value
- Technology value
- Market value

Collectively the researcher has termed these as 'Partnership Value'. Partnership value is the competitive advantage a firm achieves in the marketplace through outsourcing manufacturing and working with its manufacturing partner. The research concludes with a framework that can assist decision makers considering to outsource manufacturing so that they may achieve greater value from the relationship with their chosen manufacturing partner by evaluating factors related to the external and competitive environment and achieving Partnership Value.

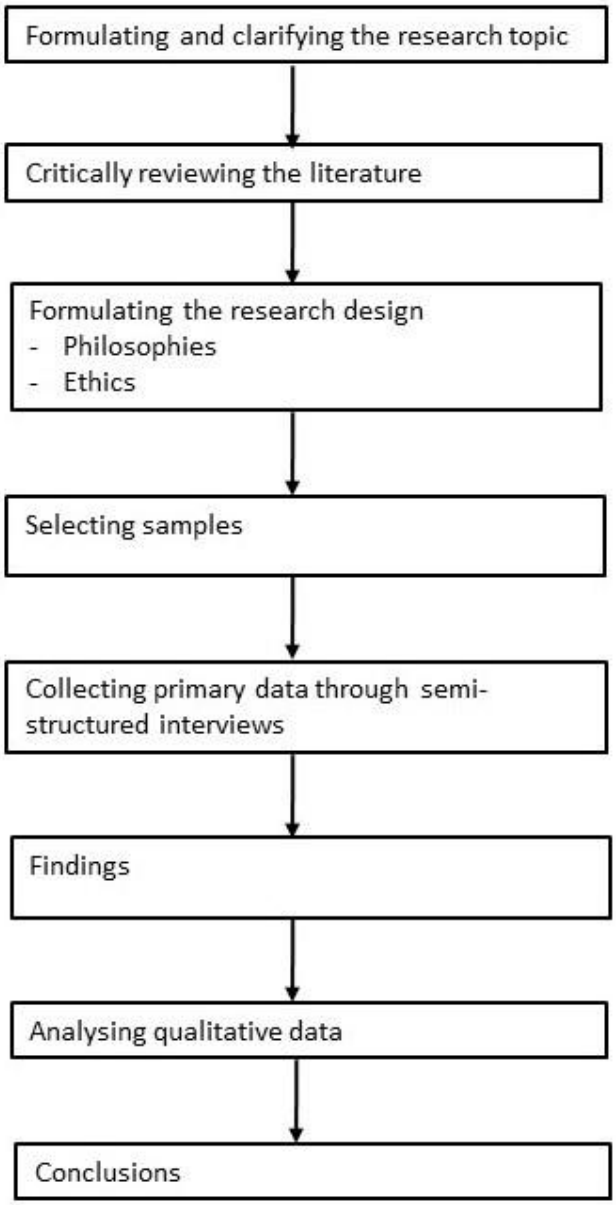
2.0 Introduction – formulating and clarifying the research topic

This chapter gives details of the research context, the research problem and how it relates to current literature. It then proceeds to explain the different chapters of the research and defines the scope of the study.

2.1 Research protocol

This research follows the protocol and methods set out in Saunders, Lewis, Thornhill (2003) as depicted in Figure 1. The research protocol

Figure 1. The research protocol



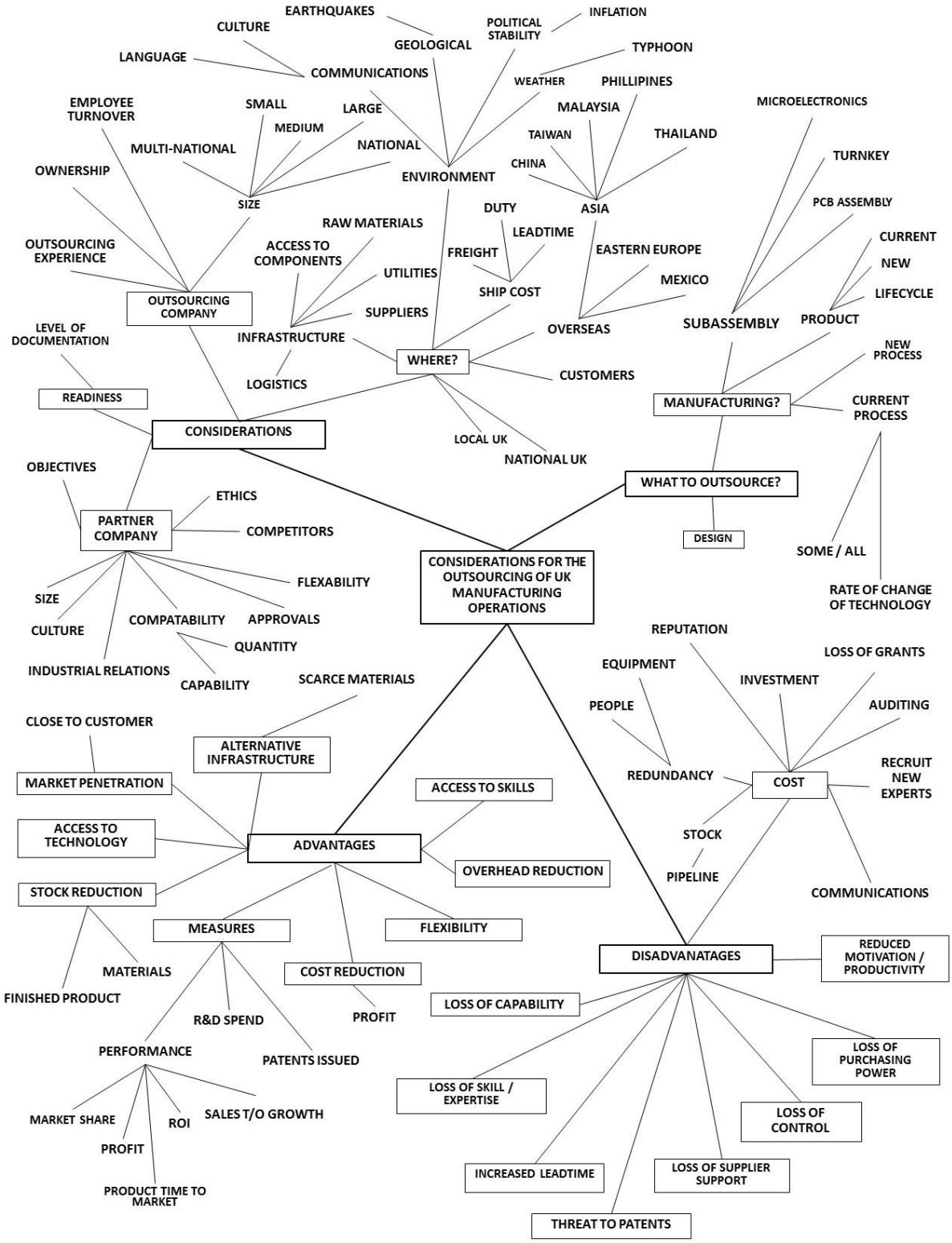
2.2 The research context

The electronics industry has undergone huge growth in the past thirty years. This has been accompanied by a transformation in industry structure as many companies have subcontracted, or outsourced, their manufacturing operations. Much of this outsourcing is to lower cost areas overseas, a process known as offshoring.

In 1990, the total global electronics industry was worth USD100bn with less than 5% outsourced (Deloitte 2008). The growth in outsourcing has meant that by 2012, the top 10 contract electronics manufacturers alone turned over sales of almost USD200bn; with the largest company, Foxconn, a division of Hon Hai Precision of Taiwan, having sales of more than USD100bn and with 200,000 employees (Hon Hai annual report). For some organisations, where manufacturing was no longer considered to be a core competence and where full consideration has been given to the supply chain and the overall company strategy, outsourcing has been considered to be successful; for others, who have considered only to "offload" their troublesome manufacturing with the hope to benefit from cost reductions, it may not have been so. The perception that lower costs may be achieved overseas through lower labour and overhead rates make outsourcing appear to be an attractive option, but direct unit manufacturing cost is only one consideration of a very complex equation and is often miscalculated, and the total cost of outsourcing is often underestimated. In addition, cost reduction is unlikely to lead to long-term competitive advantage unless the firm has a cost-leadership strategy. There is little competitive advantage achieved through any cost reduction realised by outsourcing in industries where the majority of competitors do the same thing and outsource all or part of their manufacturing operations, in this situation outsourcing is a necessity to reach the cost level that will enable a manufacturer to exist in its market.

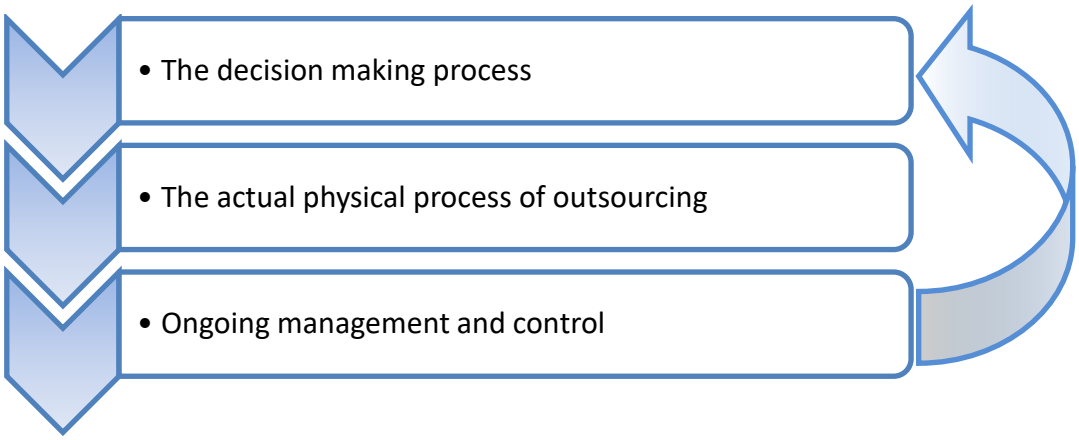
Outsourcing is a very wide ranging subject and the considerations to outsource are numerous. Decisions on manufacturing operations need to be made in an informed and structured way that fully evaluate every aspect of a firm's strategy. To try to limit the scope of the study, a spider diagram based on the knowledge and experience of the researcher was constructed in an attempt to capture as many factors as possible related to outsourcing of the manufacturing operations of electronic products companies, see Figure 2.

Figure 2. Spider diagram illustrating thoughts on the factors affecting outsourcing



In order to limit the scope of the study and to rationalise the spider diagram, it was concluded by the researcher that factors could be grouped and arranged under the major headings in Figure 3.

Figure 3. Major categories of factors relating to outsourcing



The process of outsourcing and the ongoing management and control are tactical and operational issues and are not investigated in this research. The strategic issues are related to the decision making process and why companies outsource in the first place; the expected benefits from outsourcing and the areas of competitive advantage achieved. This is the area investigated by this research.

2.3 The research problem

Current literature, and the experience of the researcher, shows that many firms consider to outsource their manufacturing with a rather short term view to reduce production costs. The experience, however, is that expected cost reductions are not achieved and that the cost involved in managing outsourcing is far greater than considered. In addition, outsourcing for cost reduction may be the norm for the industry; consequently, it is not a source of sustainable competitive advantage.

Porter's competitive forces model (2004:17) states that 'price cuts are quickly and easily matched by rivals and once matched they lower revenues for all firms'. If, however, a firm decides to outsource manufacturing to reduce cost in order to pursue a cost leadership position, and real cost savings are achieved, then outsourcing could be a positive strategic choice.

With regard to cost reduction, Welch *et al.* (1992:30) conclude that "The sourcing dilemma – to buy or not to buy – is of central importance. While cost is always important in any business decision, managers should consider strategic and technological issues in conjunction with the decision. Companies that continue to make sourcing decisions based solely on cost will eventually wither and die, as many already have." With regard to short term considerations and long term strategic planning, the Organisational Learning Model formulated by March (1991) states that 'a firm should consider very carefully whether the decision to outsource is a type of short-term exploitation learning where the firm is fighting for short term survival; or whether it is part of a longer term well considered exploration strategy that can lead to competitive advantage'.

After cost reduction, a commonly cited reason to outsource is to enable the firm to focus on core competencies. If manufacturing is not considered to be a core-competence (Prahalad and Hamel, 1990), in other words it is not an area of specialised expertise that cannot be imitated by competitors, and it does not make a positive contribution to the value chain (Porter, 2004) then outsourcing of manufacturing could be a strategic option.

Slack *et al.* (2008:227) also discuss core competences and the concept of 'strategic fit' between what the market wants and what the firm's operation can deliver, and how this can be sustained over time. Slack *et al.* (2008:227) postulate that if a firm can provide competitive capabilities in the long term then they can achieve some level of sustainable competitive advantage.

Metty (2006) states "Before you decide what to outsource, identify what advantage it will give you, what improvements it will bring to your company and how those you outsource to will add value to your business objectives and help you realize your corporate objectives". Metty (2006) warns of the potential to lose competitive advantage if outsourcing fails to help a firm differentiate products or services from competitors' offerings. Metty (2006) takes this further and considers that "outsourcing works best when it provides access to and early adoption of new technology, assures continuity of supply through preferred suppliers, cuts costs and otherwise provides a competitive advantage"; and warns that companies should not give up control of technology road-mapping sessions, sourcing authority, BOM or supplier relationships.

The literature cites many examples and situations where outsourcing decisions have achieved short term cost savings but have not achieved any kind of competitive advantage. Competitive advantage is a term applied to an advantage a firm may achieve over its

competitors in the marketplace which leads to superior performance (Porter 2004b). Many factors and theories are discussed in the literature relating to outsourcing and competitive advantage and McIvor's (2000:22) outsourcing framework was determined to be the most comprehensive summary of literature relating to outsourcing and covers the evolution of the factors identified in other studies. It brings together the value chain perspective (Porter, 2004), core competency considerations and supply base influences.

The value chain perspective considers each stage of the supply chain and considers where value is added and assists in identifying where advantages may be achieved. Core competency theory looks at what core and non-core competencies a firm may have and helps to identify what key operations should be kept in-house, and what non-core operations should be considered for outsourcing. These factors are 'inward' looking at the firm's operations and do not consider what advantages could be achieved by looking outside of the firm's operations and considering external factors, influences and opportunities in the competitive environment.

The experience of the researcher is that there are opportunities to achieve competitive advantage through partnerships but there is very little research found relating to companies outsourcing to achieve competitive advantage and none found on the creation of new competitive advantage as a direct outcome of the outsourcing partnership.

This research is exploratory and empirically investigates what competitive advantage can be created through the relationship between the outsourcer and the manufacturer.

The research investigates the decision making process and what factors decision makers consider when deciding to outsource. The purpose being to establish whether decisions are made with consideration to the company strategy and how much competitive advantage is considered at that stage. The research question being:

'To what extent do decision makers consider competitive advantage when deciding to outsource?'

The research also investigates what competitive advantages have been achieved through the research questions:

'*What competitive advantages, or partnership value, can be created by and can be attributed to the outsourcing partnership*?'

'*To what degree has competitive advantage been achieved through outsourcing and how sustainable is it likely to be?*'

The purpose of the research is to expand and extend McIvor's framework to incorporate considerations relating to competitive advantage and to give a structured tool for decision makers to refer to when making decisions relating to the outsourcing of manufacturing operations.

2.4 Scope of the study

The research empirically investigates the generation of competitive advantage generated specifically through the relationship between the outsourcer and the manufacturer in the contract manufacturing electronics industry. The research is based on semi-structured interviews with senior decision makers responsible for defining and implementing the strategy of their organisation. Interviews were also carried out with representatives of contract electronic manufacturing companies.

There are a number of variables in the contract electronics manufacturing market that may or may not have an influence on the success of the manufacturing relationship and any competitive advantage achieved. These variables were identified in the spider diagram in Figure 2. as well as in the literature. The variables include:

- Size and sales turnover of the manufacturer
- Value of the business being outsourced
- The mix of the product - high volume / low mix or low volume / high mix

With regard to the size of the manufacturer, it is generally accepted in the industry that manufacturers in the contract electronics manufacturing market can be grouped into three tiers, each defined by the amount of sales turnover:

- Tier 1 Large - more than USD800m
- Tier 2 Medium - between USD250m and USD800m
- Tier 3 Small - less than USD250m

Different dynamics may operate in each tier as larger organisations will tend to be multinational, have well established infrastructure and have customers with a larger outsourcing spend, who may also operate globally. Smaller contract manufacturers will have smaller customers and may only have one or two manufacturing facilities. It was decided to interview a representative from a contract manufacturer in each tier to gain insight from the manufacturer's perspective at all levels of the industry.

The amount of sales in the outsourcing relationship, as well as the product mix, could affect economies of scale, relative power of the supplier to the buyer, materials procurement.

The organisations in which the decision makers operate will:

- Be located in Western Europe or the United States of America USA). The researcher has access to decision makers in outsourcing companies in Western Europe and the USA and a significant percentage of outsourced manufacturing originates from these regions.
- Have outsourced some or all of their electronics manufacturing operations for at least two years. The research is concerned with identifying competitive advantage and it will take a period of time for the outsourcing process to be completed and for the outsourcing firm to assess change to its competitive position. It was felt that a period of two years should be sufficient to realise this.
- Have made the outsourcing decision less than ten years ago. The research is concerned with the expectations of decision makers when they decide to outsource and so it is necessary to interview those who have memory of the decision making taking place. It is also important for the decision maker to still be working for the firm.
- Operate within the consumer, telecoms, computer, medical or industrial electronic segments. These are the major segments of the electronics industry in which outsourcing takes place.
- Have a sales revenue of more than GBP1m per year. The outsourcing spend needs to be large enough to overcome the cost of outsourcing and for a close relationship to build between the outsourcer and the manufacturer. Anything less will not allow a partnership to build with a manufacturer that is large enough for competitive advantage to grow

In summary, the types of organisations related to this research:

- are based in the United States of America or Western Europe
- currently, or plan to, outsource electronics manufacturing
- operate within the consumer, telecoms, computer, medical or industrial electronic segments
- have sales revenue of more than GBP1m per year

Organisations not related to this research:

- are based in South America, Eastern Europe or Asia
- do not, and have no plan to, outsource electronics manufacturing
- operate in the military, aerospace and automotive industry segments
- have sales revenue of less than GBP1m per year

Current research is focused on the determinants of competitive advantage from within the firm and whether it will be lost if outsourced, mainly in the form of cost reduction and focus on core activities. There is very little research found relating to companies outsourcing to achieve competitive advantage and none found that empirically investigate the generation of new competitive advantage through the strategic implementation of outsourcing and as a direct outcome of the outsourcing partnership.

The researcher has gained extensive experience working in the electronics contract manufacturing industry and has seen many firms gain significant competitive advantage through developing a partnership with their chosen manufacturer.

3.0 The Literature Review – critically reviewing the literature

3.1 Introduction

A systematic literature review was undertaken to gain understanding of the key issues of the current published work on the topic, to review what has been researched before and how this has been researched (Hart 2005:1). It enabled the researcher to understand the main theories relating to outsourcing, how they have been applied and developed and also the criticisms of that research. The literature review justifies the chosen method of the research, as well as demonstrates that the further research contributes something new and allows the researcher to progressively narrow down initial broad research ideas into proposals that are achievable (Hart 2005:13).

A thorough, planned and methodical approach was necessary to make sense of what a collection of, often contradictory, studies are saying; in conducting the search, it is necessary to consider any bias of the researcher and approach it with an open mind, and the search must conducted with rigour (Tranfield *et al.* 2003). The review was undertaken to develop concepts and to identify gaps in current knowledge of the subject so as to enable the definition of the research problem and the subsequent empirical research

3.2 Methodology

The method was to first conduct an initial review which took an overview of the published papers relating to outsourcing and competitive advantage to identify the key authors, concepts, theories and ideas relating to outsourcing and the relationship with sustainable competitive advantage. The initial search considered papers that utilised a wide range of research methods; and those that investigated what are thought to be the major issues and debates on the subject which can be applied to western based electronic products companies. This enabled the identification of key words used for the subsequent full and systematic literature review and facilitated further review and consolidation so as to give subsequent focus on potential problems for further investigation by empirical research. The search focused on using on-line databases, such as Proquest and Emerald, and was initially based on searching for keywords; words and phrases that were expected to result in the location of relevant articles.

This positivistic process, based on a systematic and repeatable search of papers relating to a particular subject, included papers that took on all manner of research methods and

perspectives; including positivist, realist and interpretivist approaches, as well as both quantitative and qualitative methods. The search, however, could have taken on an interpretivist aspect as the Author of this thesis has developed knowledge, and therefore personal understanding and interpretation of the effects of outsourcing and needs to be aware of personal epistemological and ontological beliefs and assumptions when defining key words for the review, as well as when interpreting the data.

An initial scan of available papers revealed that the amount of work published on outsourcing has grown substantially in recent years, and also that practice of outsourcing has grown substantially in the past twenty years. The search therefore focused primarily on papers less than ten years old; with extension of up to twenty years old when seminal and influential papers are uncovered or referred to in the bibliography of the newer papers. Particular attention was given to papers that reviewed the current research on the subject. The bibliography of relevant papers was also used as a source of articles for further investigation. This systematic and iterative search process continued until no new variables or arguments were identified. The strategy was to progressively narrow down the areas of published research to a point that all the published arguments relating to the research questions had been addressed. Saunders *et al.* (2003) describe this as an iterative process as the review of the results of each literature search based on chosen key words can reveal new areas for consideration and the generation of new key words that require further search.

As a summary, the method used was to search for papers within the following parameters:

- Published in English.
- Generally published within the past 10 years, with extension for important and seminal works
- Relating to outsourcing from UK and USA based companies
- To include journals, books, reports, published papers, theses, bibliographies

The initial keywords need to encompass all aspects of the subject and be able to capture both directly and indirectly related information. The initial keywords selected were:

- Outsourcing – to gain general outsourcing information of any firm's function and to put into perspective the outsourcing of manufacturing
- Outsourcing manufacturing – to get specific information on outsourcing of manufacturing

- Make or buy decision – to approach the subject using different, but industry standard, terminology and to gain information regarding the decision making process
- Strategic outsourcing – to gain information on outsourcing which may have a long-term perspective as opposed to the general information available on cost savings
- Competitive advantage – to gain information on decision making in relation to market based considerations, as opposed to value chain considerations (Porter 2004).
- Sustainable competitive advantage – to gain information relating to long-term considerations and the firm's performance measurement

This list developed as the systematic search progressed as new areas of relevant information were uncovered, as well as when new terminology was discovered that related to the same subjects.

The final stage of the literature review was to take the concepts that had been identified and to organise the data around those concepts, in a way similar to that detailed by Hart (2005:124) where all key points, frameworks, seminal works and arguments are assimilated into one document regarding each of the research questions. This was then used to develop a conceptual framework to highlight areas for further empirical research.

3.3 The Initial Review

The initial review was based on approximately 20 papers selected by scanning current literature using the keywords identified in the methodology and identifying key themes and concepts in these papers.

Kakabadse and Kakabadse (2000) investigated what they claimed to be a paradigm shift in the service industries and reviewed the literature published at the time. They considered the trend towards outsourcing and identified two prime reasons for outsourcing; scale economies and strategic sourcing.

Scale economy is related to the consideration of scale and costs (Finlay and King, 1999). In 1991, the Boston Consulting Group concluded that most Western companies that outsource do it to save overhead costs and to induce short term cost savings. The focus is on core business activities; avoidance of investment in in-house capability for non-core activities; and outsourcing to those who can achieve the greatest economies of scale.

Strategic sourcing, in contrast, positions outsourcing as integral to an organisation's overall strategy (Quinn and Hilmer, 1994). DiRomualdo and Gurbaxani (1998) argue that companies outsource in order to satisfy strategic intents of strategic improvement (cost reduction and efficiency enhancement), strategic business impact (improving performance within existing lines of business) and strategic commercial exploitation (focus on leveraging technology-related assets).

McIvor (2000:23), in the paper "A practical framework for understanding the outsourcing process", first discusses Williamson's (1975) theory of transaction cost analysis as being the conceptual basis for outsourcing where "economic theory is combined with management theory to determine the best type of relationship a firm should develop in the marketplace". The theory being that the properties of a transaction determine the governance structure and the internal and external boundaries of a firm; and that the scope for cost reduction combined with the level of investment required for a particular transaction will determine whether that transaction is outsourced or internalized.

McIvor (2000:24) took these concepts and carried out a series of structured interviews in a cross section of companies and industries. Questions were based on the following key points:

- Influences on the outsourcing process
- Level of integration with business strategy
- Functions involved in the decision making process
- Level of cost analysis
- Role of suppliers in the process

From this interpretivist approach, McIvor (2000) concluded that the key problems encountered when outsourcing are that most firms do not have a formal outsourcing process and that they do not perform a comprehensive cost analysis; and the cost analyses that are performed can be misleading, depending on the accounting practice of the firm. Ford *et al.* (1993) also concluded that outsourcing decisions are often handled "solely by the purchasing function and are based on short-term cost reduction criteria rather than long-term strategic analysis".

McIvor (2000) constructed a framework (figure 15.) which aims to illustrate that, whilst cost considerations are important, outsourcing should be integrated into the overall strategy of an organization. The stages are:

- establish the core activities of the business that add value and are essential to serving customer needs, all non-core activities will be outsourced
- Evaluate the relative performance and cost of each core activity against industry norms to identify those activities that can 'achieve pre-eminence and provide unique customer perceived value' (McIvor 2000:30). Consider whether outsourcing such an activity could have a detrimental effect on a firm's performance or whether sustainable competitive advantage can be achieved by performing these core activities internally by benchmarking the performance of each stage of the value chain in relation to competitors and all potential providers of that activity.
- measure all the actual and potential costs involved in sourcing the activity, internally or externally then consider 'strategic outsourcing' of core activities where an outside firm may be more competent or where a firm considers that it performs well now but may not be able to sustain its competency in the future. McIvor (2009:33) suggests that it may be possible to gain competitive advantage by outsourcing those activities by, for example, becoming more flexible and able to react quicker to market changes
- Consider if outsourcing of core activities may bring benefits through a partnership or strategic alliance by, for instance, developing a new core competency by learning from the partner.

In relation to the development of competitive advantage, Jennings (2002) recognized the work of Quinn and Hilmer (1994); that an organization's outsourcing strategy needs to be consistent with competitive conditions. Jennings cites examples of the competitive environment changing due to increasing globalization, deregulation and seasonal demand cycles. Jennings states "Competitive developments may bring into question the relevance of capabilities and assets that have been seen as core for the organization. Through industry evolution the processes of buyer learning, diffusion of proprietary knowledge, process and market innovation and experience, all serve to change the competitive emphasis and the potential for particular value chain activities to contribute to profitability".

Jiang and Qureshi (2006) question the ability to quantitatively measure the effects of outsourcing on competitive advantage and state that "outsourcing is one of the most recent management strategies to emerge in response to demands for more efficient ways to address organizational competitiveness…….. finding evidence of the results of outsourcing is critical……..However, despite the growing emphasis of outsourcing, researchers are unable to empirically and systematically pinpoint its impact on firm's performance metrics by using objective "hard data," which are from audited financial reports. Most studies refer to outsourcing impact roughly as a conceptual combination of cost reduction, productivity growth, and profitability improvement approaches". Jiang and Qureshi (2006) summarise the frequency of five methods in outsourcing research as follows in Figure 4:

Figure 4. Jiang and Qureshi (2006) Appearance frequencies of the five methods in outsourcing research

Research methodology	Appearance frequency	Percentage
Case study/field study/interview	68	40.4
Survey	42	24.9
Conceptual framework/other qualitative methods	28	17.1
Mathematical modelling	25	14.8
Financial data analyses	5	2.8

Jiang and Qureshi (2006) also identify five metrics for the effects of outsourcing on competitive performance:

1. The cost reductions.
2. The productivity growth.
3. The profitability increase.
4. The firm's value improvement.
5. Risk control.

Jiang and Qureshi (2006) note that the vast majority of research on outsourcing is subjective and interpretivist 'soft data', such as self-report data and perceptual data, and is related to the process of outsourcing and the ongoing management and control. This is consistent with the initial literature review of this paper. There was very little research identified which was:

- Positivistic and quantitative research which analyses the effect of outsourcing on the firm's long-term financial performance.
- From the perspective of the manufacturer of the outsourced product.
- concerned with the use of outsourcing as a source of sustainable competitive advantage

In summary, the initial review revealed the following:

- most firms outsource to save cost and to focus on core business activities
- the cost analyses are often inaccurate
- outsourcing should be integrated into the firm's strategy
- the firm's strategy should consider the competitive environment
- it is very difficult to measure the benefits of outsourcing

The approach taken in most of the current research, including McIvor (2000), is based on the internal workings of a firm and the supply chain. The research into the outsourcing decision making process tends to be qualitative and based on interviews. There is little research on how outsourcing fits with the firm's business strategy; as well as little research from the perspective of the contract manufacturer, the firm that takes on the manufacturing of the products.

The findings of the initial review of papers relating to outsourcing are that 'sustainable competitive advantage' is not a focus in the literature, but is a subsection of the argument concerning the outsourcing decision. There is a gap in the literature relating to how outsourcing may be a source of competitive advantage and how a firm may benefit from working with an external manufacturer. This is the focus of the main review and the area for investigation by the subsequent research.

3.4 The main review

For the systematic literature review it was decided that a search of literature relating to outsourcing of any manufacturing operation, and competitive advantage in all industries, was required so as to capture the general theories and thinking on the subject and to enable the subsequent research to be put into context. It was also considered that decision-making processes need to be investigated and understood in order to enable the analysis to be conducted in an informed manner. The initial review and subject theme identified areas for research in relation to outsourcing, competitive advantage, and the decision making process

From this, the systematic literature review was divided into the following subject areas:

- how outsourcing is defined
- why companies decide to outsource
- theories formulated on the decision making process in relation to outsourcing
- the aspects of company performance measured in relation to outsourcing
- how competitive advantage has been defined and measured
- theories formulated on outsourcing and competitive advantage
- competitive advantage and cost
- competitive advantage and partnerships
- competitive advantage and technology

This literature review covers the information researched in 57 papers and articles selected on Proquest and Emerald databases searching using the key words identified above. After 57 papers, no further concepts and ideas were found. The papers reviewed showed a bias towards theoretical methods with little empirical based research.

The methods used are as follows:

Literature review/theoretical	27	47%
Interviews	12	20%
Questionnaire / survey	9	16%
Case study	6	11%
Action research	1	2%
Mathematical modelling	1	2%
Financial data analysis	1	2%

Literature reviews and theoretical discussion was by far the most common method found in the literature reviewed. This is consistent with the work of Jiang *et al.* (2005) who found that case studies, field studies and interviews were by-far the most popular; then surveys and conceptual frameworks. Mathematical modelling and financial data analyses were much less common.

This review of the research methods used in the papers highlights the emphasis on reviewing the current literature and formulating new theories and frameworks. It was also found that there is a bias towards qualitative research. Outsourcing is becoming an extremely common

practice but there is little empirically based quantitative research published on the subject.

3.4.1 Outsourcing

This section summarises ideas and definitions from papers over the years and shows how outsourcing has developed as a concept. From the simplistic 'getting others to perform operational activities' (Pagnoncelli, 1993) to Elmuti *et al.* (2001) who includes the concept of outsourcing non-core activities.

3.4.1.1 How outsourcing has been defined

Many definitions have evolved concerning the term outsourcing, maybe the most straightforward being "a process of transferring activities to be performed by others" (Pagnoncelli, 1993). Other definitions include "the use of external resources to execute operational tasks" (Grover *et al.*, 1994), or "the hiring of a contractor by a business organisation to perform parts of its operation rather than performing the tasks itself (Glagola, 1999:41). Zhu *et al.* (2001) define outsourcing as "the process of transferring the responsibility for a specific business function from an employee group to a non-employee group".

Fan (2000:213) Outsourcing is a contractual agreement between the customer and one or more suppliers to provide services or processes that the customer is currently providing internally. Within a manufacturing context Ehie (2001) defines outsourcing as "the use of production facilities of other firms rather than use those currently in-house or making new manufacturing investments.

The most recent definition in this study is that of Juras (2007:43) whose definition is that outsourcing involves transferring ownership of an organization's business activities to an outside provider.

Elmuti *et al.* (2000) summarise most aspects of the term and considers outsourcing as a global activity and a management strategy "by which an organization delegates major, non-core functions to specialized and efficient service providers.

The definitions do not consider in great detail why the function is being transferred but inferences are made in relation to:

- hiring an outside contractor
- transferring responsibility, transferring ownership

- saving investment
- non-core functions

Essentially, all the definitions listed are focused on the transferring of a function from one firm to another. The focus is on transferring ownership, transferring the problem of a non-core activity. The definitions are 'inward' looking to the firm and do not consider the opportunities of the outside environment. There is no reference to partnership, the focus of this research.

3.4.2 The 'make or buy' decision

This section summarises a number of papers which report on why firms decide to outsource. Pagnoncelli (1993), Canez *et al.* (2000), Metty (2006) and Deloitte (2008) all report similar findings with a large emphasis on saving cost. This section summarises Williamson's (1975) transaction cost analysis which is widely considered to be a key concept in the outsourcing decision making process. Slack *et al.* (2008), Ehie (2001) and Zhu *et al.* (2001) highlight some further depth with discussion on the effect of outsourcing activities on the strategic fit of the firm within its market and the firm's competitiveness, and these findings initially support the concept of outsourcing providing some kind of competitive advantage. This section summarises the perceived benefits of outsourcing reported in the literature.

This section then explores the decision making process, including the level of the decision making group. It explores the bureaucratic rational model of Simon (1960) and the concept of satisficing to accept an acceptable outcome without full agreement on all aspects of the decision. This section contrasts the reactive and goal focussed approach of Simons *et al*. (1998) with the pro-active choice of McIvor (1998). The section introduces the concept of core competency in relation to McIcvor's framework. It concludes by summarising all factors related to the decision process and the amount of strategic choice in relation to the outsourcing decision, and puts them into one 'outsourcing decision framework'.

3.4.2.1 The reasons companies decide to outsource

The Deloitte 2008 Outsourcing Report surveyed 300 senior executives of companies that have outsourced either IT or "Business Processes" and found that cost reduction was the primary driver in 64% of outsourcing initiatives. It also found that 15% of respondents had transferred the outsourced function back in-house; that 65% of respondents did not have a sourcing strategy linked to the overall business strategy; and that if the respondents could have done

something differently, 20% would have paid closer attention to comparing costs. After cost reduction, the other reasons cited, in order of importance were

- To leverage technology expertise
- Access to labour expertise
- Improved customer value
- To gain competitive advantage
- Consolidation of assets/resources
- Increased shareholder value
- Lack of in-house resources
- Increased flexibility

Metty (2006) notes that the reasons to outsource are to save money, improve flexibility, reduce capital and improve quality. Canez *et al.* (2000:1313) state that 'make-or-buy decisions are often made purely on the basis of cost'.

Outsourcing to lower cost parts of the world can result in savings in the manufacturing of a product, but a firm needs to consider the total cost and the total effect of the outsourcing, including its path dependency, or the barriers and hurdles to exit the established way. The firm needs to consider that in losing its' internal manufacturing capability they risk losing key skilled employees and supplier relationships that may be essential to the development of new processes, products and designs.

A firm should consider how reducing cost, if it is the primary driver to outsource, fits with their overall strategy.

Slack *et al.* (2008:228) discuss the strategic fit of a firm with its market, and how well the operations strategy and market requirements align. The focus is not on cost reduction, but on sustainable alignment. The alignment needs to be sustainable to be effective and so they proclaim that continual reconciliation between operational resources and market requirements is necessary.

Pagnoncelli (1993:18) found the benefits of outsourcing to be:

- Reducing cost and capital investment
- Greater capacity to adapt to change
- Concentration on what a firm knows best
- Simplifying the production process
- Improving quality

- Improving productivity
- Creating space
- Creating environment to encourage innovation
- Establishing new businesses
- Forming partnerships

A recurring theme throughout the literature is that the majority of companies decide to outsource primarily to save costs. There may be other reasons cited but cost reduction is the primary motivating factor in the majority of case studies. It is also widely stated in the literature that companies should consider longer term goals and strategies, as well as cost-reduction, but there is limited evidence from the cases studied that this actually happens in practice. Zhu *et al.* (2001) cite a survey conducted by Lackow (1999) of 176 US corporations that were outsourcing their business functions which found that "while cost saving has been identified as the primary motive behind outsourcing initiatives, there is more to outsourcing than just cost savings". The survey identified that in 59% of cases, cost saving was the main reason why businesses chose to outsource; however, improvement of services (54%), the ability to focus on core business (46%) and the ability to access outside expertise (40%) were also identified as important factors. The survey indicated that some fundamental changes were taking place in the consideration of the business environment at the time, and that outsourcing was taking a more strategic position and being recognised as being potentially important to the long-term competitiveness of a business.

Ehie's survey (2001:34) had similar findings and showed that most outsourcing decisions were based on cost considerations; behind this other factors were cited such as improving company focus, access to world-class capabilities, freeing-up resources for other purposes, unavailability of resources internally, accelerated engineering benefits, and risk sharing. Canez et al (2000:1313) observed that make-or-buy decisions are often made purely on the basis of cost. Zhu *et al.* (2001) concluded that executives increasingly understand that outsourcing for short-term cost cutting does not give long term benefits.

Davis (1992) found that "companies base their sourcing decisions on cost issues but "the results of studies carried out on the cost accounting practices and financial performance systems used by US manufacturers has shown that many of these organisations' accounting systems have not kept pace with the changes in industry and the technology used in production. 'Direct labour hours' is still the most widely used basis for allocating overheads but the majority of production

process have become highly automated. Vining *et al*. (1999:645) summarise by stating that "the strategic objective of outsourcing decision makers should be to minimize the total costs of 'receiving' any given quantity and quality of outsourced good or activity".

There is a cost associated with the outsourcing process and the total cost of outsourcing needs to be understood in order to quantify any potential cost savings. Probert (1996) quotes Williamson's (1975) transaction cost economics as a determining factor in the optimal choice of whether to outsource, "the costs of setting up the contract and monitoring the performance of the supplier need to be taken into account. The practical manifestation of these costs is termed as the total acquisition cost. There is considerable debate as to whether companies can accurately determine what the actual costs are before and/or after the outsourcing has taken place. Williamson's (1975) theory of transaction cost analysis, combines economic theory with management theory and analyses the factors which determine the internal and external boundaries of the firm. Williamson uses the term ``asset specificity'' to refer to the non-trivial investment in transaction specific assets. When asset specificity and uncertainty are low and transactions are frequent, transactions will be governed by markets. Where there is high asset specificity, uncertainty leads to transactional difficulties with transactions held internally within the firm. Where there are medium levels of asset specificity then bilateral relations in the form of co-operative alliances between organizations can operate; but there is a degree of dependency of which one or both organisations in the co-operative alliance can take advantage. Kippenberger (1997) takes the view that outsourcing choices are essentially driven by economic factors, and that transactional and production costs are the most relevant facts in this internal benchmarking analysis. Gottfredson (2005:48) postulated that "too many executives focus on cost reduction rather than on the potential for capability enhancement", and that companies make piecemeal decisions instead of being based on an overall strategic plan. Gottfredson subsequently carried out a survey which found that almost half of companies that outsource are disappointed with the results, their main focus being on cost reduction. Juras (2007:44) also finds that outsourcing decisions have primarily been driven and motivated by potential cost savings and that off-shoring, outsourcing operations overseas particularly to countries with lower costs, provides cost savings from cheap raw materials, cheaper labour, and reduction in overall overhead. Additional cost savings can result from the supplier's economies of scale and that outsourcing can mean that a firm pays for only what it needs, transforming fixed costs into variable costs. Juras (2007:44) goes on to say that financial flexibility enables organizations to

allocate resources and make investment decisions based on developing their core competencies rather than the for tactical reasons.

Pagnoncelli (1993:21) approached the argument from a different perspective and considers that cost reduction should not be the focus of outsourcing but could well be a natural by-product of the gains from improvements in productivity and quality, and that the new found focus was on core activities. The focus on core activities and core competence is a view explored by many.

The work of Ehie (2001:38) concludes that companies that adopt a strategic outlook on outsourcing have a better success rate than those that embark on outsourcing as a short-term cost-cutting decision. Outsourcing should be seen as a method to enable the firm to focus on its core competencies. Competitive and market factors such as increasing manufacturing flexibility, reducing inventory investments, ability to respond quickly to changing market requirements are being recognised as some of the real benefits of outsourcing.

Ford *et al.* (1993) found that few organisations take a strategic view of make-or-buy decisions, with many companies deciding to buy rather than make for short-term reasons of cost reduction. Linder *et al.* (2002) studies reveal that "some executives still use outsourcing primarily to offload non-core activities, others have taken a more sophisticated approach- gain access to competitive skills, improve service levels, increased ability to respond to business needs".

Franceschini *et al.* (2003) found the two most important drivers for outsourcing are cost efficiency and production reorganization. By outsourcing, companies can focus their efforts on core business, medium-/long-term targets and diversification opportunities.

Interviews held by Canez *et al.* (2000:1319) reveal that the principal reasons for undertaking make-or-buy decisions were price competition, lack of capacity, skills shortage; and that the expected benefits were to increase responsiveness, increase quality, reduce time to market. The findings were that the external environment normally triggers the make or buy analysis.

Reorganisation was also cited as a reason to outsource by Fan (2000:213), who found that most outsourced activities are "peripheral" in nature and found commonly-cited reasons to outsource such as cost reduction; quality, service and delivery improvement; improved organisational focus; and increased flexibility; but the ability for outsourcing to facilitate change was actively exploited by one firm in the study. The author also found the firm initially contracted out and then brought that activity back in after a period of time. The rationale was

that it would have been impossible to effect the step-change in service improvement and cost reduction if it had been implemented round the existing structure. The process of temporary outsourcing and then bringing back in was seen as the most effective way of achieving major change.

Zhu *et al.* (2001) recognised the changing environment and that outsourcing needs to keep pace with change, the premise being that outsourcing is a "natural outgrowth of globalisation and fast-changing technology for many companies in the world, for those who anticipate and manage these changes strategically, the gains can be enormous".

Mason *et al.* (2002:610) found that shortened product life cycles and increasingly global competition have caused companies to focus on their core competencies. Outsourcing has allowed companies to increase their agility and their ability to react to market changes, agility being the ability to respond quickly and effectively to satisfy customers.

The reasons to outsource are summarised in Figure 5, the perceived benefits of outsourcing.

Figure 5. The perceived benefits of outsourcing

This review of literature related to reasons to outsource has revealed that the discussion on whether cost-reduction or whether core competencies should be the primary focus, has been discussed for more than ten years, and still the same points are being raised:

- the expected cost reductions are not being achieved, as reported by Probert (1996), Gottfredson (2005)

- Cost reduction does not bring long term benefits as reported by Canez *et al.,* (2000), Ford *et al.* (1983)

Firms are either underestimating the cost for outsourcing, or are overestimating the costs of performing the function internally. The theme is now moving from these perspectives and authors are starting to consider the changing competitive environment and the need to achieve and sustain some kind of competitive advantage. The themes have moved from cost reduction, to offloading non-core competencies, and now to strategic issues such as reorganisation and flexibility to react to a changing competitive environment. There is little evidence, however, from the papers reviewed that these themes have been translated into practice and there is no empirical research found on this area.

3.4.2.2 The decision making process in relation to outsourcing

The outsourcing of manufacturing operations will have long-term implications for a firm and its strategy. The process of making a decision which leads to such strategic change and the logic behind the decision is one of the considerations for this research. Considerations need to be made to factors such as the level of the person making the decision within the organisation; the amount of time spent in collating and evaluating information before making the decision; and the links between the decision and the firm's strategy.

Decisions relating to outsourcing require collection of information to provide a justification for the selected outcome, the decision is generally a formal one and needs to be made in a timely manner. Hatch (1997) defined a rational decision-making model based on participants agreeing in advance that a decision needs to be made, and that optimal decisions will be made after carefully evaluating all possible courses of action in a sequential series of activities. The rational decision making model may be too idealistic where there are multiple decision makers. Outsourcing involves many interested parties that may have differing viewpoints and may challenge the decision to outsource. In addition, as determined previously, the outcomes of outsourcing are not precisely known and the evaluation process may have a level of inaccuracy due to the large number of variables affecting the outcome.

In Rusjan's (2005) model, two distinct levels of strategic decision-making are considered, the enterprise level and the business function level. Business function level tend to make decisions

that are part of a “continuous iterative process that will lead to both continuous incremental improvement and occasional step change”. For outsourcing, the decision to outsource should be taken considered to be a step change to the firm’s strategy and made at enterprise level.

Simon (1960) developed the bureaucratic model based on the bounded rationality of the human capacity for processing information and subsequent rationality. Consequently, decisions are made based on a compromise of optimised cost and timing. The decision may not be the optimal but is good-enough, based on the limits of human rationality. This model is echoed in the De Boer *et al.* (2006) paper, ‘A Satisficing Model of Outsourcing’. Instances can be found in larger companies where bureaucracy and extended decision making groups result in ‘satisficing’ being the only way to progress. Outsourcing may be necessary but can also be problematical, with many conflicts, as the action can cause staff redundancy, de-motivation of remaining staff and changing of employee roles, both during and after the outsourcing process.

Panagiotou (2008) identified that the prevailing view in strategy development is a technical process; identify opportunities, consider environmental threats, address the firm’s strengths and weaknesses and achieve the desired strategic fit; consequently, the technical process of strategy is emphasised and the human element is overlooked. Stubbart (1989) found that it is often assumed that all managers possess similar knowledge, that all reason in a similar logical way, all notice the same threats and opportunities and all pursue similar goals. This could be represented in the literature by the consistency of information regarding the decision to outsource and cost reduction.

Panagiotou (2008) postulates that one of the most important strategic management issues is strategy development and generating a “road map” for decision-making that enables effective strategy formulation; this strategic theme is explored by Rusjan (2005) who identified that, despite extensive research on decision-making, there has been little effect on strategic manufacturing decision-making and investigates the relationships between manufacturing activities, business strategy and business performance. Kim and Arnold (1996) highlighted that few firms have a formal manufacturing strategy

Factors identified in this section of the review in relation to the outsourcing decision are summarised as follows:

- Length of time for the decision to be made

- The amount and type of information collected and subsequent analysis
- The amount of agreement, consensus and/or compromise on the decision
- Influence of the decision makers in relation to the firm's strategic and operational management
- Amount of involvement, breadth and size of decision making group
- Formality/informality of the process
- Links of the outsourcing decision to the firm's strategy

Simons *et al.* (1998:17) classified the factors impinging on decision making into environmental, organisational, content or individual; the first two being the most significant. Factors influencing the decision maker include past experience, complexity of the decision, political nature of the decision and the time available to formulate the decision.

Simons *et al.* (1998:19) conclude that, despite the complexities and the uniqueness of each decision made, there are some fundamental processes that influence managerial decision-making behaviour; they also concluded that decision-making is generally a reactive process and is problem-focussed, goal-focussed or political appeasement. This contrasts with McIvor's (1998) view that the decision to outsource should be a proactive choice following a considered evaluation of options for strategic progress.

Hatch (1997:269) continues the discussion by highlighting the political nature and influence of the environment. An organization is a political arena, and politics undermine rationality. Ehie (2001:31) states that the majority of outsourcing is for cost cutting reasons and a tactical decision and that outsourcing contracts have tended to be adversarial and not focused on cooperative relationships.

To summarise this section, the following factors were identified in relation to the outsourcing decision:

- Consideration of internal factors and external environment
- Level of connection between manufacturing and the firm's strategy
- Influence of company politics on the decision
- Proactive or reactive decision

Hatch (1997:270) also recognises that there are different organizational structures, such as hierarchical, functional and divisional. In essence, decisions are made at many different levels of a hierarchical organization, with differing degrees of importance and political influence.

In the hierarchical model, top-management focuses on strategic direction; middle-management focuses on internal structure and junior managers and supervisors are concerned with day-to-day decisions on operational matters. The organization is a locus for decision-making; and that decision-making processes can be argued to be endless.

Kotabe *et al.* (2004:11) recognised that Production Managers had a reduced influence in the organization which led to a belief that manufacturing functions could be transferred easily to independent operators and subcontractors.

Fan (2000:214) found that the largest percentage of outsourced activities were considered to be "peripheral" and consequently did not warrant board level attention and that few outsourcing proposals of any nature were being considered at board level. In some cases, the decision to outsource is being made very early in the process, and the business case is only serving to endorse the decision that by and large has already been made. Ehie (2001:35) found that two thirds of outsourcing decisions are made at the senior to middle-management level and only around 10% are made at the executive or board level. In contrast, Zhu *et al.* (2001) found evidence that the decision on whether and how to outsource is steadily moving up the organization to the highest executive levels where the Chief Executive Officer, the Chief Operating Officer or the Chief Financial Officer make the decision and that the decision to outsource a function should be treated as a fundamental business decision, which requires a sound plan and an associated economic study. McIvor *et al.* (2000:296) advocate that the decision to outsource requires "substantial judgement to assess the wide range of trade-offs present, to recognise all the alternatives available and to make a decision which balances both the short- and long-term needs of an organisation". Gottfredson (2005:48) postulates that too many executives focus on cost reduction rather than on the potential for capability enhancement and that companies make piecemeal decisions instead of being based on an overall strategic plan.

As Ehie (2001:38) concluded, companies need to adopt a strategic outlook on outsourcing and that the competitive market is changing fast; firm's need to know how to respond to maintain

their advantage for changing market requirements; in other words, to achieve sustainable competitive advantage.

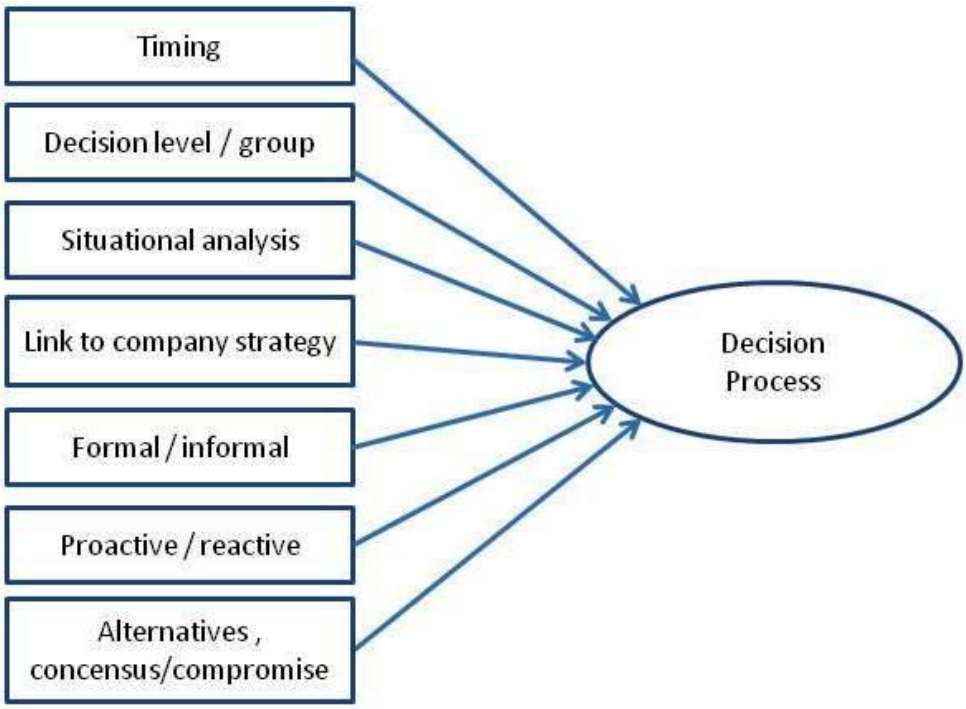
Harrison (1998) considers the application of the rational model, where the decision maker "always" considers the alternatives in light of the managerial objectives; choice is relatively easy when one alternative provides more positive consequences than any other, but notes that very few alternatives completely achieve the objectives and that the best alternative is not always readily apparent; there is often a compromise that goes towards satisfying as many different objectives as possible. "The alternative finally chosen may very well be one that is not the best for a particular objective, but it may further the attainment, in some degree, of several objectives, without jeopardizing the attainment of any single one" (Jones, 1962:89).

Important factors in relation to the outsourcing decision identified in the preceding review are summarised as follows:

- Management level of decision making group
- Consideration and evaluation of alternative courses of action
- Consensus on the decision

The factors identified in the literature relating to the decision making process and summarised above are represented in Figure 6.

Figure 6. Factors affecting the decision process



The literature review identifies a number of considerations relating to the choice of strategies open to an organisation when considering to outsource. The single most cited reason for outsourcing is to try to achieve cost reduction, and transaction cost analysis (Williamsons 1975) is the theory most associated with calculation and consideration of the comparative benefits.

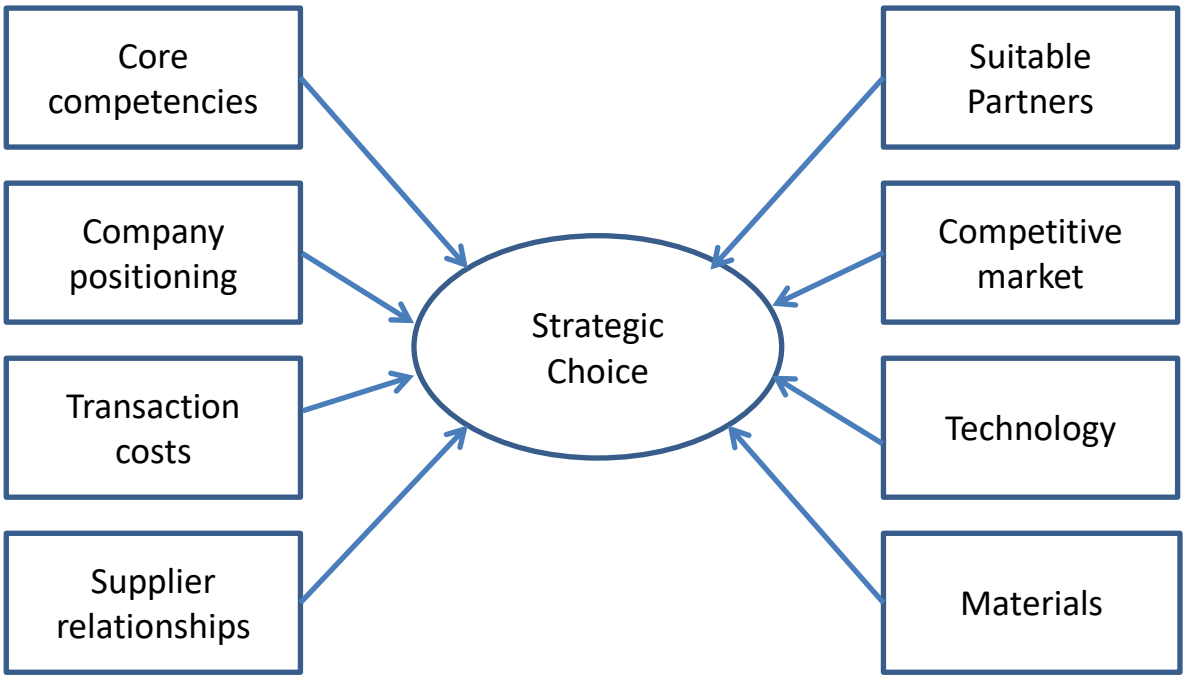
Pagnoncelli (1993:21) reminds us that the focus on cost should not be the focus of outsourcing but could result from improvements in productivity and quality, and that the key consideration should be on core activities and core competence, a view explored by many. Gottfredson (2005:48) emphasises the need to focus on strategic planning, to explore capability enhancement and to put less emphasis on cost reduction.

McIvor's (2000) framework summarises the concepts of identification of core competencies (Finlay and King, 1999), cost and performance analysis and benchmarking, as well as suitability of partners and partner analysis. McIvor (2000) also discusses the potential to outsource core competencies that may evolve to be non-core in the future.

Quinn and Hilmer (1994) and Jennings (2002) emphasise the need for an organisation's strategy to be consistent with the competitive environment, which in turn is changing due to increasing globalization, deregulation and demand cycles.

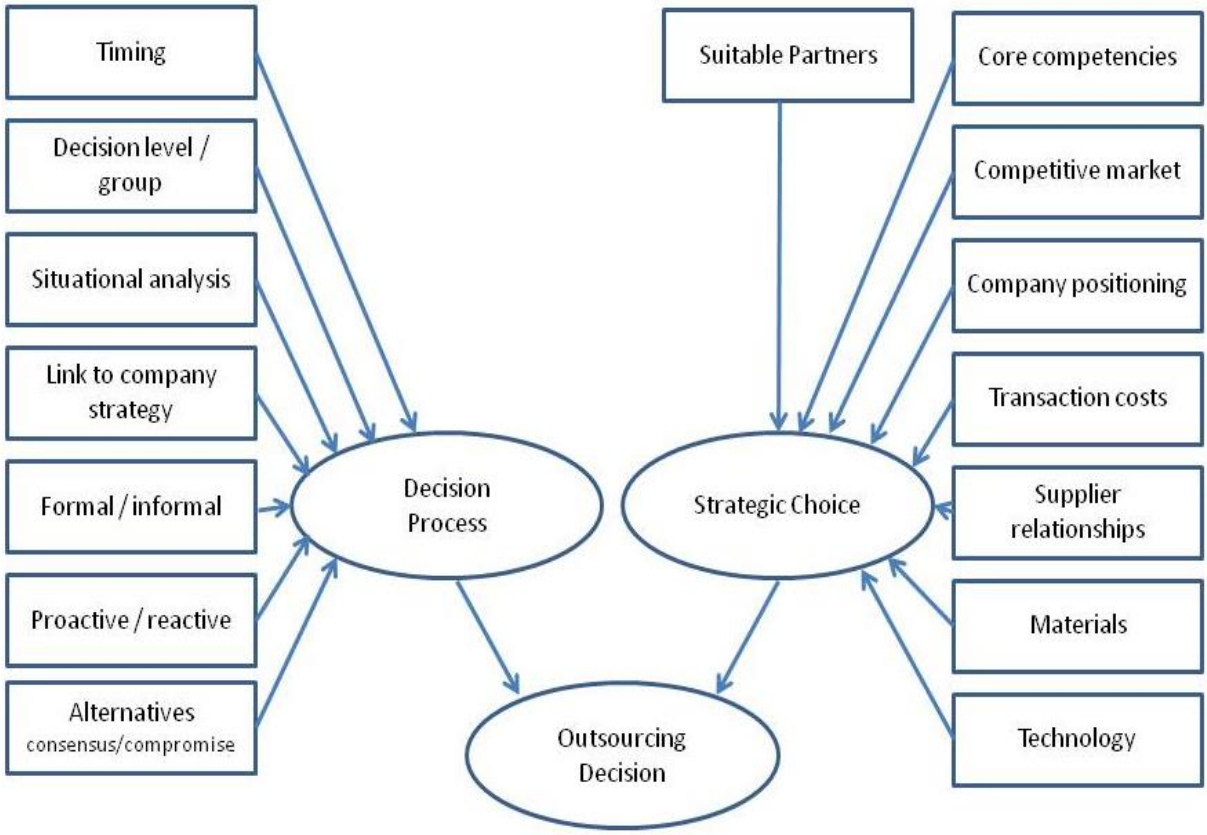
These factors can be grouped under the heading of strategic choice available to the decision maker and consideration of each gives the strategic choices available when considering to outsource and are summarised in Figure 7.

Figure 7. Strategic choices identified in the literature which may be considered during the decision making process



Factors identified in the literature review that influence the decision making process and the strategic choices are summarised in the outsourcing decision framework in Figure 8.

Figure 8. The outsourcing decision framework



This limited review of literature relating to decision making highlights the complexity of the decision-making process and the wide range of considerations and views. The review focused on three areas of decision–making; the decision type; the decision process; and the choice; and how these related to the organization.

In summary, a decision may be rational and informed with full agreement of all those involved, but is more likely to be a compromise because not everyone will agree, not all information will be available and all outcomes will not be known. The speed of process will be determined by the amount of formality in the process, the structure of the organisation and the level of the decision maker in the organisation, as well as the amount of choice available. In general, current research has found that the decision to outsource is a step-change in strategy made by those leading the operations of an organisation. The literature relating to strategic decision making in relation to outsourcing highlights a clear and consistent trend to the consideration being consciously made at higher levels of the organisation.

3.4.3 Outsourcing, performance and competitive advantage

This section investigates how the success of outsourcing has been measured. There are financial metrics defined by Jiang and Qureshi (2006) and there are also those difficult to measure such as enhanced abilities to focus on core competencies and flexibility discussed by Ehie (2001).

The section then investigates how competitive advantage has been defined and measured. It covers Porter's competitive forces model (2004) and value chain analysis (Porter 2004) and combines this with the work of Prahalad and Hamel (1990) in relation to core competency theory. The section then looks at the work of Pagnoncelli (1993) and Ehie (2001) and summarises the findings from surveys in relation to factors affecting outsourcing success. There is little consensus in the literature on how to measure the success of outsourcing.

3.4.3.1 Measures of performance in relation to outsourcing

In order to determine whether an outsourcing strategy has been successful it is necessary to identify measures of performance in the literature that relate to manufacturing strategy and the tangible benefits achieved through outsourcing.

Elmuti *et al.* (2000:121) list high level performance indicators as profit margins; return on investment; sales per employee; and higher stock values to shareholders. Operational measures include cost reduction, productivity, cycle time, customer service (repeat purchase and retention rates), market share and quality. Elmuti *et al*. (2000) found that cost savings and indirect benefits were achieved and that "global outsourcing strategies" helped improve performance, increase access to international markets and leading-edge technologies, enhance responsiveness to customer needs, and contribute to organizational goals of increased efficiency, reduced costs, reduced cycle time, and improvement in quality.

Jiang and Qureshi (2006) identified possible metrics for the effects of outsourcing on competitive performance, the most significant being:

1 cost reduction
2 productivity growth
3 increase in profitability
4 the firm's value improvement

Canez *et al* (2002:1325) simply state that the measure of the success of outsourcing is the amount of cost reduction and level of quality improvement. The results of a questionnaire by Ehie (2001:35), however, lists the biggest benefits from outsourcing as the enhanced ability to concentrate on core competencies, the enhanced ability to respond to customer needs, and enhanced flexibility. Ehie (2001:36) summarises the goals of outsourcing as helping to achieve dependability of supply, speed of response, price competitiveness, and high quality and high performance products. Outsourcing helps to achieve these goals as well as freeing capital for investment in core competencies.

Figure 9. Ehie (2001:35) Benefits Derived From Manufacturing Outsourcing Decisions

Rank	Benefits	Mean*	Std. Error
1	Enhanced ability to concentrate on core competencies	3.19	.15
2	Improved responsiveness to customer needs	3.13	.16
3	Enhanced flexibility	3.13	.14
4	Improved efficiencies	3.06	.13
5	Financial gains	2.98	.14
6	Increased customer satisfaction	2.92	.14
7	Improved/enhanced company focus	2.71	.15
8	Strategic enhancements	2.68	.15
9	Shortened cycle time	2.59	.15
10	Technological improvement of operations	2.47	.14
11	Better access to new technology	2.26	.15
12	Reduced employee training cost	2.17	.13
13	Improved management system	2.17	.14
14	Increased innovations	2.14	.14
15	Decreased business risks	2.10	.15
16	Provided formidable barriers to market entry	1.71	.13

*Based on a 5-point Likert scale, "1 = no benefit, 5 = most benefit"

Elmuti *et al.* (2000:121) list high level performance indicators as profit margins; return on investment; sales per employee; and higher stock values to shareholders. Also listed are more operational measures include cost savings, productivity, cycle time, customer service (repeat purchase and retention rates), market share and quality. The authors found that cost savings and indirect benefits generated by the outsourcing programs were greater than the costs of implementing these programs and that "global outsourcing strategies were believed to help improve performance, increase access to international markets and leading-edge technologies, enhance responsiveness to customer needs, and contribute to organizational goals of increased efficiency, reduced costs, reduced cycle time, and improvement in the quality of the goods and services in their organizations".

Fan (2000:217) found that the scope of measurement varied greatly but there was a 'distinct correlation between the size of the organisation and the sophistication of the measurements employed'. Smaller firms were measuring absolutes like on-time delivery, levels of rework (quality control) and lead-time. Supplier performance was being conducted and this varied from “one company who had a bespoke program that extended as far as end-user attitude surveys to a firm”. Fan (2000:217) also found a small number of companies that conducted regular formal reviews.

Only half of the organisations reviewed by Fan (2000) were setting improvement targets for the supplier, and only one firm was conducting benchmarking exercises on an ongoing basis. The implications from this are that the supplier could be the sole beneficiary of any improvements made and thus from surplus value that both parties generated. The consequences of which could be the competitiveness of the outsourcing venture will gradually diminish in relation to the market as the initial benefits erode over time.

The literature review by Jiang *et al.* (2005:48) concludes that if outsourcing can help the firm reduce costs, increase profits, and improve productivity, then the firm’s value should be improved. The measure of whether outsourcing can create or protect company value is to assess the market reaction. The market’s valuation of a firm is reflected in the stock price, and that the immeasurable factors end benefits resulting from outsourcing can only be indirectly measured by analysing their impacts on the outsourcing firm’s market capitalisation. Jiang *et al.* (2005:49) made definitions of how outsourcing affects operating performance, and then attempted to identify the measurable criteria for each of the metrics. These concepts were classified into five areas:

- cost reductions, cost efficiency being the primary explanation for the development of outsourcing

- productivity growth, companies allocate their resources to activities for which they enjoy comparative advantage and other “non-core” activities not enjoying such advantages were outsourced to external suppliers

- Profitability increase, resisting the temptation to increase internal resources and investment when business is booming

- Value improvement, from synergy between the outsourcing contract-granting firm’s and the

contract-receiving firm’s capabilities

- Risk control, risk awareness enables decision makers and stake holders to make informed decisions and draw contingency and mitigation strategies

There seems to be little consensus on how to measure performance in relation to outsourcing, consequently it is not clear how successful manufacturing outsourcing strategies have been. This is in part due to differing expectations and definitions of what is successful, and what is trying to be achieved. There is also some degree of disappointment from those who outsource for cost reduction reasons in that the goals were generally not achieved; this could be due to underestimating costs, not considering the total cost of acquisition, measuring internal and external costs in different ways, or not fully understanding or defining how to actually measure the costs in the first place.

The factors identified in this section will be used to formulate questions related to how firms assess their performance in relation to the outsourcing process

3.4.3.2 How competitive advantage has been defined and measured

This research aims to investigate whether competitive advantage can be created by the outsourcing partnership. In order to understand this, it is necessary to define what competitive advantage actually is and how it can be measured. It is also necessary to consider the meaning of what is sustainable, and what sources of competitive advantage could be exploited.

A competitive advantage implies that there is competition, and that competition exists in a marketplace where advantages can be sought and achieved. Alderson (1965) first recognised that firms should strive for unique characteristics in order to distinguish themselves from competitors and that suppliers should specialise to meet variations in buyer demand. Hamel and Prahalad (1989) discussed the need for firms to create advantages that will keep them ahead of competitors and Barney (1991) defined sustainable competitive advantage as the result of a value creating strategy 'not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy'.

Day and Wensley (1988) identified superior skills and superior resources as two sources of sustainable competitive advantage and Barney (1991) states that a firm’s resources must possess four attributes to be sources of sustainable competitive advantage:

- Rareness
- Value
- Inability to be imitated
- Inability to be substituted

Prahalad and Hamel (1990) extended the work of Johnson and Scholes (1998) to suggest that resources and skills can be combined in unique and enduring ways to form core competencies which may be used to out-perform competitors and adapt easily to changing business opportunities and environments. These are non-physical assets and so are not easily replicated. Originating from the studies of Selznick (1957) and Penrose (1959), Bharadwaj *et al.* (1993) discuss the concept of sustainable competitive advantage from the integration of marketing, strategic management and organisational factors which were internal to a firm and not available to the competition. They asserted that this had greater potential to generate sustainable competitive advantage than environmental analysis and factors which were available to the competition and was considered to have more sustainability. This resource based view was further developed by Fahy (2000) who constructed a model around the original theory and discussed characteristics of resources which could create sustainable competitive advantage through adding value, creating appropriability and creating barriers to duplication. The resource based view focuses on the firm's internal environment where assets such as knowledge and systems have accumulated and may be the source of advantage over rivals. It may be, however, that resource based view theory could lead to the identification of sustainable competitive advantage in the outsourcing relationship if it is considered that the outsourcer and the manufacturer are one firm sharing resources.

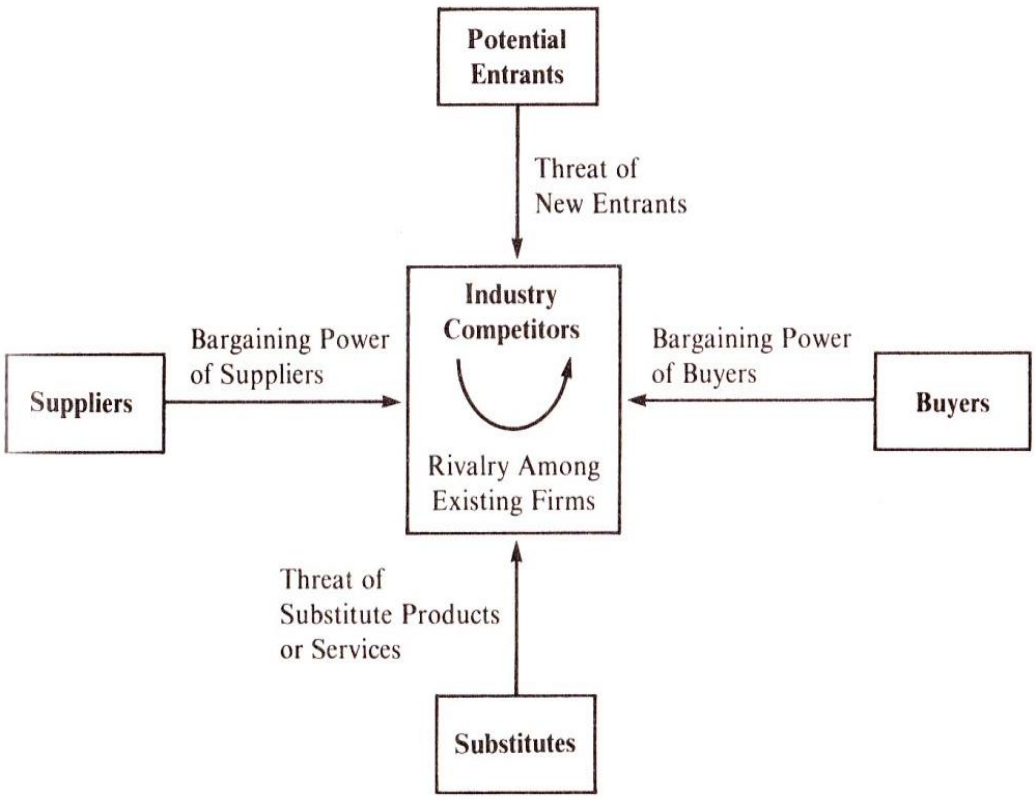
Porter (2004b) considered how companies may create and sustain superior performance, or a competitive advantage. Porter (2004b:1) first considers whether a particular industry offers the opportunity for sustained profitability, and secondly the factors that determine the relative competitive position of companies in that particular industry. Porter (2004:3) states that 'the essence of formulating competitive strategy is relating a company to its environment', the environment being the industry in which it exists, and that competition in an industry 'is rooted in the underlying economic structure and goes well beyond the behaviour of current competitors'.

Slack *et al.'s* (2008) concept of sustainable alignment between company resources and market requirements through continually reconciliation could be construed to be concerned with

maintaining a competitive position and may not be a method to create new competitive advantage. Slack *et al.* (2008:238) do, however, suggest using innovation and change to achieve sustainability.

To consider whether an industry can sustain profitability Porter evaluates the collective strength of five competitive forces. These forces form the factors that influence a key measure of profitability, return on investment, and the strength of each force influences the industry structure and the 'underlying economic and technical characteristics of an industry' (Porter 2004b:5). Porter (2004b:7) argues that if a firm can influence one or more of the five forces then there is an ability, over time, to change the industry structure. If the industry structure cannot be changed or can only change very slowly, then there is little opportunity for a firm to achieve any level of sustained competitive advantage or sustained profitability. The research will consider Porter's five forces (Figure 10).

Figure 10. (Porter 2004b:5) The Five Competitive Forces That Determine Industry Profitability

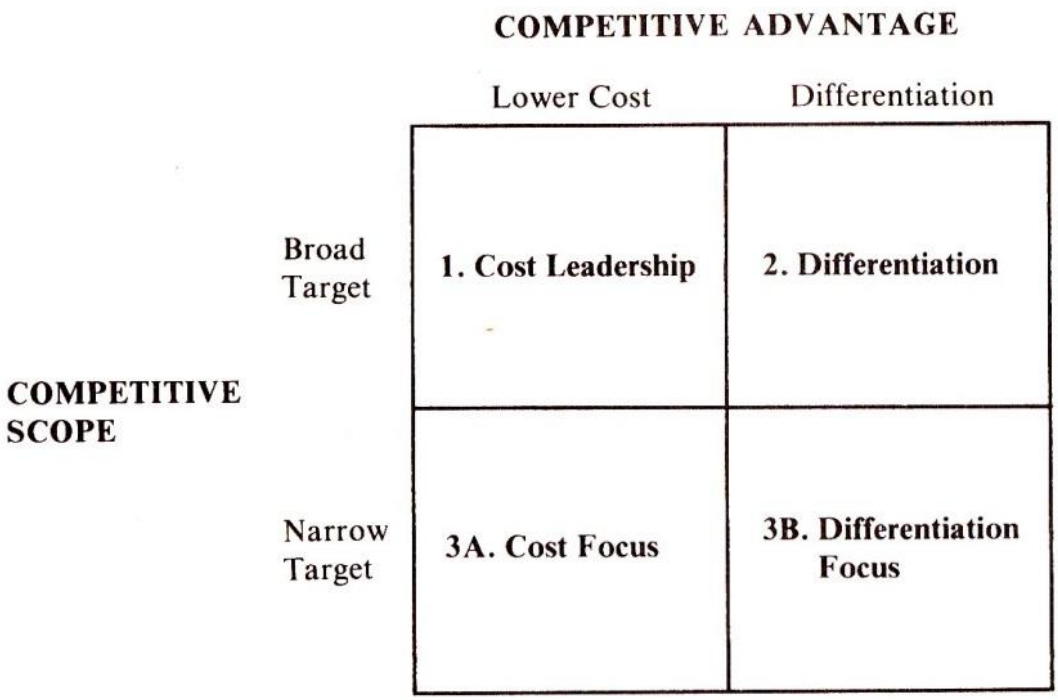


Porter (2004b:8) also warns that in some instances, transformational strategies can destroy industry structure and profitability and that companies should consider the long-term consequences before making strategic decisions.

Competitive strategy, according to Porter (2004:47), involves positioning a firm to maximise the value of its capabilities that distinguish it from its competitors and stresses the importance of analysis of current and potential competitors.

Porter (2004b:11) defines sustainable competitive advantage as 'above average performance in the long run' and that there are two basic types of competitive advantage; one being cost, the other being differentiation. To achieve an advantage a firm may adopt a generic strategy of cost leadership, differentiation or focus. Focus has two variants; cost focus and differentiation focus. These strategies are summarised in Figure 11.

Figure 11. (Porter 2004b:12) Three Generic Strategies



Porter (2004b:12) asserts that for a firm to achieve a competitive advantage, a strategic decision needs to be made on what that advantage should be. A firm that tries to be 'all things to all people' will lead to below average performance and strategic mediocrity with no competitive advantage at all. Cost leadership strategy requires the firm to be the cost leader

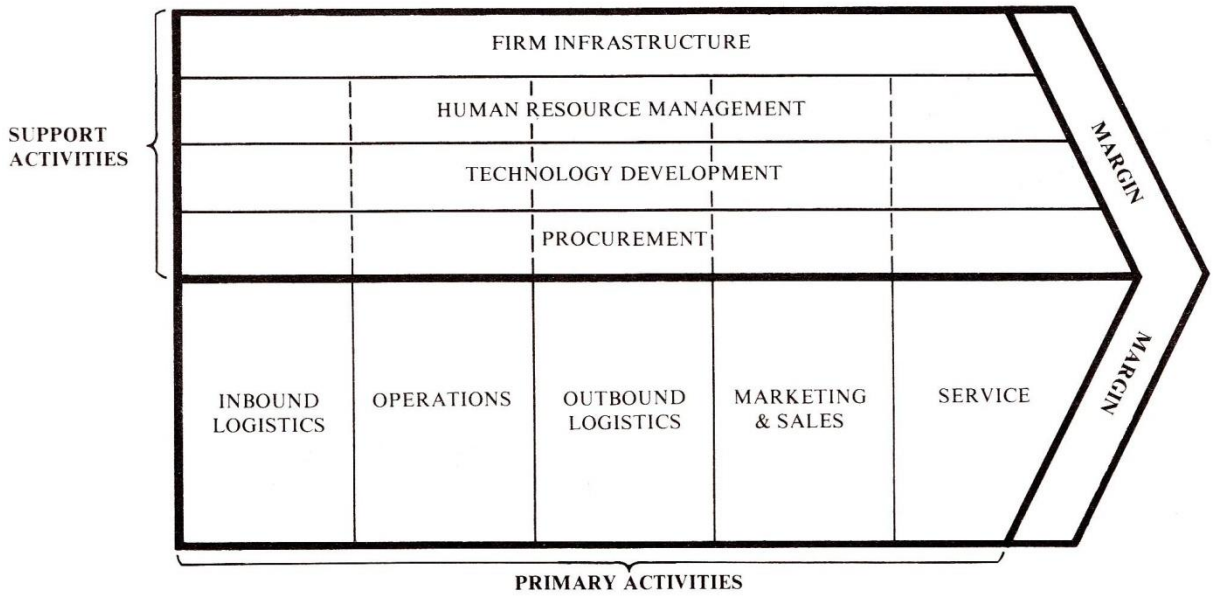
and not one of several companies trying to achieve the position. Before outsourcing, a firm should consider its strategy. Porter (2004b:112) highlights that improving relative cost position in an industry is unsustainable and cost reduction in itself cannot bring sustainable competitive advantage.

Innovations in product design, manufacturing technology and logistics could all be sources of competitive advantage and it is feasible that these could be achieved through outsourcing.

Sustainability of a strategy is a function of the difficulty for others to imitate it (Porter, 2004b:20) and the strength of the barriers to the imitation and sustainability usually requires a firm to continually improve its position.

To evaluate a firm's competitive position, Porter (2004b:37) considers the elements of the value chain which illustrates the contribution of all company activities required to design, produce, market, deliver and support its product.

Figure 12. (Porter 2004b:37) The Generic Value Chain



Porter (2004b:120) defines differentiation as the ability of a firm to offer something unique, which differentiates it from its competitors that is valuable to its customers. Porter uses the value chain to analyse each activity to identify sources of uniqueness or differentiation.

A cursory review of the activities in the generic model suggests some areas where outsourcing could be a source of uniqueness, and consequently sustainable competitive advantage.

Inbound logistics – if suppliers are located close to the manufacturing partner

Operations – if the manufacturing partner has jointly developed and specific patented technology or if the manufacturing partner has large scale which allows the use of otherwise uneconomic technology

Outbound logistics – if the manufacturing partner is geographically close to or has unique relationships with freight companies

Sales – if the manufacturing partner has unique relationships and access to the end customer

Procurement – if the manufacturing partner has access to unique or rare resources which could enhance the performance or properties of the product

Technology development – if the manufacturing partner has developed unique technology which can result in unique product capabilities or functionality

Process capability – if the manufacturing partner has developed unique processes that can create unique manufacturing processes

It is apparent from the literature that theories such as the resource based view (Bharadwaj *et al.* 1993) and core competency theory (Prahalad and Hamel, 1990) are very much based on utilising assets to maximise advantages that can be created within the firm. It is really Porter (2004) and Slack (2008) who start to consider how competitive advantage can be achieve from outside of the firm and from the external competitive environment.

Cost leadership may be considered as a competitive strategy but the level of off-shoring and outsourcing in the electronics industry is so great that this is unlikely to lead to a sustainable competitive advantage as others have done so already. A differentiation strategy may be a source of sustainable competitive advantage but it is difficult to see how this can be achieved in the electronics industry through outsourcing alone.

Interview questions will be formulated with regard to if and how competitive advantage has been achieved through the activity of outsourcing.

3.4.3.3 Outsourcing in relation to competitive advantage

The achievement of a sustainable competitive advantage has long been the goal of companies and organisations (Hines *et al.*, 1998). Bettis *et al.* (1992) argue that a decrease in competitive advantage as reflected in declining profitability leads to outsourcing. Outsourcing is often

considered a strategy that allows companies to concentrate on core business (Prahalad and Hamel, 1990) in ways that reinforce competitive advantage (Porter, 1980). Therefore, it is expected by those that outsource that it will improve profitability.

Pagnoncelli (1993:16) highlights that with appropriate use of outsourcing, a firm becomes less susceptible to sudden transformations in the environment and will be better positioned to survive and in a better positioned to concentrate on what they do best, seeking quality, productivity and competitiveness, as well as reducing costs and staff. These views are based on reducing costs, reducing risk and focusing on internal activities of the firm. They are not based on exploiting opportunities in the marketplace or creating an advantage that may be sustainable.

Barney (1991:102), however, recognises the requirements to achieve sustainable competitive advantage and stresses that a firm achieves this when it adopts a strategy that is ‘‘not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy’’. Barney (1991) goes on to state that “product innovation alone cannot guarantee that a firm would enjoy sustainable competitive advantage. Instead, it is of utmost importance for a firm to complement its product innovation with strong manufacturing and marketing capabilities. This is primarily because, in today’s highly competitive market, legal means of protecting proprietary technology have become ineffective as new product innovations are easily reverse engineered”. The business environment is becoming increasingly competitive as companies operate on a global basis, as well as increasingly dynamic as process and product lifecycles shorten, this is especially valid in the electronic product and high technology markets.

Deavers (1997) indicates that the growth in outsourcing can be attributed to four fundamental changes in the competitive market environment facing firms today: rapid technological change, increased risk and search for flexibility, greater emphasis on core corporate competencies and globalisation. Kotabe et al. (2004:7) found that global competition results in a drastically shortened product life-cycles and companies need to take a globally oriented approach to sales to achieve competitive advantage and to prevent competitors “blanketing the world markets with similar products in a shorter period of time”

Barney and Deavers highlight some factors that have relevance to achieving competitive advantage coming from outside of the firm, namely; product innovation, strong manufacturing, strong marketing, IP protection and reducing time to market.

Ehie (2001:36) investigated the impact of outsourcing decisions on manufacturing competitive capabilities, the results of which are in Figure 13. Certain factors stand out as having more strategic relevance to the competitive environment, such as flexibility to changing market demand and the ability to deliver the product on a global basis.

Figure 13. Ehie (2001:36) Impact of Outsourcing Decision on Manufacturing Competitive Capabilities

Rank	Competitive Capabilities	Mean*	Std. Error
1	Deliver products/services on time	2.83	.15
2	Deliver products/services quickly	2.75	.14
3	Compete on price	2.48	.14
4	Offer consistent quality	2.37	.16
5	Provide high performance products/services	2.33	.14
6	Flexibility to changing market demand	2.30	.13
7	Introduce new products/services to market quickly	2.22	.15
8	Distribute the product/service widely	1.92	.15
9	Deliver a broad product range	1.89	.13
10	Advertise and promote product/service effectively	1.50	.11
11	Provide after-sales service	1.21	.13

*Based on a 5-point Likert scale, "1 = not important, 5 = extensively important"

Ehie (2001:37) also lists the factors affecting outsourcing success and this reveals some factors that could be argued to pertain to sustainable competitive advantage, namely; improving customer service, obtaining services not available internally, reducing lead-time, and freeing internal resources for other purposes.

Figure 14, Ehie (2001:37) Factor Affecting Outsourcing Success

Rank	Success Factors	Mean*	Std. Error
1	Reliability of supplier	4.19	.09
2	Technical competence of the supplier	3.92	.11
3	Manufacturing capability of the supplier	3.83	.13
4	Selecting the right supplier	3.64	.12
5	Maintaining open and credible communication with all parties	3.61	.11
6	Reducing and controlling operating costs	3.60	.13
7	Improving customer service	3.56	.15
8	Securing suitable and capable outsourcing partner	3.55	.13
9	Long-term financial justification	3.46	.13
10	Lowering production cost	3.44	.14
11	Obtaining resources not available internally	3.44	.14
12	Managing ongoing customer-supplier relationships	3.41	.13
13	Reducing lead time	3.31	.15
14	Control of proprietary information	3.31	.17
15	Clearly stated and measurable performance criteria	3.30	.13
16	Near-term financial justification	3.29	.14
17	Stabilizing supply	3.25	.14
18	Freeing internal resources for other purposes	3.25	.14
19	Properly structured contract	3.08	.14
20	Long-term partnering relationship with supplier	3.06	.15

*Based on a 5-point Likert scale, "1 = least critical, 5 = most critical"

The research by Ehie (2001:37) highlights that core competencies are dynamic and companies should become attuned to the fact that what may be considered a core competence today may be less so in the future. Companies should embark on continuous improvement of their key capabilities to ensure they maintain a competitive advantage. Previous core competencies are now being outsourced and so it is important for a firm to identify what core competencies can be maintained as such, and which should be considered to be outsourced.

Zhu *et al.* (2001) cites Embleton *et al.* (1998) who state that outsourcing is a strategy that can lead to greater competitiveness and that although outsourcing as a business strategy has been practiced for years, "what makes outsourcing so viable is the fact that there is a dramatic change in the way companies are competing with each other".

Probert (1996:49) noted that it is necessary to have the best available information about competitor, and supply base capability is key to making accurate assessments, and hence devising strategic options which inspire confidence.

Kotabe *et al.* (2004:9) quotes Drucker, "sourcing and logistics would remain the darkest continent of business - the least exploited area of business for competitive advantage". For global companies, factors need to be considered such as exchange rate fluctuations, the infrastructure (including transportation, communications, and energy), the industrial and cultural environments, and the ease of working with foreign host governments. There are many barriers to successful global outsourcing, in particular, logistics, inventory management, distance, nationalism, and lack of working knowledge about foreign business practices. Kotabe *et al.* (2004:13) stated that the more dispersed the company and its' suppliers' assets and capabilities are, the more difficult it is for them to manage wild currency fluctuations.

This section has identified several papers which focus on cost reduction and the internal benefits of outsourcing. It also identifies several papers with factors related to competitive advantage coming from outside of the firm.

The factors relating to competitive advantage and outsourcing identified in this section will be used to formulate interview questions for the data collection.

3.4.4 Partnerships

This section summarises the work of Ehie (2001) and McCormick (2006) in relation to McIvor's outsourcing framework (2009). The section then summarises the work of Pagnoncelli (1993), Ehie (2001) and Zhu *et al.* (2001) who all emphasise the importance of forming close working

partnerships with the manufacturing partner. It explores the long-term partnerships of outsourcing and manufacturing firms.

The final part of this section explores the importance of access to technology from the outsourcing relationship. Metty (2006) and McCormick (2006) discuss the potential benefits of having access to and the development of technology at an early stage.

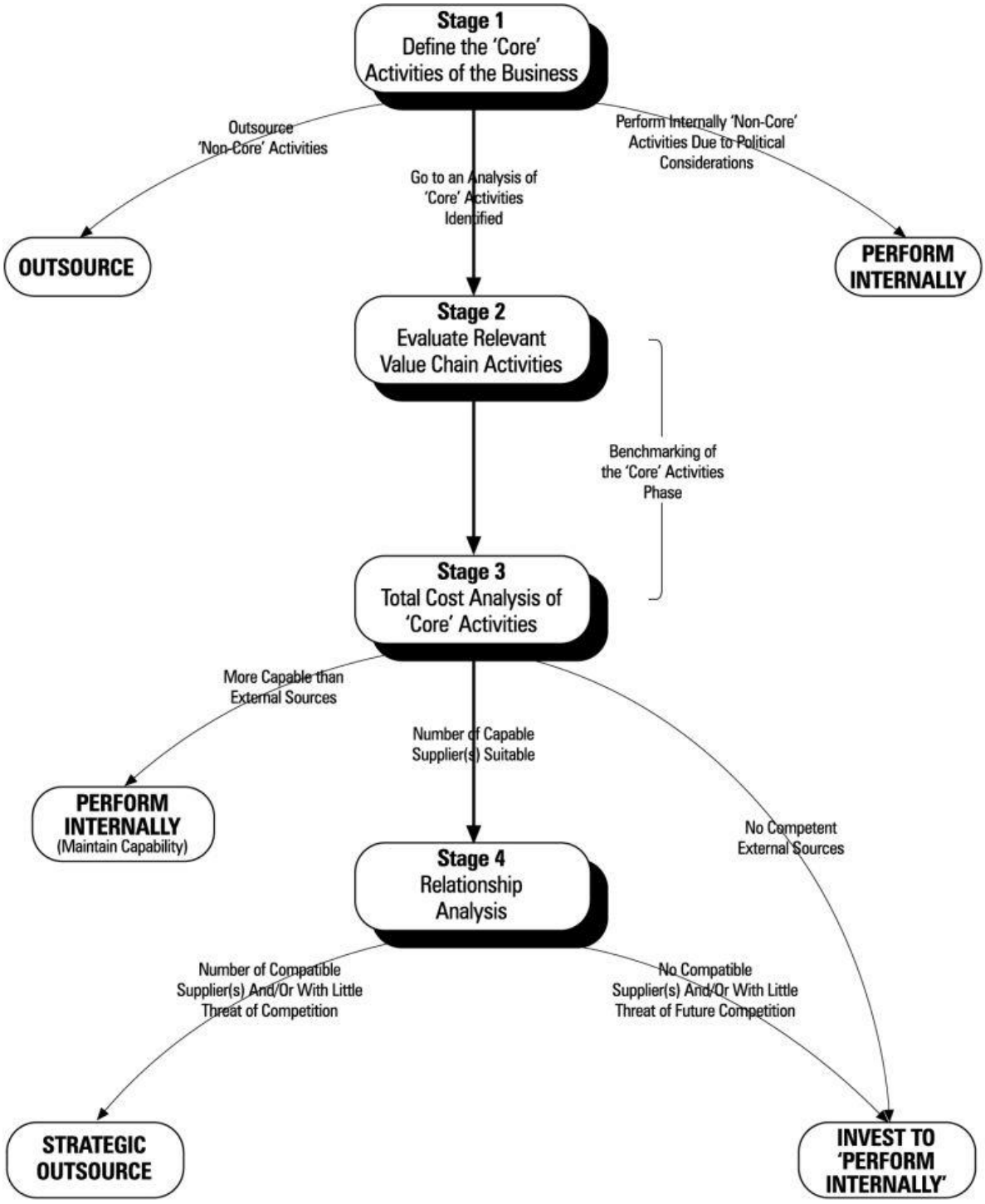
3.4.4.1 Competitive advantage, cost reduction and core competencies

The most common reason to outsource and the most commonly perceived benefit is for cost reduction. Ehie (2001:32) recognizes that outsourcing has the ability to convert fixed costs to variable costs and outsourcing may benefit a firm when competition drives down prices. Outsourcing may bring other benefits such as increased flexibility, decreased inventory and shorten time to market but it is unclear as to how these factors may bring about competitive advantage. Cost reduction may not bring about competitive advantage if the firm's competitors also outsource. Ehie (2001:32) also states that the majority of frameworks developed in relation to sustainable competitive advantage focus on the premise that firms should focus their resources on those core activities that provide and sustainable and distinctive competitive advantage; the remaining non-core activities are open to being outsourced.

Canez *et al* (2002:1325) state that the measure of the success of outsourcing is the amount of cost reduction and level of quality improvement. McCormick (2006), however, considers competitive advantage in terms of technological edge, and that a cost edge strategy leads to the commoditisation of the product or service which leads to a downward spiral of reducing costs and increasing number of competitors. McCormick does not see cost competitiveness as a sustainable competitive advantage. The results of a questionnaire by Ehie (2001:35), however, lists the biggest benefits from outsourcing as the enhanced ability to concentrate on core competencies, enhanced ability to respond to customer needs, and enhanced flexibility. Ehie (2001:36) summarises the goals of outsourcing as helping to achieve dependability of supply, speed of response, price competitiveness, and high quality and high performance products. Outsourcing helps to achieve these goals as well as freeing capital for investment in core competencies.

McIvor's outsourcing framework (2009:22) covers the evolution of the factors identified in other studies and summarises the value chain perspective (Porter, 2004), outsourcing of non-core activities, cost reduction considerations and supply base influences.

Figure 15. McIvor's outsourcing framework



3.4.4.2 Competitive advantage and partnerships

Competitive advantage has been a topic of much strategic discussion in relation to outsourcing, usually with advantage only being sought inside the organisation (Porter, 2004b). Recently, more focus has been placed on considering the complete supply chain, the extended organisation including the firm and its manufacturing partner, as the unit of potential source of competitive advantage, with supply chains competing against each other, rather than individual organisations. Pagnoncelli (1993:15) emphasises the importance of partnership relationships and that competitiveness and focus are the two main characteristics a firm should attain, outsourcing being a means of making a firm more flexible. Advantage may be gained through the development of strong networks of companies either through horizontal associations or consortia, joint venture agreements or through close supply relationships (Harland, 1996; Nassimbeni *et al.*, 1993).

The findings of research by Ehie (2001:31) and Elmuti *et al.* (2000) are that the most successful outsourcing companies have strong relationships with their suppliers and hold high level strategic talks with them, taking increasing responsibility in activities such as the outsourcer's corporate strategy.

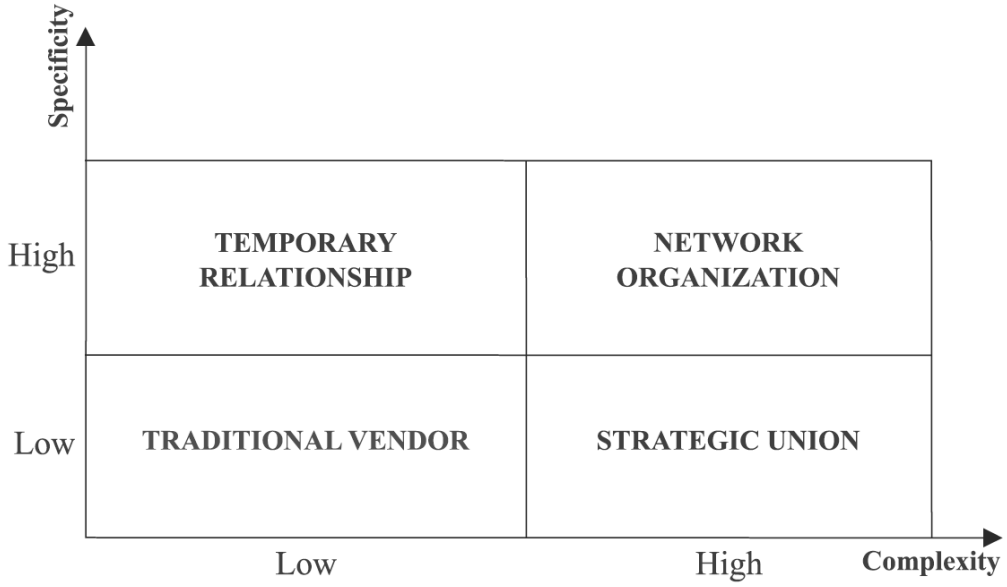
Zhu *et al.* (2001) conclude that the best outsourcing relationships establish measurable goals and objectives; ensure that both parties benefit from the relationship; maintain mutual respect and willingness to learn from one another; involve senior management support; use a joint, multi-level relationship management approach; and continually track and measure performance and provide feedback.

Franceschini *et al.* (2003:251) focused on two factors in the outsourcer and the outsourced relationship; those being "specificity" which refers to the amount of reliance on the use of specific assets and the costs associated with this, and "complexity" which refers to the level of difficulty in defining and monitoring the terms and conditions of the contract. This was then formed into a scheme of the outsourced-outsourcer relationships based on different levels of complexity and specificity. See Figure 16.

Barney (1999) states that companies increasingly outsource to gain access to suppliers' capabilities and Kotabe *et al.* (2004:8) stated that the ultimate objective of a global sourcing strategy is for the company to exploit both its' own and its suppliers' competitive advantages and "the comparative location advantages of various countries in global competition". Then items such as design for manufacturability and component and product standardization have

become increasingly more strategic issues. To exploit R&D, manufacturing, and marketing on a global basis, companies should have a well-defined sourcing strategy. In this instance, product designers, engineers, production and purchasing managers become more important in the formulation of strategy development.

Figure 16. Franceschini *et al.* (2003:252). Main Characteristics of Different Types of Outsourced – Outsourcer Relationships

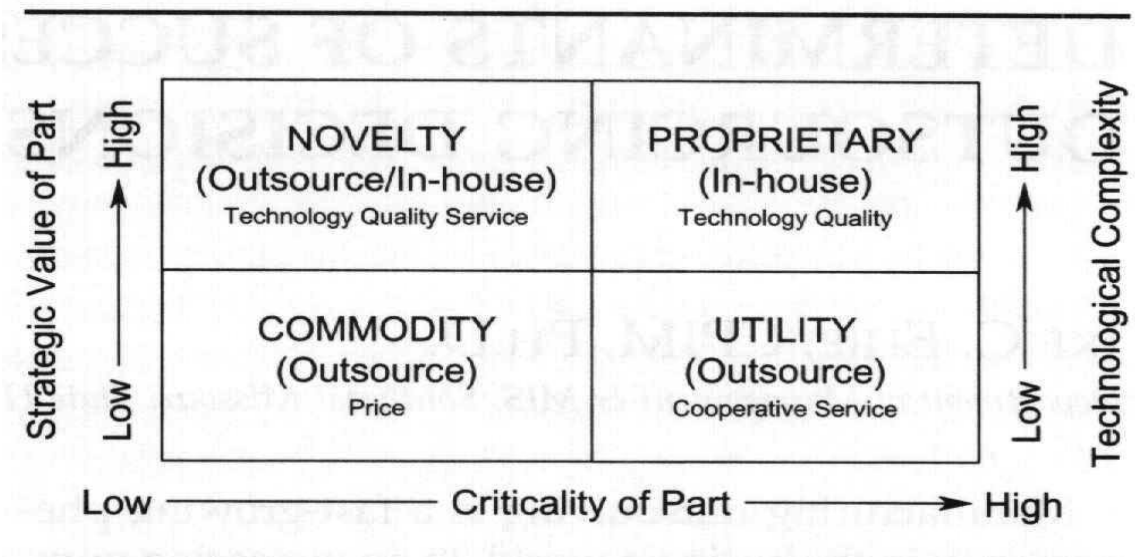


Hines *et al* (1998:525) noted that basing competitive advantage around productivity data alone showed no net advantage within the firm but considerable advantage can be achieved in the external supply chain through supplier integration; improvements in on-time delivery from suppliers, lead-time reduction and increased stock turns. Involving the supplier and getting suppliers to work together can bring further benefits than working with suppliers individually. Dornier *et al.* (1999) developed a framework where the strategic value of the part being manufactured is considered in relation to the criticality of the part to the final assembly. Indicators of strategic value are the level of technological complexity, the level of proprietary of the technology, and the position of the part in the product life cycle. Criticality refers to the indispensability of the part to the finished product; this was plotted on a grid as per Figure 16 which defines the sourcing strategy for that part.

Kavcic *et al.* (2008:242) second approach is grounded in the "resource based view" of the firm. Companies could more effectively allocate scarce resources by outsourcing non-core activities, and focusing efforts and capacity on core competencies, i.e. skills, knowledge and technologies

that a firm must own in order to differentiate its capabilities and compete effectively. Kavcic *et al.* (2008:245) found that companies which outsourced were sometimes faced with reduced product development efforts; loss of key workers; neglected or abandoned marketing activities. Companies may lose core capabilities and consequently competitive advantage. Kavcic *et al.* (2008) note that trust is the basis of mutual long-term interests of both participants. Detailed contractual arrangements are good professional practice but should not be considered as a substitute for or undermining trust in relationship. Detailed contracts represent more of a background safeguard, which provides contract parties with confidence to start business together.

Figure 17. Dornier *et al.* (1999) Strategic Value and criticality matrix



Huxman (1996:2) describes collaboration as 'a good way of achieving things that would be difficult or impossible for an organisation to do on its own'. This goes beyond benefits in efficiency and cost reduction achieved by non-duplication of effort, and is the result of the coherent and coordinated effort of two organisations directed as a whole. These benefits will take time to develop as the two organisations overcome 'collaborative inertia' (Huxman 1996:4) and align culture differences, aims, procedures and perceived power. Collaborative advantage is defined by Huxman (1996:14) as advantage 'achieved when something unusually creative is produced that no organisation could have produced on its own and when each organisation, through the collaboration, is able to achieve its own objectives better than it could alone.

Huxman recognises the potential for the creation of advantage through the collaborative relationship. Huxman recognises that there is cost associated with this relationship, as well as the need for compromise. The aims and goals of the two organizations need to be aligned and the benefits achieved should be greater than the cost of the relationship.

Cagliano *et al.* (1990:198) cite Fronterre's (1991) motives for collaboration, that being the search for excellence and the search for economic convenience. These may be broken down into the search for economies of scale, access to scarce resources, overcoming entry barriers, growth of the firm, risk reduction and sharing. More formal relationships may also assist in speed of introduction of new products, ability to enter new markets and access to complimentary technology.

Cagliano *et al.* (1990:199) explore collaborative relationships by interviewing managers of firm's that have participated in this type of arrangement. The interviews concerned the following topics (Cagliano *et al.* (1990:200) :

- the specific motivations and objectives of the collaboration analysed
- the process of selection of the partner's
- the process through which the organizational form and the 'rules of the game' among partners have been defined
- the resources allocated by each partner to the collaboration
- the organization and management of the collaboration
- the results achieved
- the success and failure factors

Cagliano *et al.* (1990:220) research investigated firms with between 2 and 10 collaborative partners, where the higher the complexity of the product brought a higher number of partners whilst collaborations based on outsourcing of non-core activities alone resulted in the lowest number of partners. The research found that that the level of formalisation of the partnership increased with the level of collaboration. The research also found that collaborations based on manufacturing tended to be short-term and based on the life-cycle of a particular product. Longer term collaboration tended to be informal and the durability was dependant on technological developments.

Gray (1989) lists seven interconnected incentives for forming collaborative alliances, amongst which four are related to industry and profit making organisations:

- Rapid economic and technological change

- Declining growth and increasing competition
- Global interdependence
- Differing perceptions of environmental risk

Huxman (1996:58) cites examples of where collaborative alliances have been identified as 'logical and necessary response to turbulent conditions' by building a collective capacity to respond. Two organisations working together can better cope with changing market conditions than one alone.

Cagliano *et al.* (2000:194) state that 'the key technical knowledge and assets needed for the development and production of product and processes are often dispersed among a number of companies' and that technological collaborations develop which are based on cooperative relationships as opposed to simple economic exchanges. These collaborations can take the form of joint ventures, consortia, long term contracts and informal agreements; the type of relationship being determined by the phase of the innovation process. It may be research and development, prototyping and/or manufacturing, with each phase having differing levels and types of risk.

Cagliano *et al.* (1990:213) describe manufacturing collaborations as generally being precise in scope in the short term but typically the medium and long-term objectives are not clearly defined. The collaboration is generally based around sharing of tangible assets, such as products, materials and components and that typically there are very little joint performing of physical activities. As such the risk in terms of technological and financial investment is typically low.

Variables in the particular industry sector also influence the type of relationship formed (Cagliano *et al.,* 1990:195) such as maturity of the technology required, the maturity of the product and the characteristics of potential partners. The number of collaborative partnerships may increase as the amount and complexity of the technology involved increases, and the type of contract may vary from informal agreement to written contractual rules. The motivations for manufacturing collaboration are generally achieving economies of scale, integration of complementary competencies and technologies required to produce complex products, and externalisation of non-core activities. One further motivation stated is that it may be used to capture market opportunities that cannot be seized by stand-alone operations where sharing of production volumes, technological competencies and resources give a firm an advantage over competitors.

Control of the relationship may be determined by the relative power of the partners and control may be centralised in one place or may be delegated and shared at operating unit level (Cagliano *et al.,* 1990:196). Huxman (1996:47) recognises that there will be different positions of power in this kind of relationship and that one organisation may take a stronger position in realising its strategy. Two dimensions are considered in the behaviour of the two organizations; the interest in the strategic activity of the relationship, and the distribution of the power and influence in the implementation of the strategic intent.

Huxman (1996:84) identifies positive behavioural qualities that may result from collaboration as:

- Productivity - with sharing of resources, skills, technologies, access to markets, exchange currencies, legitimacy and reputation
- Efficiency – where transactions are frequent and more efficient processes evolve
- Legitimacy – in terms of developing common goals
- Adaptability – collective ability to change

The period of the collaboration may also vary (Cagliano *et al.* 1990:196). Long-term relationship will be needed for long-term collaborative advantage; other collaborations may exist to take advantage of short-term market opportunities. Huxman (1996:85) highlights that common productivity objectives will only be sustainable if their value is realisable. Attention must be paid to the sustainability of the workings of the collaborative relationship as well as the benefits achieved. The purpose of the collaboration needs to be defined and maintained.

Ring *et al*. (1994) discuss the threats to inter-organizational collaboration and highlight four factors that can cause the relationship to dissolve:

- Excessive legal requirements and monitoring of the relationship
- Conflicts at interpersonal level between the two organisations
- Conditions for violations of trust
- Escalating commitment to failing transactions

A collaborative relationship may also prolong actions needed to take advantage of emerging opportunities as both parties may need to agree on how to proceed (Huxman, 1996:95).

Huxman (1996:96) highlights that the major success factor in collaborative relationships is trust. There can be endless contracts explaining how the two parties collaborate in any kind of circumstance, but these mean very little compared to the trust and bond that needs to develop for the relationship and advantage to be sustainable.

Frayret *et al*. (2001) consider agility in manufacturing through various means, collaboration being one, and summarise the aspects of the relationship to consider as follows:

Relational aspects

- Partners must know each other (operational, tactical and strategic)
- Partners must trust each other
- Partners must be committed
- Win-win relationship
- Partners must be able to measures their own contribution to the collaboration as well as the contribution of their partners
- They must have proactive behaviours
- Strategies and goals must be in alignment
- They must avoid opportunism behaviour
- Partnership profit before individual profit
- They must exploit collaboration opportunities to improve the partnership

Business operation aspects

- Partners must have the ability to coordinate their interdependent activities
- Partners must have the ability to work efficiently together
- They must share responsibility and self-managed partners
- They must or may share the profits, the resources, problems, etc.
- They must identify contingencies and contingency plans
- They may use incentive and award mechanisms
- They must eliminate work duplication

Communication aspects

- Partners must use understandable, fast and efficient communication channels

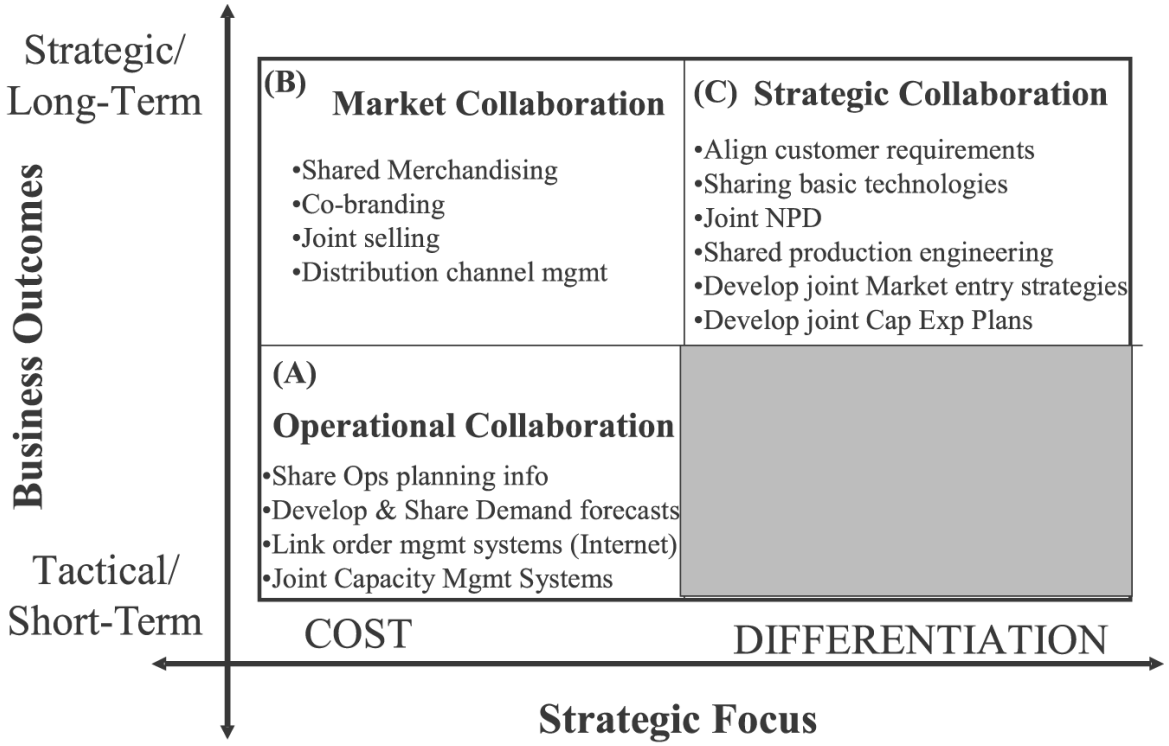
Cousins (2005) identified four types of collaboration:

- Sharing of production plans and systems
- Adaptation of production processes
- Common work for cost reduction
- Early supplier involvement in new product development

The first factor tends to be a short term focus on operational collaboration. With the exception of the first factor, which focuses on improving price and delivery, all factors can contribute to some kind of competitive advantage by creating some kind of distinct competence through

market based collaboration. The different types of collaboration are summarised in Figure 18; the Strategic Focused Outcomes Model (Cousins, 2005:419)

Figure 18. Strategic Focused Outcomes Model (Cousins 2005:419)



Cousins (2005:419) deduced from his research that firms who follow a cost focused approach are primarily concerned with business development outcomes based on cost reduction and lead time reduction through short to mid-term operational and tactical collaborations (Quadrant A). Longer term (Quadrant B) may be achieved by entering into marketing collaborations such as merchandising, co-branding and joint selling leading to improving market share, reducing time-to-market and improved cash flow (Cousins, 2005:420).

The differentiated approach (Quadrant C) to supply management is characterised by making best use of the capabilities of the firm and its suppliers. This involves outsourcing no-core activities and tasks better performed by others. These collaborations could also include co-design approaches to product and new product development and sharing of design expertise and technologies. These approaches are long-term and strategically important to the firm.

Cousins (2005:419) model prescribes that a firm pursuing a cost competitive focus should adopt strategies in quadrant A or B which are short-term operational collaboration or longer-term market collaboration. Firms that have a “differentiation” focus will develop ‘long-term

sustainable business outcomes, based around strategic collaborations (quadrant C). Strategic collaborations are concerned with aligning the customer requirements with the supplier, the sharing of technological processes and products to enhance offerings to existing and new customers which may lead to new product development activities'.

3.4.4.3 Competitive advantage and technology

McCormick (2006) considers competitive advantage in terms of cost edge and technological edge. If a firm pursues the technological edge, then they will invest time and money in systems that may or may not lead to future competitive advantage. A cost edge strategy leads to the commoditisation of the product or service which leads to a downward spiral of reducing costs and increasing number of competitors. McCormick does not see cost competitiveness as a sustainable competitive advantage. Welch *et al.* (1992) formulated a framework that focussed on a firm's process capabilities in order to avoid the problems associated with making outsourcing decisions based on cost alone; the focus being on the process technology's role in providing sustainable competitive advantage, the maturity of the process technology under consideration, and competitors process technology positions. Welch and Nayak (1992) suggested a generic framework was necessary to assist firms in the complex evaluation of sourcing decisions. This strategic sourcing model augmented traditional cost analysis by considering strategic and technological factors in the decision-making process. In addition, factors such as the competitive advantage of the process technology, its maturity and competitors' process technology positions all need to be considered in making the final sourcing decision.

Probert (1996) attempted to put this into perspective and proposed a four-stage process to the make or buy strategic decision. The stages being:

- Initial business appraisal, collection of the firm's, competitors and supplier data, evaluation of strategic issues
- Internal/external analysis, identification of major parts families, manufacturing processes, cost allocations and alignment of parts and technologies on a competitiveness/importance matrix
- Evaluation of strategic options
- Selection of optimal strategy by application of financial decision support models to identify the most appropriate fit with the organisation's current and future operations.

Welch *et al.* (1992) recommend that if a firm has a relatively high level of process technology in–house then that should be developed, and that "new emerging technologies should also be developed to provide internal advantage and a future core competence. Nevertheless, a firm should identify activities which involve firm's technological secrets and consider very carefully whether they should be outsourced (Pagnoncelli, 1993:19). If the processes are mature then they should be outsourced as they are unlikely to provide any kind of competitive advantage". The firm should consider the internal process technology in terms of the stage of the process lifecycle and determine whether it is a core competence and/or could be a source of competitive advantage. Probert (1996) recognised that strategic management literature has increasingly focused on technology as a source of competitive advantage, and suggests that the "identification and exploitation of appropriate individual technologies is one of the most important bases of competition".

Metty (2006) advises that companies should consider how outsourcing could contribute to the business objectives and the corporate objectives and that competitive advantage can be lost if outsourcing fails to help a firm differentiate its products or services from competitor's offerings, "outsourcing works best when it provides early access to evolving technologies, assures continuity of supply through preferred suppliers as well as reducing costs. Metty (2006) advises against giving up control of core technologies, and of supplier relationships. Companies must maintain supplier contact and trust.

Probert (1996) developed a structured process for analysing the manufacturing technologies used in relation to the competitiveness with which they are deployed, and their comparative importance to the success of the business; then appraise the costs of each manufacturing technologies used including allocation of overheads, fixed and variable costs, utilization rates and source of acquisition costs. The relative positioning of the competitiveness and importance of each process family is plotted on a matrix and sourcing strategy for each is determined by financial modelling of costs against varying forecast activity levels. Manufacturing companies need to identify the manufacturing technologies required for the future, while aiming for continuous cost reduction (Probert 1996:47) as well as to develop techniques for comparing internal manufacturing capability and competitiveness with potential suppliers.

Elmuti *et al.* (2000) found from their surveys that the top reason to outsource was cost reduction, as well as improved quality and delivery performance, use of resources that are not available internally, reduction in the overall amount of required specialized skills and knowledge

needed for operations, make capital funds available for more profitable operations, but also found reasons that could be determined to be related to sustainable competitive advantage, such as:

- increased exposure to worldwide technology
- improved delivery and reliability
- access to materials only available abroad
- established presence in a foreign market
- to combat the introduction of competition to the domestic supply.

This suggests that global outsourcing is undertaken for purposes that have a large impact on the organization's profitability, as well as strategic competitive advantage reasons.

Kotabe *et al.* (2004:7) state that it is "imperative for companies to continuously create and acquire capabilities that would help generate a sustainable competitive advantage over their rivals" on a global scale and that in a highly competitive environment "many manufacturers begin to either produce in lower-cost locations or outsource components and finished products from lower-cost producers on a contractual original equipment manufacturer (OEM) basis".

Kotabe *et al.* (2004:13) in an era of technological obsolescence, no one company possesses the capabilities needed to maintain a sustainable competitive advantage for long.

Juras *et al.* (2007:44) discussed the concept of "strategic enhancement" where companies gain access to new technologies that otherwise might not be available, through the process of outsourcing. Synergies may also be developed as each party learns how its partner's processes interact. A firm can "jump on the fast track to innovation" by focusing on "activities that drive its success, further refine its' competencies, and strengthen competitive advantage". Juras *et al.* (2007:44) warn that "failure to identify whether outsourcing is part of the core strategy or merely operational will only result in unclear objectives and ineffective measurement systems as outsourcing becomes a more critical part of the company's operations". Technological change is one of the principal drivers of competition and can erode the advantage gained by established companies (Porter 2004b:164). Porter (2004b:169) goes on to state that technological change affects competitive advantage if it has a significant role in determining relative cost position or differentiation, for example if a better technology is discovered for performing an activity or if it raises the entry barriers to a market. The advantage can be

sustainable if it can be protected from imitation or if the firm innovates faster than competitors can catch up (Porter 2004b:182).

3.5 Literature Review Summary and Conclusions

The purpose of this systematic literature review is to enable the formulation of a framework which shows the relationships that exist between individual pieces of work (Hart 2005:162); and which will highlight gaps in current knowledge and, consequently, areas for the subsequent research. Vining *et al.* (1999:645) also summarise by stating that the purpose of research on outsourcing must be clear and recommends that a framework be developed, and that the framework can be applied to a real (and potentially complex) company's outsourcing problems. The first part of the literature review looked at why firms decided to outsource and identified the most commonly cited reasons for choosing to outsource manufacturing, these reasons can be assumed to be the expected or perceived benefits of outsourcing for firms considering to outsource. These were summarised in Figure 5. The perceived benefits of outsourcing
It is not clear from the literature, however, how successful firms are in achieving these goals and it is also not clear how the success of outsourcing is being measured, if at all. The majority of these reasons are focused on the more efficient and effective use of the internal resources of the firm but some are related to the external competitive environment such as access to labour and technology expertise; to establish new business and to gain competitive advantage. This research will investigate whether these benefits were the expectations of decision makers, who were interviewed in the course of this research, when deciding to outsource, and will also investigate what benefits were achieved.

The literature review then looked at the outsourcing decision making process and identified factors relevant to the outsourcing decision, which were summarised in Figure 8. The outsourcing decision framework. These factors will be used to formulate questions to investigate the outsourcing decision making process in relation to what factors were considered and the link between the outsourcing decision and the firm's strategy. The purpose being to establish whether the decision was made at an operational level with operational outcomes, or at a strategic level with links to the firm's strategy as a whole.

There is evidence that the decision making process is becoming more related to the strategic

direction of the firm and decisions are being made at the highest levels of an organisation.

A number of key points relevant to the outsourcing decision were cited:

- Hamel and Prahalad (1994) postulate that companies who measure competitiveness in terms of price only are inviting the erosion of their core competencies.
- Webster *et al.* (1997:827) corporate agility contributes to competitive advantage
- For a few of the world's most successful organisations competitive advantage is being sought and achieved primarily through their direct and indirect network of suppliers (Hines, 1997a).
- Zhu et al (2001) - The faster way to improve a company's ability to compete in today's fast-changing environment is to buy technology and service from an outsourcer.
- Mason *et al.* (2002:616) stressed the need to maintain relationship with suppliers even if need to purchase has gone
- Linder *et al.* (2002:23) postulated that a firm can use outsourcing to achieve "rapid, sustainable radical improvement in enterprise level performance ". Outsourcing can be used to transform business practices into competitive weapons. Outsourcing can transform critical processes - core and non-core is not the main thrust – companies should focus on how to create new capabilities that can be used to achieve competitive advantage.
- Linder (2004:29) uses outsourcing as a transformational process to reposition the firm.

These key points in the literature carry a clear theme of the decision making process moving away from purely considering cost savings, which were frequently not achieved, towards a more strategic outlook where analysis of core and non-core competencies is considered more important. It was also recognised that cost reduction is likely to be a by-product of this process. Later research considers the changing competitive environment and considers how companies create and maintain competitive advantage. It was recognised that a firm's competitive advantage can be eroded as the environment changes and as competitors develop their strategies. In the electronics industry change can be fast and sudden as a technological development can overtake incremental increases in competitiveness. Sustainability is not only reliant on the achievement of common benefits and the ability to change with the competitive environment, but also reliant on the maintenance of any collaborative partnership through the

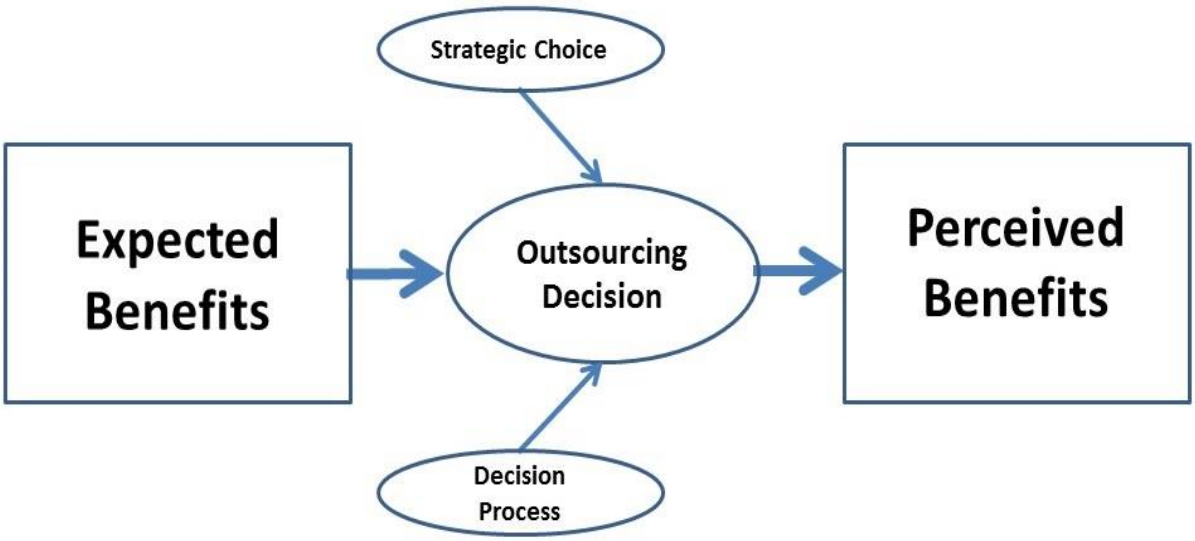
building of trust and recognition and successful achievement of common goals of both the collaborative partners.

The literature is focused on the determinants of competitive advantage from within the firm and whether it will be lost if outsourced, as well as if a current advantage can be sustained as a result of outsourcing

The third and fourth stages of McIvor's framework (2009:32) do look externally and considers 'strategic outsourcing' outsourcing of core activities. McIvor (2009:33) suggests that it may be possible to gain competitive advantage by outsourcing those core activities where an outside firm may be more competent or where a firm considers that it performs well now but may not be able to sustain its competency in the future. This may be through increased flexibility and ability to react quicker to market changes or through developing partnerships or strategic alliances with selected suppliers sharing activities such as research and development. The benefits achieved through outsourcing may be different to those perceived when making the decision to outsource. Some perceived and expected benefits may not be realised and there may be additional benefits not considered when making the decision.

The literature identifies the expected benefits of outsourcing, factors relating to the outsourcing decision are identified, and the benefits perceived to have been achieved through outsourcing are identified in terms of operational and internal performance improvements as well as strategic outsourcing of core competencies to achieve some kind of competitive advantage. An initial framework was formulated from the literature and is illustrated in Figure 19.

Figure 19: Initial framework



This research is concerned with the benefits perceived to have been achieved from outsourcing through the building of a partnership between the outsourcer and the manufacturer in relation to competitive advantage. The research does not consider, in detail, operational and internal performance improvements. The expected benefits are documented in current literature. The perceived benefits are based on the views of those interviewed in the course of this study and are based on their views on the benefits actually achieved. The opinion and views are qualitative in nature and have a level of subjectivity but are based on real cases. There are a significant number of variables involved when outsourcing which makes a quantitative analysis extremely complex. This research is exploratory and provides a framework from which quantitative studies may evolve.

There are a number of references to competitive advantages that could be created through strategic outsourcing and by the outsourcing partnership in the literature review. This research classifies these under the categories of 'Sourcing Value', 'Technology Value' and 'Market Value'. These 'values' will be used to structure a framework to formulate questions for the semi-structured interviews in the data collection for this research.

Sourcing Value

There are a number of observations and theories in the literature relating to advantages created through sourcing of materials and access to the services of sub-suppliers. These have been

grouped together and, for the purpose of this research, shall be termed 'Sourcing Value'.

These observations have been grouped into four sub-sections.

The first sub-section relates to access to raw materials where the manufacturer will be able to source components as well as sub-assemblies and services from their suppliers in the region of manufacture that may not be available in the region of the outsourcer. Ehie (2001:31) and Elmuti *et al.* (2000) emphasised the importance of strong relationships with suppliers who are taking increasing responsibility in the outsourcer's corporate strategy.

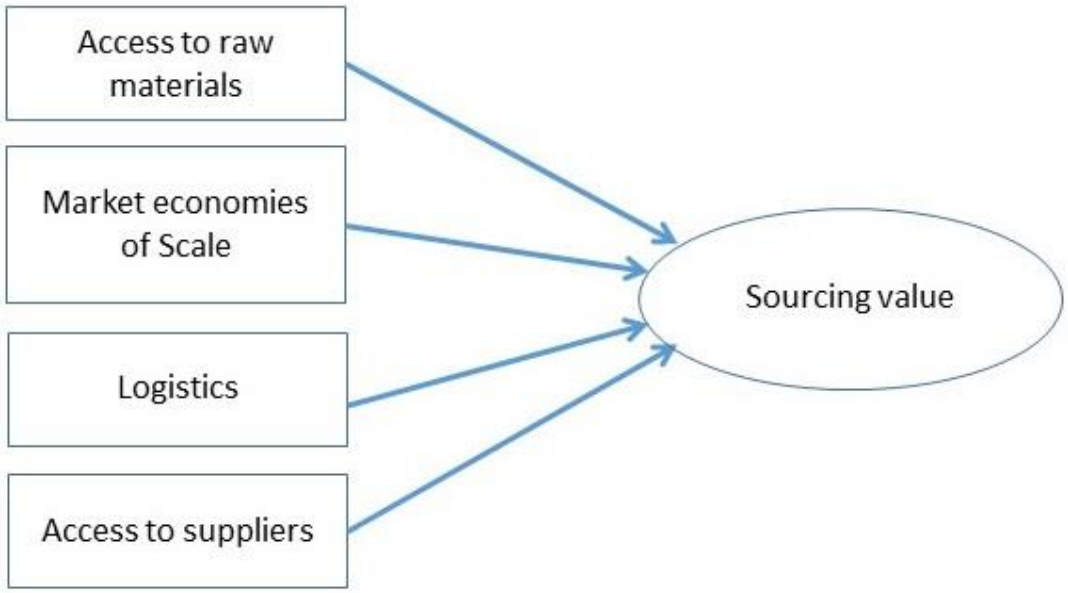
The second sub-section relates to market economies of scale. This is economies of scale through the sourcing of materials, as opposed to economies of scale achieved through using high volume production equipment identified in the previous section. Jiang *et al.* (2005:48) outsourcing can help the firm reduce costs, increase profits, and improve productivity, through different aspects of economies of scale.

The third sub-section relates to logistics. Hines (1997a) stated that competitive advantage is achieved primarily through direct and indirect network of suppliers and Hines *et al* (1998:525) found that considerable advantage can be achieved in the external supply chain through supplier integration effectively shortening the supply chain and improving logistics.

The fourth sub-section relates to access to suppliers. Barney (1999) outsourcing can gain access to suppliers' capabilities and Kotabe *et al.* (2004:8) found that global sourcing strategy allows exploitation of both the organisation and its suppliers' competitive advantages. Harland (1996); Nassimbeni *et al.*, 1993), advantage may be gained through the development of strong networks of companies and close supply relationships. The manufacturer will have access to sub-suppliers not available to the outsourcer directly.

These factors identified in the literature which may potentially offer competitive advantage from sourcing have been grouped under the concept of sourcing value and are summarised in Figure 20.

Figure 20. Sourcing Value Factors



Technology Value

There are a number of observations and theories in the literature relating to advantages created through technological collaboration or sharing and exploitation of processes which, for the purpose of this research, shall be termed 'Technology Value'. These observations have been grouped into three sub-sections.

The first sub-section relates to access to technology. Welch *et al.* (1992) put forward the concept of developing new emerging technologies through research and development (R&D) to provide internal advantage and a future core competence, which is especially important in the fast changing and developing electronics industry. Probert (1996) stated “identification and exploitation of appropriate individual technologies is one of the most important bases of competition” and Lacklow (1999) discussed outsourcing as a means to access outside expertise not available internally in the firm. Zhu *et al.* (2001) recognised that to compete in today’s fast-changing environment it is necessary to buy technology and service from an outsourcer.

Metty (2006) expands on the Technology Value theme and considers that 'outsourcing works best when it provides access to and early adoption of new technology'.

Gottfredson (2005:48) emphasises the potential for capability enhancement and Juras *et al.* (2007:44) discussed the concept of 'strategic enhancement' through outsourcing giving access

to new technologies that otherwise might not be available and synergy from collaboration through the interaction of each partner's processes. Technology Value can therefore potentially arise from collaboration and joint R&D, as well as from access to new technology.

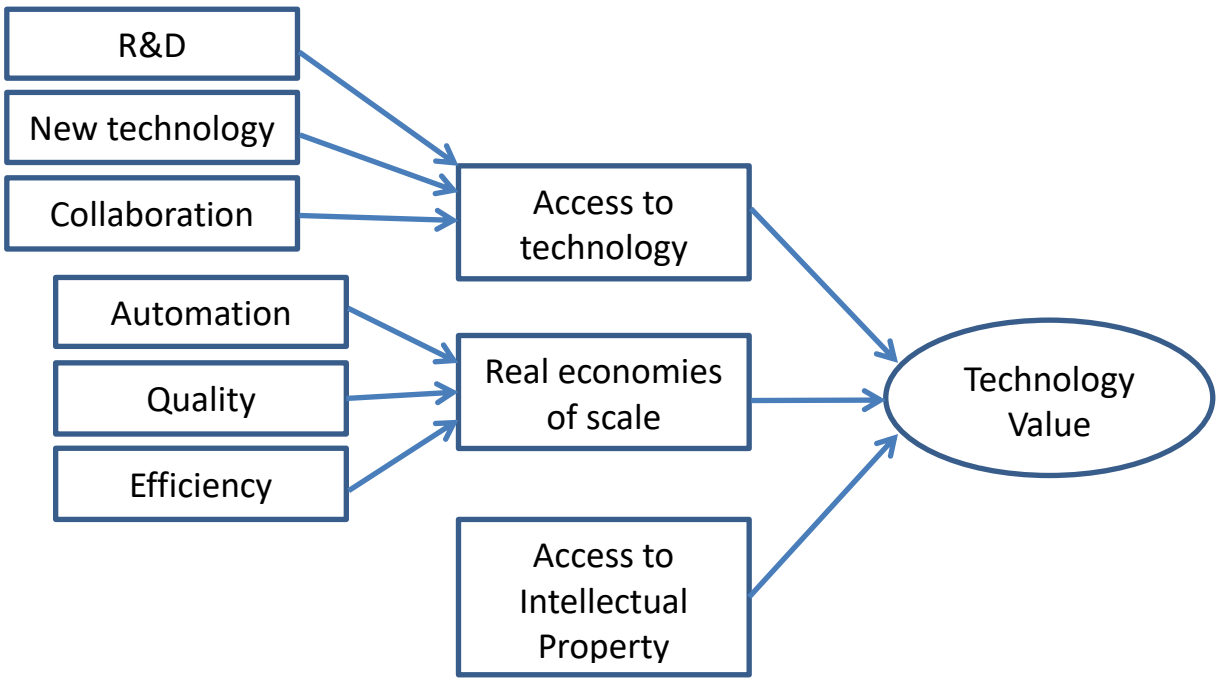
The second sub-section relates to economies of scale. Cagliano *et al.* (2000:194) discuss the sharing of production volumes, technological competencies and resources to give advantage over competitors. DiRomualdo and Gurbaxani (1998) argue that outsourcing can bring about strategic improvements through strategic commercial exploitation by leveraging technology-related assets and the Deloitte 2008 Outsourcing report also lists leveraging technology expertise as a major consideration when deciding to outsource. It is likely that the manufacturing firm will have made significant investment in high volume automated production equipment that will have capacity far beyond the needs of the outsourcer and will also have far greater efficiency and productivity than the outsourcer could hope to achieve in their own facility. These real economies of scale will also give a high level of quality as it will be necessary for the manufacturer will have strict controls in place to ensure repeatability of good product. There is discussion in the literature regarding Total Quality Management as a source of sustainable competitive advantage where an ethos is established by involving everyone in a company in continuous improvement (Cherkasky, 1992). This may be extended by establishing continuous improvement teams and management systems across the outsourcing partnership, and is referred to as part of the quality consideration in this research.

The third sub-section relates to access to intellectual property. McIvor (2000) discussed the outsourcing of core activities to bring benefits through developing a new core competency by learning from the partner by sharing of intellectual property (IP). Sharing of IP and developing new products and / or processes unique to the outsourcer and manufacturing partner could be a source of competitive advantage.

Cagliano *et al.* (2000:194) technological collaborations and cooperative relationships to bring together key technical knowledge and assets needed for the development and production of products and processes including research and development, prototyping and/or manufacturing

The factors identified in the literature above are related to technology and process and, for the purposes of this research, will be grouped under the heading of 'Technology Value'. These factors are summarised and illustrated in Figure 21.

Figure 21. Technology Value Factors



Market Value

There are a number of observations and theories in the literature relating to advantages created in the market place through collaboration with the manufacturing partner. For the purposes of this research, these factors shall be termed 'Market Value'. These observations have been grouped into four sub-sections.

The first sub-section relates to agility, where agility refers to the ability of a firm to react to changing needs of the market over time. Mason *et al.* (2002:610) found that outsourcing increases agility to respond to customer needs and increases ability to react to market changes and Canez *et al.* (2000:1319) stated that outsourcing increases responsiveness and quality, and reduces time to market.

The second sub-section relates to flexibility, where flexibility refer to the ability of a firm to react to changes in production requirements, this may require capacity and alternative capabilities. Pagnoncelli (1993:15) found that outsourcing can bring flexibility and the Deloitte Outsourcing Report (2008) found that outsourcing increases flexibility. McIvor (2009:33) stated that outsourcing may increase flexibility and ability to react quicker to customer demand and Ehie (2001:38) stated that outsourcing can increase manufacturing flexibility, reduce inventory investments, and give ability to respond quickly to changing requirements

The third sub-section relates to market intelligence. Ehie (2001:38) recognised that the

competitive market is changing fast; company's need to respond to maintain their advantage for changing market requirements and gather market intelligence. The manufacturing partner may have insight into the needs of the market and changes taking place in different geographical regions through working with their other customers.

The fourth and final sub-section relates to access to new customers. Slack *et al.* (2008:228) stated that continual reconciliation between operational resources and market requirements may bring sustainable alignment between the outsourcer and the customer. The ability to serve a market will increase the customer base and the manufacturer, in many cases, is located in a different region to the outsourcer and so may be in a better position to gain market intelligence, to provide flexible manufacturing volumes and be close to the customer.

The factors identified in the literature which may potentially offer competitive advantage from the market have been grouped under the concept of market value and are summarised in Figure 22.

Figure 22. Market Value Factors

In summary, the factors identified in the literature that could lead to 'value' being added by the outsourcing partnership are therefore categorised as being sourcing value, technology value, and market value.

A cursory review of the activities in the generic Value Chain Model (Porter, 2004) whilst considering the areas of value identified in the previous section also suggests some areas where outsourcing could be a source of uniqueness, and consequently sustainable competitive advantage.

Inbound logistics – if suppliers located close to manufacturing partner

Operations – if manufacturing partner has developed specific patented technology or has large scale which allows the use of otherwise uneconomic technology

Outbound logistics – if manufacturing partner is geographically close to or has unique relationships with freight companies

Sales – if manufacturing partner has unique relationships and access to the end customer

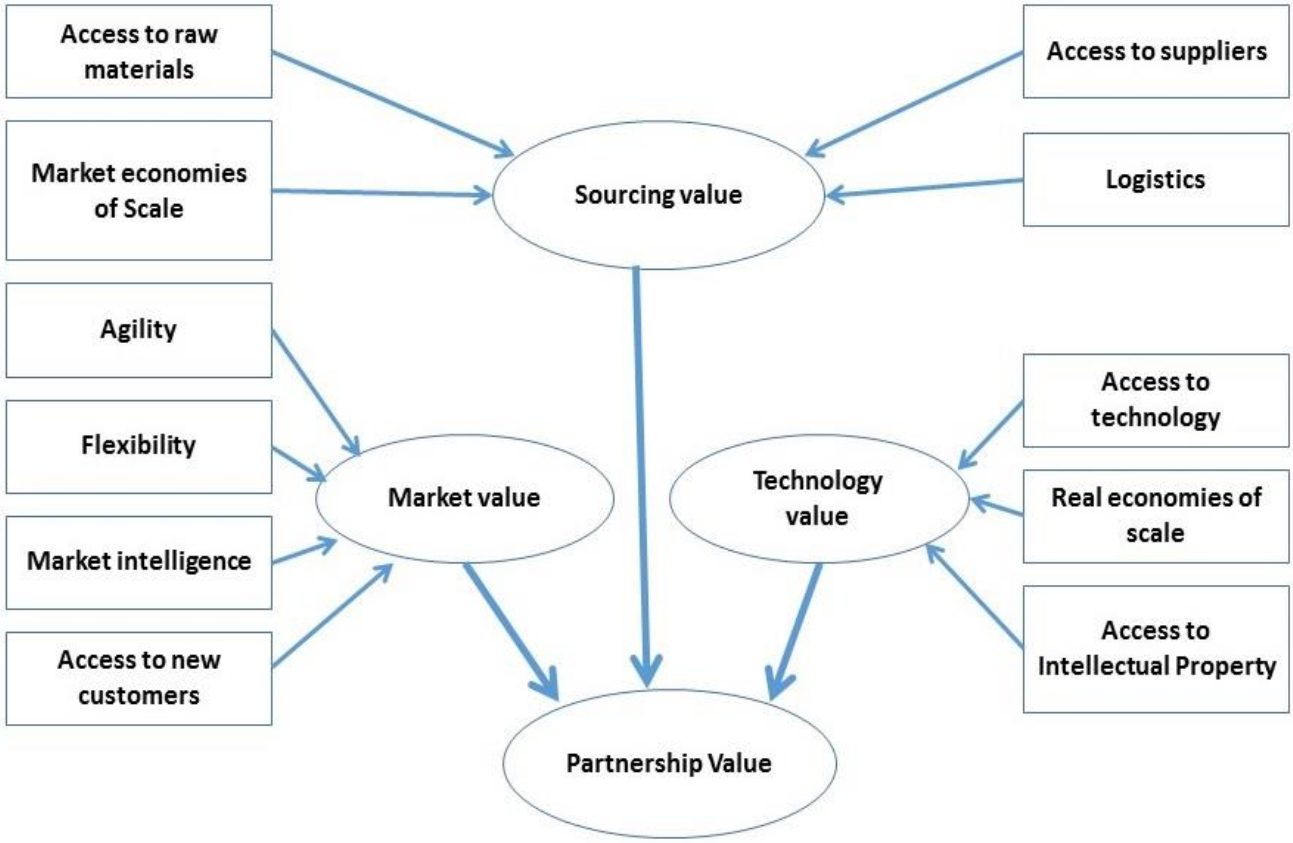
Procurement – if the manufacturing partner has access to unique or rare resources which could enhance the performance or properties of the product

Technology development – if the manufacturing partner has developed unique technology which can result in unique product capabilities or functionality

Process capability – if the manufacturing partner has developed unique processes that can create unique manufacturing processes

Combining these factors together with the Sourcing Value, the Market Value and the Technology Value may result in a factor classed as 'Partnership Value' and this is summarised in the conceptual diagram in Figure 23.

Figure 23. Partnership Value

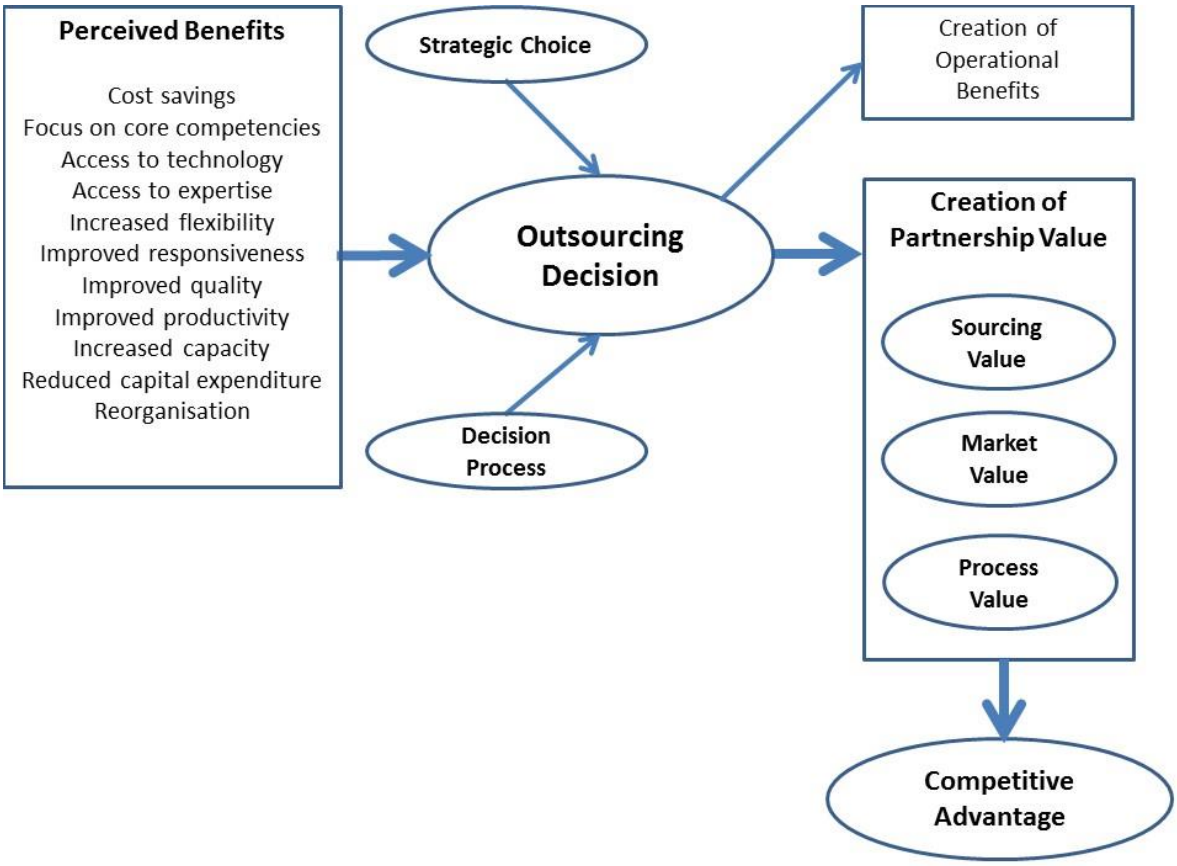


Partnership Value is defined by the researcher as the competitive advantage a firm achieves in the marketplace through the outsourcing of manufacturing operations and working collaboratively with its manufacturing partner.

This concept of Partnership Value is echoed by the work of Huxman (1996:14) who defines collaborative advantage as advantage 'achieved when something unusually creative is produced that no organisation could have produced on its own and when each organisation, through the collaboration, is able to achieve its own objectives better than it could alone.

The Initial Framework (Figure 19.) can now be expanded to incorporate the 'values' identified in the Partnership Value diagram to give a conceptual framework, Figure 24., which will be used to structure the research strategy and design.

Figure 24. The Conceptual Framework



The systematic literature review identified a number of gaps.

Firstly, there is little empirical research on the impact of outsourcing on company performance. Jiang (2005) identifies that the contract-granting firm has not been investigated by hard data and that future study may be concerned with empirically examining the impact of outsourcing on firms' performance by using audited financial data.

Secondly, there is little study on the relationship between the outsourcing decision and competitive advantage and whether decision makers consider the competitive environment when making the decision to outsource.

Finally, there are very few studies that consider:

- the effects of outsourcing on competitive advantage
- the relationship between outsourcing and the competitive market
- the ability to achieve and sustain some kind of competitive advantage

There is little information and no empirical research found on the creation of competitive advantage from the outsourcing process; and none found that investigates the generation of competitive advantage generated from the outsourcing partnership.

The literature review of fifty-seven papers and articles showed a bias towards theoretical methods. Further reviews of existing literature and theoretical discussion were by far the most common methods found. Jiang *et al.* (2005) found that case studies, field studies and interviews were by-far the most popular research methods.

This review of the research methods used in the papers highlights the emphasis on reviewing the current literature and formulating new theories and frameworks. It was also found that there is a bias towards qualitative research.

This gap identified in the literature review, which is the focus of this research, is the benefit of the 'strategic outsourcing' of core activities identified in McIvor's framework (2009:32). This research is exploratory and investigates what value and competitive advantage can be created by the relationship between the outsourcer and the manufacturing partner through joint cooperation and utilisation of joint resources. The research will expand on stages 3 and 4 of McIvor's framework.

4.0 Research strategy and formulating the research design

The purpose of research design is to define a process that will enable answers to the research questions to be formulated with the least amount of ambiguity. It is based on the precept that knowledge is provisional and based on our current understanding, and that 'we should seek evidence that provides a compelling test of the theory' as opposed to seeking evidence that supports it (de Vaus 2006:11); it is much tougher for a theory to survive the test of people trying to disprove it than it is to find evidence that supports it.

This research is exploratory and the design of this research is based on the hypothetico-deductive method described by Sekaran (2003). The stages being:

- Observation and identification of the research problem and generation of research questions
- Information gathering through semi-structured interviews
- Theory formulation incorporating all relevant factors
- Generation of hypotheses
- Analysis of the data to identify factors related to the original research questions
- Deduction of conclusions through interpretation of the analysis results

4.1 The research questions

The literature review identified that there is a gap in current research concerning the creation of sustainable competitive advantage resulting from the outsourcing relationship. It is key that the competitive attributes are created by the partnership alone, and that they would not exist if the partnership did not exist. For the purposes of this research, these advantages are collectively termed 'Partnership Value'.

It was determined from the literature review that to explore this gap it was necessary to investigate:

- the outsourcing decision making process
- competitive advantages created by the partnership
- the manifestation of these advantages and their sustainability

4.1.1 The outsourcing decision making process

The literature review reveals that the factors involved in the outsourcing decision-making process are numerous, interrelated and extremely complex. Data will need to be gathered concerning the decision making process and the scope of strategic choice considered.

Factors raised in the literature review in relation to the outsourcing decision making process and in relation to the strategic choices available are summarised in Figure 8. The Outsourcing Decision Framework.

What is not clear from the literature is how much decision makers consider the firm's strategy and the potential for achieving sustainable competitive advantage from the outsourcing relationship. The research question formulated to cover the gaps in the research is:

- **To what extent do decision makers consider competitive advantage when deciding to outsource?**

The subsequent research will be directed towards strategic decision makers who lead their organisation and the factors identified in this section will be used to formulate interview questions related to the outsourcing decision.

4.1.2 Competitive advantages created by the partnership

The literature review identified that it may be possible to generate 'partnership value' from the outsourcing relationship. Partnership value being competitive advantage created by the partnership that would not exist without the specific partnership. It has also previously been discussed that the partnership or the nature of the partnership may need to change over time to reflect changes in the market to enable the competitive advantage to be sustainable. To determine whether a competitive advantage has been achieved and whether it has been or is sustainable, it will be necessary to consider how to measure the benefits of that advantage.

It can be seen that many potential factors can be created by the partnership which may lead to competitive advantage. The second research question is therefore formulated as follows:

- **What competitive advantages or 'partnership value' can be created by and can be attributed to the outsourcing partnership?**

From the research it can be seen that there is potential for competitive advantage to be created by the outsourcing partnership. It is also evident that there is very little empirical research on the measurement of this advantage and its sustainability. The third research question has therefore been formulated to investigate the advantages perceived to have been achieved and their sustainability.

- **To what degree has competitive advantage been achieved through outsourcing and how sustainable is it likely to be?**

In summary, the research questions formulated to cover the gaps in the literature are:

- To what extent do decision makers consider competitive advantage when deciding to outsource?
- What partnership value can be created by and attributed to the outsourcing partnership?
- To what degree has competitive advantage been achieved through outsourcing and how sustainable is it likely to be?

4.2 Data needs analysis

This section will identify what data is needed to answer the research questions, as well as where and how the data can be collected.

4.2.1 The first research question is *'To what extent do decision makers consider competitive advantage when deciding to outsource?'*

Using the outsourcing decision framework (Figure 8) as a guide, the research question can be broken down into sub-questions that target different aspects of the decision making process:

- Why did the firm consider to outsource?
- What potential benefits were considered when deciding to outsource?
- Who was involved in the decision to outsource?
- How is the manufacturing strategy related to the strategy of the firm?
- What was the firm's competitive position before outsourcing and how has it changed?

4.2.2 The second research question is '*What competitive advantages, or partnership value, can be created by and can be attributed to the outsourcing partnership*?'

This question assumes that competitive advantage can be created by the partnership. It is necessary to distinguish the long-term strategic partnership values, which can only be achieved through the relationship, from benefits achieved from other factors such as short term cost savings and fortuitous events.

Using the Partnership Value framework (figure 22) as a guide, this question can be broken down into what advantages or 'value' can be created by sourcing factors, market factors and technology factors.

4.2.3 The third research question is '*To what degree has competitive advantage been achieved through outsourcing and how sustainable is it likely to be?'*

This question relates to the value of any benefits achieved through outsourcing, and whether it is long-term and strategic. It is necessary to identify these factors so as to give guidance to the outsourcing decision making process and to provide a contribution to the practice of strategic outsourcing for maximum benefit.

Factors identified in the literature review relating to partnership value are summarised in the framework in Figure 22. Using the framework as a guide, the second and third research questions can be broken down into sub-questions that question different aspects of partnership value:

- What attributes of the manufacturing partner related to the market have brought competitive advantage to the firm?
- What aspects of the manufacturing partner related to sourcing have brought competitive advantage to the firm?
- What aspects of the manufacturing partner related to process have brought competitive advantage to the firm?
- What other aspects of the manufacturing partner have brought competitive advantage to the firm?

4.2.4 The literature review of fifty-seven papers and articles showed a bias towards theoretical methods, the emphasis is on reviewing the current literature and formulating new theories and frameworks. Further reviews of existing literature and theoretical discussion were by far the most common methods found. Jiang *et al.* (2005) found that case studies, field studies and interviews were by-far the most popular research methods to gather new data related to outsourcing and that there is a bias towards qualitative research.

The data required to answer the research questions is not available in the current literature and is therefore a gap. To answer the research questions and to explore the gap, it was first considered to perform a survey and distribute a questionnaire but the number of companies who have outsourced their manufacturing is extremely large. The sampling frame is unknown and very large, the resultant probability sampling would require such a large sample that it would not be possible to distribute or process the information collected within the timescales of this research. The research is exploratory and the information required is wide ranging and so it was decided that the best method to collect the data would be from interviews with senior decision makers responsible for outsourcing in the electronics industry.

The research questions and the factors discussed in this section are summarised in the data needs matrix Figure 25.

Figure 25. Data needs matrix

Research Question	Reason for question	data required	data sources	collection method	practical collection issues	method of analysis	analysis concerns
1. To what extent do decision makers consider competitive advantage when deciding to outsource?	To understand what strategic objectives and competitive factors are considered by a firm when deciding to outsource	Details of the decision making process	Decision makers of firms that have outsourced manufacturing operations	interviews	Need to arrange face to face meetings and secure time with senior decision makers	Coding of replies from interview using Framework	Large amount of data to analyse
2. What competitive advantages, or partnership value, can be created by and can be attributed to the outsourcing partnership?'	To understand what perceived advantages have been created by the outsourcing partnership that exist because of the partnership alone	Perceived benefits and values gained through the outsourcing partnership	Decision makers of firms that have outsourced manufacturing operations	interviews	Need to arrange face to face meetings and secure time with senior decision makers	Coding of replies from interview using Framework	Large amount of data to analyse
3. To what degree has competitive advantage been achieved through outsourcing and how sustainable is it likely to be?	To understandwhat is needed to sustain the advantages and how the advantages manifest themselves and how they are valued	Data relating to the value of advantages achieved above the industry norm and compared to the performance of firms that have not outsourced	Decision makers of firms that have outsourced manufacturing operations	interviews	Need to arrange face to face meetings and secure time with senior decision makers	Coding of replies from interview using Framework	Large amount of data to analyse

4.3 The research strategy and philosophies

The purpose of the research is to explore the effects of outsourcing on competitive advantage and to investigate whether the outsourcing partnership can create competitive advantage. The research adopts a series of cross-sectional semi-structured interviews.

The research is concerned with achieving competitive advantage through the collaboration of two or more partners in the outsourcing of the manufacturing process. The ontological nature of the research is subjective, as it investigates the purposeful decision making and consequent actions of individuals and groups in the quest for above average performance (Porter, 2004). It is necessary to explore the subjective meanings motivating the actions of the social actors in order to be able to understand these actions (Saunders *et al.,* 2009:111).

The research will be based on semi-structured interviews which will attempt to understand the thoughts, motives, meanings and actions of the social actors, the decision makers, in their subjective reality. This inductive and exploratory approach focuses on relatively small number of cases in detail so as to gather different viewpoints on phenomena in the context of differing situations and circumstances (Saunders *et al.* 2009:126) so as to get new insights and to clarify understanding of the factors involved.

The information gathered in the interviews will be analysed to formulate theory around the research questions which will lead to identification of any causal relationships in the theory.

Competitive advantage cannot be directly observed or measured therefore the interview questions will need to consider indicators of competitive advantage that may be measured. The research will need to identify factors related to outsourcing that have a significant effect on competitive advantage. The research will also need to evaluate whether the electronics industry is capable to sustain competitive advantage. Porter (2004b:1) equates sustainable competitive advantage to sustainable superior performance and that for a firm to be able to achieve sustainable competitive advantage, the particular industry in which it operates must offer the opportunity for sustained profitability.

The research will need to identify factors related to outsourcing that can contribute to the creation of sustainable company performance that is beyond the industry norm.

This interpretive ontology assumes that the answers given will be independent of influence by the researcher, and the epistemology being that this observable data will give evidence of causality. It is intended that the inductive approach of the interviews will lead to theory with

some degree of generalisation that will assist future decision makers considering the outsourcing process.

Figure 25 is a data needs matrix which summarises the data required to answer each of the research questions, where it will come from and how it will be collected. It also summarises the reason for the question, the method of analysis and concerns about the analysis that will need to be considered.

5.0 Data collection and methods

It was decided that the best way to capture the thoughts and feelings of the decision makers was through interview, the structure being based around the reasons to outsource and what has perceived to have been achieved. It was expected that the interviewees will prefer to be interviewed as opposed to completing a questionnaire (Saunders *et al.,* 2009:324) because it is likely they will find the research subject interesting and will want to contribute their view and relate their experiences, both positive and negative. The research subject will be specific to their experience and it is foreseen that the interviewees will be interested to review the research findings, which will be made available to them.

Structured interviewing, where interviewees are given the same questions and in the same context (Bryman *et al.* 2003:116) will result in a range of specified answers and, from a quantitative perspective, can reduce 'errors' from interviewer variability. Structured interviewing using closed questions will also facilitate data processing and analysis, and will avoid misinterpretation of responses by the interviewer. The nature of this research, however, is exploratory and it was felt that closed questions will not give sufficient scope for the interviewee to express experiences and ideas in sufficient detail. It was felt that the interviewing process needed to have a degree of flexibility to allow development of the discussion to enable the interviewee to think deeply about the outsourcing process and what has been achieved, and also to allow the interviewer to probe more deeply by asking further questions that may not be appropriate in other interviews (Bryman *et al.* 2003:121).

The interview process will need some structure and to guide the process and it was thus decided that the most appropriate method for data collection will be to carry out semi-structured interviews with the key and senior decision makers in companies that have outsourced some or all of their manufacturing operations. This exploratory data collection method will gather data relating to the research questions from key decision makers.

One-to-one and, where possible, face-to-face semi-structured interviews will be used because the interviewees will need questions and themes to guide the direction of the discussion, but the process will need to have flexibility to allow responses to the initial questions to develop in a way that returns the most information and to seek new insights into what is a complex and dynamic process (Robson 2002:59).

Some questions were omitted from some interviews, other questions were generated and the order of the questions changed as each interview progressed (Saunders *et al.* 2009:320), the

purpose being to try to identify variables and to understand the relationships between them.

Semi-structured interviews will lead to a variety of responses and the progress of the interviews may take many different courses, but care was taken to ensure as much as possible that the approach to the interviews was standardised so that other researchers may understand the process and that the data collected may be analysed again and in different ways (Saunders *et al.* 2009:328).

5.1 Selecting samples

The number of companies that outsource manufacturing of electronics based assemblies is extremely large. It is impractical to question the motives of everyone and so it was considered to take a sample which represents, to some degree, the population (Saunders *et al.* 2009:212).

In practice the population is continuously changing as different firms decide to outsource, in-source, start and cease trading. It was decided to limit the sampling frame to firms:

- that currently outsource some or all of their manufacturing operations, and have been doing so for a period of more than two years
- whose products include printed circuit board assemblies
- whose annual sales revenue exceeds GBP1m per year
- based in Western Europe or the United States of America

In addition, the electronics industry can be broken down into segments as follows:

- Consumer
- Telecomms
- Computer
- Medical
- Industrial

Other segments do exist which were not considered in this research. Military and aerospace have government enforced restrictions which limit free choice and competitiveness. The automotive segment was also omitted because the approval process restricts free choice.

It was intended that interviews would be conducted with decision makers from two companies within each of the five industry segment identified above. Within each firm it was intended to

interview decision makers with differing functional responsibilities covering the factors related to the creation of Partnership Value, as summarised in the conceptual framework. It was intended to interview the following:

- The firm's leader; such as the General Manager, the Chief Executive Officer or Managing Director

- The person responsible for technology; such as Research and Development Director, Engineering Director, Chief Technology officer

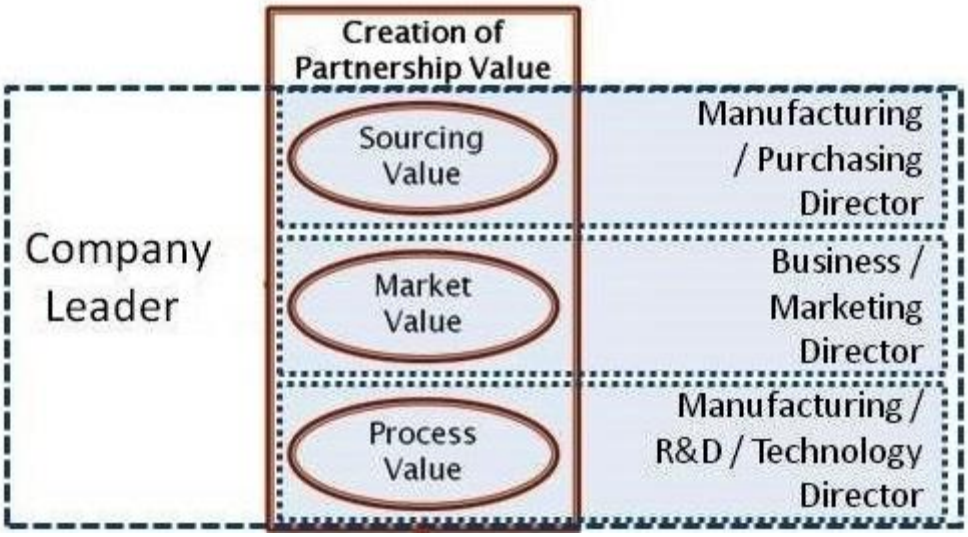
- The person responsible for procurement; such as Purchasing Director, Procurement Director, Logistics Director

- The person responsible for operations; such as Manufacturing Director, Operations Director

- The person responsible for marketing: such as Marketing Director, Business Development Director

It was expected that purposeful selection of individuals with differing responsibilities from the same organisation will give different insights into the outsourcing process and the perceived benefits. It was also expected that greater insight will be gained into each functional area from interviewees who have responsibility for that function, and also that some interview questions may not be relevant to every interviewee. It was expected that the Manufacturing and Purchasing Directors will have more insight into sourcing factors; that the Business and Marketing Directors will have more insight into market factors; and that the Manufacturing and R&D Directors will have more insight into technology factors. It was also expected that the firm's leader will have some overview of all factors. There may or may not be a difference in the view and understanding of each factor between interviewees from the same firm, and from the firm's leader. Any differences may be attributed to the amount of communication, consultation and level of agreement when the decision to outsource was made (Linstead *et al.* 2004). The relevance of responsibilities is represented in Figure 26.

Figure 26 - Relevance of responsibilities



In order to gain a different perspective on the achievement of partnership value and sustainable competitive advantage, it is intended to interview senior decision makers from contract electronics manufacturing companies. As discussed in Section 2, the contract electronics manufacturing industry is segmented into three different tiers of manufacturers based around their annual sales turnover. It is intended to interview representatives from companies within each of those tiers.

It was expected that this purposive, or judgemental, sampling based on strata representing opinions and experiences from all key areas of across the electronics industry will result in a wide range of viewpoints which have the potential to reveal information relevant to the research questions.

The final choice of interviewees was ultimately determined by those who agreed to be interviewed within the timeframe of the research.

5.2 Ethical considerations

The researcher has access to a substantial number of senior decision makers in organisations in the electronics industry that have outsourced their manufacturing.

Due to the nature of the researcher's professional relationship with the decision makers, it is considered that the researcher will have sufficient credibility to arrange interviews with key people and to gain their appreciation of the value of the research.

It is expected that the research will be of interest to the interviewees and a summary report of the findings will be produced to encourage them to fully participate.

It will be made clear that participation will be voluntary; participants will be informed of the purpose of the study, the identity and professional capacity of the researcher, and the use to which the data will be put; care will be taken to protect the identity of the respondents, should they wish to have anonymity and consideration will also be given to not disclose confidential and sensitive information (de Vaus 2006).

5.3 Collecting primary data through semi-structured interviews

Data was collected by the use of semi-structured interviews to identify common themes from the subjective views of the interviewees and was used to provide a basis for interpreting statistically significant findings to provide information to answer the research questions (Flick 2006:150).

Caution was taken to ask questions that do not lead the interviewee in a particular direction and to avoid influence by imposing the views of the interviewer. Flick (2006:150) suggests to use four criteria when designing interview questions and the interview process, the criteria being non-direction, specificity, range and depth.

Non-direction - the interviewer should refrain from making early evaluations and be non-directive in the conversation.

Specificity - the interview questions need to be specific enough to bring out the key elements of any event; a balance needs to found between being general and directional

Range - the questions need to allow the interviewee to express their opinions without restricting their views but need to capture all aspects relevant to the research questions

Depth - the questions should be designed to ensure that sufficient depth of response is achieved that goes beyond any surface level emotional responses so that underlying themes can be identified

In this exploratory research, the issues were defined and presented to the interviewees so that they would be able to respond in an open manner (Flick 2000:150). The interviewer gave some guidance, where necessary, to keep the response within the frame of the question but it was also intended for the interviewee to express their ideas and experiences freely without influence, the purpose being to find out what is happening and to gain new insights into the research topic (Saunders *et al*. 2009:322).

The interview questions were used to structure the discussions and not all questions were asked to all respondents. The questions asked were dependent on the functional responsibility, knowledge and level of expertise of each respondent.

5.4 The semi-structured interview questions

Contextual questions

- Did your firm manufacture and then decide to outsource?
- How long ago did this take place?
- To what country or region do you outsource manufacturing?
- What is the sales turnover of your manufacturing partner?
- What is the size/value of the business being outsourced in relation to your total manufacturing volume/spend?
- Are your products generally high volume/low mix or low volume/high mix?
- How does your firm compete in the market place and what are your competitive advantages?

The decision making process

- Who was involved in the decision to outsource and what was the process?
- Who were the decision maker(s)? Management level, amount of involvement, breadth and size of decision making group?
- What length of time was given for the decision to be made?
- Was there agreement, consensus and/or compromise on the decision?
- Influence of the decision makers in relation to the firm's strategic and operational management
- What was the level of formality/informality of the decision making process?

- What was the influence of company politics on the decision?
- Was it a one-time decision or is it an ongoing decision process?
- What factors were considered when the firm decided to outsource?
- What situational analysis was carried out?
- What type and how much information was collected?
- What consideration was given to internal factors?
- What consideration was given to the external competitive environment and competitive advantage?
- Would you say that outsourcing was successful? Why?

The next part of the interview concerns the factors, or strategic choices, considered when deciding to outsource

- What potential benefits and advantages were anticipated when deciding to outsource?
- What problems were envisaged or foreseen when deciding to outsource?
- How much of a consideration was competitive advantage and sustainability?
- What was the level of connection between manufacturing and the firm's strategy at the time?
- What consideration and evaluation was given to alternative courses of action?

This part of the interview concerns the experiences of outsourcing and competitive advantages achieved

- What benefits and advantages were actually achieved through outsourcing?
- Did these benefits arise from the relationship with the outsourcing partner?
- What are the negative experiences of outsourcing and what challenges has the manufacturing partnership generated?
- How is the effectiveness of outsourcing assessed?

This part of the interview concerns the relationship with the outsourcing partner and the

sustainability of the value gained in relation to competitive advantage

- What competitive advantages have been created by the outsourcing partnership and how sustainable is it likely to be?
- What level of collaboration has been established with partners?
- To what extent has the manufacturing partnership made you more agile; more flexible; closer to your customers.
- Has it brought any other competitive advantages?
- Has the manufacturing partnership brought sourcing and supply chain related competitive advantages? (Access to suppliers, raw materials, logistics, economies of scale)
- Has the manufacturing partnership brought process and technology related competitive advantages? (Access to technology - R&D, new technology, collaboration; economies of scale - automation, quality, efficiency; sharing or creation of IP)
- What other aspects of the manufacturing partnership have brought competitive advantage to the firm?
- What was the firm's competitive and strategic position before outsourcing and how has it changed?

5.5 Considerations

The researcher has experience both of being responsible for outsourcing of manufacturing; as well as being employed by a top tier global contract manufacturer.

It was expected that each interview would last between thirty minutes and one hour and was arranged at a time convenient for the interviewee. Additional time was given for the interviewee to expand as much as they wished on any particular issue and for the interviewer to probe deeper, but reminders were given to ensure the importance of commenting on all questions was understood.

Care was taken to limit bias introduced by the interviewer by limiting comments related to the experiences of the interviewer and by asking the interview questions in a manner consistent to all interviews (Saunders *et al.* 2009:326). The interviewer was known to the majority of the interviewees in a professional capacity and has in-depth knowledge of the background to the research subject, the industry and the interviewee organisations; it was therefore expected that

appropriate time and commitment will be granted to the process by the interviewees and consideration to the answers given. Each interviewee will be sent the Information and Consent Form (Appendix A).

In deciding on the number of interviews and selecting who would be interviewed it was necessary to consider the question of access. The interviewees needed to be of sufficient seniority to have the knowledge and the understanding so as be able to answer questions relating to company strategy and competitive advantage. It was necessary to secure a period of time with these senior people dedicated to the interview. All interviews were held by the use of video-conferencing, and not face-to-face due to the majority of the interviewees being located a large distance away and overseas. It was cost prohibitive to hold face-to-face interviews with the majority of the interviewees and problems would be experienced in trying to arrange travel times that coincided with the availability of both the interviewees and the interviewer. Video-conferencing is widely used in the industry due to the nature of outsourcing offshore and the need to communicate regularly and in-depth between teams in different continents and time zones. Video-conferencing is therefore a communication medium that most interviewees felt comfortable and relaxed with to allow free and open discussion.

Each interview was recorded and transcribed for later analysis.

Each interviewee will receive a summary of the research subject which will contain information relevant to the subsequent interview questions.

6.0 Findings

The semi-structured interviews will generate a mass of interwoven and unstructured thoughts and ideas that should contain information that answers the research questions. The answers to the interview questions was transcribed and resulted in pages and pages of data. The analytical task is to give structure to this data so that it is manageable, to find associations and relationships and to draw conclusions from it.

Ritchie and Spencer (1999:176) state that "qualitative data analysis is essentially about detection", that is detection of associations that can lead to theories. Ritchie and Spencer (1999) also postulate that the analysis should allow certain functions to be performed as follows:

- defining concepts, understanding internal structures
- mapping the range, nature and dynamics of phenomena
- creating typologies, categorising attitudes, behaviours and motivations
- finding associations
- seeking explanations
- developing new ideas, theories or strategies

There are numerous ways to analyse qualitative data, there being no right or wrong way, but "Framework" (Ritchie *et al.*1999), has been developed as a systematic method to perform qualitative data analysis incorporating the functions listed above. Framework gives a logical flow of stages of analysis, but these stages again are interconnected and the process is iterative.

This first stage is to become familiar with the range and diversity of the data and gaining an overview of the material gathered (Ritchie *et al.*1999:178). The familiarisation stage will treat all factors with equal importance as the significance of each factor is not yet known. The conceptual framework developed in 4.2.3 will be used as a guide through the familiarisation process.

The factors identified in the familiarisation stage will be used to give an initial coding of the interview data. This initial coding will then be reviewed to identify main themes in relation to the research questions, which will be summarised in the thematic framework. "The thematic framework is used to identify the key issues, concepts and themes according to which the data can be examined and referenced" (Ritchie *et al.*1999:179).

The next stage is to code, or index, the data and organize into different categories. The data can then be reorganized so as to highlight similarities and differences from which theories can be generated, in relation to the research questions.

The next stage was to consider the range of attitudes and experiences to build up a picture of the data as a whole (Ritchie *et al.* 1999) by rearranging the data into thematic charts. The data will still retain its context and be in the language it was expressed. This will facilitate later analysis as the charts bring together the data from the interviews and lists them, in the relevant categories of the Thematic Framework, on one page for each theme.

The final stage is to map and interpret the data so as to be able to prepare descriptive accounts, to identify key dimensions and to map the range and diversity of each phenomenon (Ritchie *et al.* 2006:214). This involves moving from the original interview texts to descriptive categories based on the key dimensions, or factors, identified in the analysis.

Telephone and video interviews were conducted using Skype software combined with Amolto Call Recorder to record the conversations. NVivo software was used to collect, organise and analyse content from transcription of the interviews.

6.1 Types of Organisations and Profile of respondents

6.1.1 Outsourcers

A total of seventeen interviews were held with key decision makers in nine firms who have outsourced their manufacturing. The profile of the decision makers and the firms are summarised in Figure 27. The decision makers are located in firms in the following markets, as identified in section 5.0:

- Consumer 2 firms 4 decision makers
- Telecomms 2 firms 5 decision makers
- Computer 2 firms 3 decision makers
- Medical 1 firm 1 decision maker
- Industrial 2 firms 4 decision makers

The annual sales revenue of each company ranged from USD12m to USD250m and outsourcing rate ranged from 5% to 100%. Those that outsourced 100% did not have internal manufacturing from the company inception, they had always outsourced 100%. The majority of companies

outsourced to both local and overseas (offshoring) suppliers; and all had either a global or at least Europe wide market place. The majority outsourced high volume and low mix products and first outsourced between 10 to 20 years ago.

Interviewees cited service, support, technology and quality as their firm's strategy for competing in the market place. Only two of the interviewees cited low price as their firm's competitive strategy.

Each interviewee was given a reference code which will be used to identify responses in the data analysis section. The above information is summarised in Figure 27.

Figure 27 - Profile of outsourcers

SECTOR	COMPANY	SALES REVENUE 2012 (USDm)	% OUTSOURCED	COMPETITIVE STRATEGY	OUTSOURCE LOCATION	PRODUCT MIX	MARKETS	SOURCING VALUE	MARKET VALUE	PROCESS VALUE
CONSUMER	A	55	80	SERVICE AND SUPPORT	UK + EU + ASIA	HIGH VOLUME LOW MIX + LOW VOLUME HIGH MIX	UK + US	A2. PURCHASING MANAGER		A1. TECHNICAL DIRECTOR
	B	20	50	TECHNOLOGY / LOW COST	EU + CHINA + MALAYSIA	HIGH VOLUME LOW MIX + LOW VOLUME HIGH MIX	WORLDWIDE	B1. OPERATIONS DIRECTOR B2. MANAGING DIRECTOR		
TELECOMMS	C	250	95	TECHNOLOGY VALUE PROPOSITION, SHORT LEADTIME	ASIA + EU	HIGH VOLUME LOW MIX	WORLDWIDE	C1. GENERAL MANAGER C2. PURCHASING MANAGER	C3. BUSINESS MANAGER	
	D	12	100	TECHNOLOGY / FIRST TO MARKET	TAIWAN + MEXICO	HIGH VOLUME LOW MIX	WORLDWIDE	D2. MANAGING DIRECTOR		D1. PROJECT MANAGER - OUTSOURCING
COMPUTER	E	80	100	LOW PRICE	CHINA	HIGH VOLUME LOW MIX	WORLDWIDE	E1. PURCHASING MANAGER		
	F	20	100	SERVICE AND SUPPORT	UK + MALAYSIA + CHINA	LOW VOLUME LOW MIX	EU + ASIA	F1. PROCUREMENT DIRECTOR	F2. SALES DIRECTOR	
MEDICAL	G	25	90	QUALITY PRODUCT / REPUTATION	IRELAND + MALAYSIA + CHINA	HIGH VOLUME LOW MIX	WORLDWIDE	G1. GENERAL MANAGER		
INDUSTRIAL	H	18	5	QUALITY PRODUCT / SERVICE, SHORT LEADTIME	UK + EU + ASIA	HIGH VOLUME LOW MIX	EU	H1. MANAGING DIRECTOR		
	I	48	90	TECHNOLOGY	ASIA + UK + SWEDEN + USA	HIGH VOLUME LOW MIX + LOW VOLUME HIGH MIX	WORLDWIDE	I1. PURCHASING MANAGER		I2. R&D MANAGER I3 .TECHNICAL DIRECTOR

In summary, interviews were conducted with a range of respondents from different industries who outsource a variety of products and quantities. It was considered that this wide range of views and opinions will give some degree of representation of the population by exploring and gathering information from each sector (Saunders *et al.* 2009:212).

6.1.2 Manufacturers

Interviews were conducted with representatives of three contract manufacturing companies.

Tier 1 - Interview with Business Development Director of firm with sales turnover of more than USD2bn. Headquarters in Taiwan with global manufacturing locations.

Tier 2 - Interview with Customer Director of firm with sales turnover of more than USD250m. Multiple manufacturing locations in different countries in South-East Asia.

Tier 3 - Interview with Business Development Director of firm with sales turnover of approximately USD20m. Single manufacturing location in Asia.

6.2 Response to the research questions

6.2.1 *'To what extent do decision makers consider competitive advantage when deciding to outsource?'*

As discussed in section 4.1.1, there are two major factors to evaluate when considering the outsourcing decision, these are the decision making process itself and the strategic choices available. The factors related to strategic choice and the decision process deduced from the literature are illustrated in Figure 8, The Outsourcing Decision Framework.

6.2.1.1 The decision making process

Nine of the seventeen outsourcing interviewees stated that the decision to outsource was made at Board level. The majority also stated that the driving force to outsource was from either the Managing Director or the Engineering Director. Interviewees whose firms had made the decision to outsource at Board level also advised that there was a linking between the manufacturing strategy and the firm's strategy as a whole. The outsourcing of manufacturing was linked to expanding product ranges, penetrating new markets, as well as for cost and overhead reduction to enable competitiveness for both new and old products.

The decision process was found to be very formal, with a structured and rigorous procedure evaluating different options. Three interviewees advised that their firm's undertook benchmarking of their capabilities, quality levels, ability to deliver and internal costs compared to outside suppliers. Those that had always outsourced production did so because they could not justify the investment for internal manufacturing, or did not have the capital available, or decided that manufacturing was not a core competence.

In general, the decision to outsource was reached by consensus with very little opposition at Board level. Interviewees from six firms advised that there was some resistance from managers and from shop-floor workers. This resistance came from those who felt their future

employment could be under threat and was a result of uncertainty of their future. In reality, most workers became involved in the outsourcing of the manufacturing and were redeployed to alternative functions within the firm, although it did lead to redundancies in most cases. The majority of employees understood to some extent that it would be necessary to outsource some or all of the manufacturing. One interviewee mentioned that a compromise was reached about what products would be outsourced and that some products would remain in-house, the firm continued to manufacture products where there was some sensitive IP and outsourced the rest. Another firm outsourced products where the most cost savings could be achieved, for example where there is greater labour content or where the supplier can achieve better cost reduction on components. Another consideration was the amount of training that was required to build the product, as well as the number of prototype runs. None of the firms involved in this study had any issues with unions

Two firms made some kind of evaluation of their competitive position when considering the outsourcing decision. Three firms also used outsourcing to change the emphasis of their business and extended their product lines to be able to service new markets. This included working with partners who could introduce new products without disturbing the current in-house manufacturing, as well as working with manufacturing partners to fabricate the current product range, which is typically stable in design and steady volumes, whilst the firm invested in new high-end technology and production techniques internally to develop and manufacture more sophisticated new products. One firm made the decision to extend their product range by having the manufacturing partner make parts for which they had no in-house capability or capacity, it was not possible to manufacture the new products competitively in house due to overhead and investment costs and the time it would take to get the product to market. Outsourcing and using a CEM made it possible with no investment in capital equipment and associated support costs, and with minimal time to market. Outsourcing has also been used as a means to reduce in-house overheads and to free up business premises for sale.

All but one firms discussed outsourcing as a proactive decision as part of a strategic plan for growth of their organisations. Four firms also outsourced part of the design process as well as manufacturing. In these cases, the outsourcing decision was a pro-active decision based on situational analysis to free up resources to develop new products, and to reduce costs of mature products as well as to enable the production of new products under shorter lead-times and lower costs from the outset. These firms saw outsourcing as a way to move to new markets or

expand their product offering and therefore expand current markets, this in turn would lead to increased market share. The decision making process typically took between three and six months, although one firm took two years to complete the process.

On firm mentioned outsourcing was a reactive decision, mainly in an attempt to recover market share through cost reduction. Outsourcing was seen by some as a 'last chance' option for survival to keep the business going and, in these cases, the decision making process was much shorter, which reflects the urgency of the situation and the need for action to ensure survival.

Interviewee C1 realised that their current products had limited life and decided to outsource these to make way for the development and production of new products. In fact, one firm decided to outsource mature and steady running products to enable them to introduce new products and new technology utilising the capacity and equipment of their own factory.

Two interviewees also discussed the concerns and objections they had encountered during the decision making process in relation to outsourcing and these were mainly to do with quality of service and product, delivery times and also to do with intellectual property (IP) protection. Interviewee E1 expressed concern about signing a contract with a Chinese firm and whether any such contract had any legally binding validity.

Reasons to outsource cited include:

- cost reduction (interviewees B1, C1, C2, C3, D2, E1, F1, F2, G1, H1)
    - lower labour costs
    - lower overheads, margins
    - capacity utilisation
    - lower material costs
- focus on core competencies, outsource non-core to specialists (interviewees A1, B2, C1, D2, E1, F1, H1, I1)
- to increase capacity overall (interviewees A1, F1, H1, I1)
- capacity, increasing capacity internally requires capital investment and the automated equipment required may have capacity far beyond the needs of the firm thus inflicting an under-utilised burden and overhead on the cost of production (interviewees A1, F1, H1, I1)
- to capture new market opportunities with minimal investment (interviewees C2, G1, I1)

- regain market share, increase profit margin (interviewees C1, C2, C3)
- unable/unwilling to invest in internal manufacturing capability (interviewees C2, G1, I1)
- releasing capital (interviewees B1, B2)
- current building constrained / preventing expansion (interviewees B1, B2)
- capital investment and support costs prohibitive for internal production (interviewees B1, B2)
- technology shift (interviewees A1, C3)
- automated equipment for volume, cost reduction and quality (interviewees B2, i3)
- outsource mature stable and high volume products to free up internal capacity for higher value, higher margin, and higher technology new products (interviewee C1)
- to facilitate growth (A1)
- to take advantage of supplier's approvals and qualification (interviewee C1)
- utilisation of partner's capabilities to increase product range at minimal cost (interviewee A1)
- reduce time to market through existing capacity utilisation (interviewee A1)
- to increase design capacity (interviewee F2)
- to give temporary capacity and flexibility to cover peak demands and fluctuations (medium size manufacturer)

6.2.1.2 Strategic choices available

It became clear from the interviews that there are three distinct positions with regard to the manufacturing strategy of firms that outsource, it will be necessary to consider each of these positions in relation to the research question. The positions are:

- the firm had internal manufacturing and has decided to outsource all of manufacturing capabilities (firms B, D)

- the firm that still has some internal manufacturing capability and outsourced some manufacturing operations (firms A, C, G, H, I)

- the firm that has never had internal manufacturing capability and has always outsourced all manufacturing operations (firms E, F)

Other positions such as firms that have never outsourced and firms that did outsource but have brought manufacturing back in-house are not considered in this research.

Interviewees from firms that had internal manufacturing and have subsequently outsourced all manufacturing operations stated that they had done so by outsourcing certain operations first, then others later or, in one case, sold their entire manufacturing facility to another firm for them to operate.

Interviewees from firms that outsource some manufacturing and retain some internal capability stated that they tended to outsource mature and relatively high volume products and to keep internal manufacturing of low volume products, custom products and those with a high number of variants.

It was found that firms that have never had internal manufacturing tend to be younger and have a strong emphasis on product design and innovation. The investment, support and infrastructure needed for the set-up costs to manufacture can be beyond reach for many young and start-up companies, and the low costs and economies of scale enjoyed by contract electronic manufacturers with equipment suited to high volume throughput are not achievable by the relatively low volume production lines of in-house manufacture. The contract electronic manufacturers share their resources with other customers and so the overhead burden is also shared.

Interviewee C3 expressed the need for their firm to develop new technology and to outsource their current production which is stable and mature. A goal for the outsourcing of this mature product was also to reduce costs and therefore prolong sales by reducing prices. This outsourcing of mature products enabled some firms to re-position their product offering and to develop new products using new technologies and consequently to penetrate new markets or to drive growth of existing products. Interviewee C3 stated "we had mature product line with mature technology and we wanted to move the factory onto higher value, newer markets, with different kinds of technology. Our current products had limited life and could not ensure sustainable growth". A key consideration in the selection of a suitable partner is how that partner may help contribute to the future strategy of the firm. This firm outsourced mature telecomms product to enable the introduction of higher technology products for the medical market. The core competence of the firm is leading edge electronics production and the mature products were all using old technology. Three firms outsourced production processes which require very high value automated equipment. The equipment also has very large capacity, far

in excess of the requirements of the firm and so, if purchased by the outsourcer, would place unacceptably high overheads on all production. The manufacturing operation performed was a niche operation that other firms had been specifically set up to perform. This operation was not a core competence of the firm. The outsourcing of mature product could also be considered to be part of a process of focusing on core competencies.

Interviewees from three firms discussed their consideration of how they compete in the marketplace. Some compete on costs, others on servicing niche requirements and customised products, these include late stage customisation. One firm competes by offering lower grade product at lower price. In one case the firm competes based on quality, reputation and reliability. Extreme care and consideration will need to be given to ensure the customer experience is no different to when the product was being manufactured within the firm, before outsourcing.

It was found that all interviewees had decided, to some degree, to evaluate the suitability of potential partners before making a decision on where to outsource. Factors considered when making the evaluation include:

capability - interviewees A1, B2, C1, F1 and H1 stated that the outsourcing partner will need to have the capability and capacity to make the required product, this includes technical capability with the required equipment. Some interviewees preferred to have a partner who had experience of similar products and also partners that could perform a complete turnkey service to deliver a finished product.

intellectual property (IP) - interviewees C2, G1 and I3 discussed having non-disclosure agreements with manufacturing partners manufacturing as well as for joint development of products. Another interviewee, G1, stated that they could not outsource some products because their customer insisted that they manufacture it in their own factory because of concerns over IP protection.

location interviewees F1, G1 and H1 stated that they have outsourced to partners in the UK, the rest of Europe, Asia and Mexico. Locations were selected based on relative costs, where the end customer is located, local and national infrastructure and supply chain.

relative size - interviewees B1, C1 and F1, as well as the Tier 2 manufacturer, stressed the need to find manufacturing partners who were of a suitable size. If the partner was too

big then the outsourcer would have very little power or influence and would not get enough attention, if the partner was too small then the outsourcer's business could be too large a percentage of the manufacturers business and make them unstable. If the manufacturing partner was too small, then it may not be competitive in terms of sourcing and economies of scale.

approvals – interviewee G1 required their products to be built in facilities which have been approved to certain industrial standards. In every case, the outsourcer required their partner to have ISO9001, other approvals required include TS16949 for automotive related products and ISO13485 for medical related products. Interviewee C2 was aware that transfer of production to another manufacturing site, and in a different country, may require a requalification of the product. Whether this would be economical or not depends on stage in the product life-cycle.

service - interviewee C2 considered their ability to service their customers after outsourcing and using a manufacturing partner. Interviewees took into consideration such factors as cycle times and potential lead-time for delivery when considering a partner. Some interviewees discussed service level agreements where performance targets were set

technology roadmaps - interviewee C2 considered the match between his firm's technology roadmap and that of the manufacturing partner.

culture - interviewee G1 stated that they considered cultural, as well as language, issues when making their partner selection.

potential competition - although some interviewees stressed that they prefer a partner who has some experience of making similar types of product, other interviewees preferred to have a partner who had no experience of that particular technology because they had concerns about IP protection and whether the supplier could potentially become a competitor or the supplier could leak IP to the Firm's competitors.

Choice of supplier can also be determined by the type of relationship that can be established between the two firms. Interviewee B2 selected a partner because it was found that communications could be established at all levels and with all functions of the manufacturing partner, "If there is a problem then I know I can talk directly to the guy that is making them and

get an answer. That is crucial when you subcontract overseas. Relationship and communication has got to be good... The interviewee felt that a true partnership could develop with future collaboration on product developments. Interviewee C1 also emphasised the need for good relationships and found a partner who had the required capabilities and managed to sign an exclusive contract with the partner which prevented them from working with the firm's competitors. C1 stated that if there are a "limited number of suppliers who qualify to build your product and your competitors products and you secure the best one then you could secure an advantage".

Strategic choice is limited by technology, if the supplier does not have the required technology and experience then they are not going to be able to supply without investment and possibly extensive training. Interviewee C1 advised that their manufacturing partner was chosen due to their focus on quality and their reputation, not because of lowest cost.

Interviewees B2, C1, C2, C3, D2, E1, F1, F2, G1 and H1 all considered their relative costs when determining where to outsource. Some chose the lowest cost, whilst others considered other factors to be more important. Some interviewees deeply analysed their internal manufacturing costs and found that the product could not be competitive unless it was outsourced to lower cost locations. Two interviewees found that the product had a market price and the only way to achieve that price was to outsource. The transaction costs of manufacturing internally were prohibitive for the product to be able to compete in the marketplace. Others found that transaction costs were increasing whilst the sale price of the product was reducing, therefore profits would reduce unless a lower cost manufacturing operation was utilised.

6.2.2 '*What competitive advantages, or partnership value, can be created by and can be attributed to the outsourcing partnership*?'

As discussed in section 4.2.3, this research question assumes that competitive advantage can be created by the partnership and makes the distinction between long-term strategic partnership values, which can only be achieved through the relationship, and benefits achieved from other factors such as short term cost savings and fortuitous events. Using the Partnership Value framework (figure 28) as a guide, the data gathered from the interviews was collated and broken down into three considerations: what advantages or 'value' can be created by sourcing factors, market factors and technology factors.

6.2.2.1 Sourcing factors

Respondents cited several factors related to sourcing that potentially gave them some advantage from the outsourcing relationship. One major area of discussion was the establishment of geographical centres of excellence for the development and manufacture of certain types of products. Complete supply chains and supporting infrastructure has been established in specific areas in the outsourcing region related to specific products giving access to manufacturing and design expertise, equipment, raw materials and sub-suppliers not located together in other areas. Interviewee A1 discussed Xiamen in China which has become "a shower city" where "there is a level of expertise in all the things that we want and all close to hand" and Interviewee E1 talked about a tablet computer product where "within one kilometre you have a board maker ..... and you have a semiconductor guy at the other end of the street. You have everything concentrated there. If you want to develop a tablet and you do not want to do it in Shenzhen then it will be much more complicated and the costs cannot be achieved".
These geographical areas of expertise provide a highly cost competitive source for specific products and have increased the barriers to having similar products built economically anywhere else.

In terms of the sourcing of raw materials and component parts, interviewees reported to have capitalised on the relationship in the following ways:

- utilising the manufacturers relationship with their sub-suppliers to source generic components at much lower cost
- utilising the manufacturers relationship to ensure continuity and security of supply of key components which are on limited allocation, for example Interviewee E1 requires hard to secure chipsets for MP3 players
- utilising the manufacturers design capabilities to optimise the product so it can use lower cost and shorter lead-time components and materials only available in the region of manufacture. Interviewee F1 had a keypad redesigned to use Malaysian materials and had it produced locally "at a fraction of the cost". Some materials are lower cost to purchase in some regions than in others, interviewee A1 cited plastic materials as an example of a material lower cost in Asia than elsewhere. In another case, the Tier 2 manufacturer discussed their suggestions to improve the design by recommending different materials

and/or materials only available in Asia, it was preferable if the outsourcer designed in materials that are available locally and specified by the manufacturer. Early involvement in the design process can produce benefits in terms of reduced lead-times, cost reduction and better product performance.

- designing in materials recommended by the manufacturer, which are being used by their other customers brings about greater economies of scale, reduces lead-times and improves availability. Interviewee F1 stated that manufacturers "can spread the cost of high MOQ's to many customers whereas if you do it in house then you cannot do that. It is definitely a benefit to go to a CEM for that reason".
- working with the manufacturer to get the best overall material prices by comparing their costs in their region with prices secured by the outsourcer. By adopting a partnership type arrangement, there were many instances of the manufacturer and the outsourcer working together to minimise the cost of materials by combining the best pricing for each component sourced in each region.
- Interviewee A1 said that they had met with their manufacturer's supplier of sub-assemblies and components so as to get confidence on the supply chain and the performance of the product. Sourcing from local suppliers can bring cost reduction through simplified supply route, lower cost material and lower cost labour to product sub-assemblies. Also, the manufacturer may be sourcing the same material for other customers and so the outsourcer gets the benefit of the economy of scale for doing this.
- The Tier 2 manufacturer stated that they worked with their customers to develop expertise in materials to give better performing product at lower cost. This may be better reliability, longer life, longer lasting colour or better biodegradability.
- Interviewee G1 said that the cost saved by sourcing consumable items in Asia gave them a huge competitive advantage.
- Interviewee F2 found that the manufacturer had much better relationships with material suppliers and were able to secure much shorter lead-times because of the manufacturers influence, especially at times when materials are in short supply, stating "when materials are in short supply they....can get materials at shorter time than we can". Interviewee C1 also stated "twelve weeks as a standard lead-time.....and we managed to get that down to two weeks in the end and that was shorter than any of the competitor lead-times

- access to suppliers of the manufacturer enabled Interviewee E1 to improve their product by giving access to materials and components not otherwise available and not previously known to them, we got some new ideas for purchasing and sourcing, and then we met new suppliers and this has helped us also to improve our in-house design of products.
- Using the services of a manufacturer in a particular region has given many outsourcers access to suppliers of sub-assemblies that they would not otherwise have. The manufacturer manages these sub-assembly suppliers and guarantees their quality. Interviewee A1 found access to the largest manufacturer of heating coils in Asia who was working with their chosen manufacturer. The heating coil manufacturer would not supply A1 in Europe and it would not be feasible for the outsourcer to manage a multitude of suppliers in Asia, but it was feasible for the manufacturer based in Asia to do this.
- Interviewee A1 stated that their manufacturer had introduced them to suppliers of sub-assemblies that they would never be able to find. The use of local partners of the manufacturer makes a real contribution to cost reduction and improved manufacturability of the product
- Interviewee F1 stated that they had learnt how to design and develop their products utilising the best material suppliers from the region of their chosen manufacturer. “A key mat assembly…. designed and manufactured in the UK originally bur when we moved it to Malaysia they tweaked the design and produced it locally at a fraction of the cost”.
- in some cases, A1 and B2, the outsourcer has introduced their sub-assembly suppliers to the manufacturer, establishing new links and partnerships in the region, and in one case the outsourcer has regular meetings with the sub-supplier to develop new ranges of products.

Interviewees C1 and E1, as well as the medium sized manufacturer stated that the manufacturer was considerably larger than the outsourcer, with correspondingly larger material spend. The outsourcer is able to utilise the manufacturer’s purchasing power and economies of scale to reduce material costs. All interviewees stated that the manufacturer took responsibility for sourcing of materials and the supply chain, thus reducing outsourcer’s overhead costs. In some cases, the manufacturer sources some materials from the outsourcer or from the outsourcer’s suppliers in their local region, but the manufacturer still manages the supply chain. In some cases, the manufacturer supplied materials to the outsourcer for other projects.

Many factors were cited relating to improvements in logistics, both in terms of materials supply and in terms of shipping of manufactured product. These are as follows:

- The Tier 2 manufacturer highlighted the importance of logistics and that the supply chain was becoming a more important factor than the actual manufacturing itself, the interviewee stated that firms that focus on the development of a complete and strategic supply chain are likely to find more benefits through outsourcing than those that focus purely on production.
- interviewees B1 and C1 found that sourcing from offshore can add significantly to the cost of supply if the product has to be shipped back to them but benefits can be achieved if the product can be drop-shipped to the end customer by the manufacturer.
- the Tier 2 manufacturer commented that they carry stock of raw materials, WIP, partly finished and fully finished goods to enable their customers to reduce lead-times
- Interviewee B1 moved their warehousing and logistics function offshore, they achieved cost savings by performing this logistic function in the region of their manufacturer where all costs are lower, including land and warehouse space. Utilising the manufacturer's logistics expertise also allowed the outsourcer to learn about local logistic issues.
- Interviewee A1 stressed the benefits of late point customisation, where standard products are built in bulk and then customised to order at the final stages of production. This allows shorter lead-times and reduces stock holding by the outsourcer and the manufacturer. These benefits can only be realised if the product has been designed for modularity. The product was also drop shipped by the manufacturer to the end customer in the same region. The materials and finished product stock, the work in progress and the lead-times are all minimised. Interviewee A1 said "we have got to find ways to manage the outsourcing through clever logistics and late point customisation, and that goes back to modularity and that goes back to design".
- the 'centres of excellence' described at the beginning of this section greatly reduce the logistics of the supply chain by having everything in one place, also reducing costs and lead-times
- The Tier 2 manufacturer discussed a case where they built a factory next to the outsourcer's production facilities to supply sub-assemblies and part finished product. This reduced lead-time and cost. "This required an extremely good relationship and financial commitment

which had developed over many years, but will take away cost from the outsourcer and reduce lead-times". This was referred to as 'the supplier next door'. In this case the manufacturer holds the majority of the stock and WIP delivering sub-assemblies 'just-in-time' for use on the outsourcer's production line.

- The Tier 1 manufacturer said "many of our customers have an office inside our company where they run their ordering and logistics, these have developed over many years of working closely with our customer. This builds relationship and trust between the outsourcer and the manufacturer.

Economies of scale was a theme of a further selection of factors. The manufacturer can achieve market economies of scale not achievable by the outsourcer because they offer a service to many others. This will include bulk purchasing of materials, access to raw materials and sharing of capacity on high volume machines. Also economies of scale of the complete product supply chain infrastructure in one area.

Supply chain collaboration was cited by B1 and the Tier 2 manufacturer as a source of competitive advantage. The ability to source materials at the lowest cost by combining the sourcing of materials in two different geographical markets as well as being able to secure supply from component manufacturers who work on allocation of scarce materials. This results in the lowest cost and maximises manufacturing volume by securing supply at the lowest cost.

Manufacturing know-how – a manufacturer emphasised the value of working with them, an outsourcer gets the manufacturing know-how as well as cost and sourcing benefits. Manufacturing is becoming standardised and a manufacturer needs to excel in other areas of service to capture and retain business. For example, logistics and supply chain benefits could differentiate a manufacturer from others who have the same production capabilities. An outsourcer referenced the bigger pool of knowledge available from a firm dedicated to manufacturing and supply, the outsourcer can learn a lot from the manufacturer. The outsourcer may not have manufacturing knowledge of all processes required to build their product and should choose a manufacturer who can provide a complete service, or engage with more than one manufacturer. In more than one case the manufacturer manages the complete production process and subcontracts processes they cannot do in-house.

Summary of sourcing factors

This section identifies the key dimensions of the data above and moves away from the original

interview texts and groups the factors into descriptive categories (Ritchie and Lewis, 2006, p.214). The factors were rationalised and are listed in the table below to give a clear summary. This series of points will be used for later analysis:

FACTOR	SUB-FACTOR
Access to suppliers	- able to source generic components at much lower cost, lower storage cost, shorter lead-times and with security of supply - reduced outsourcer's material overhead cost - access to materials only available in the region of manufacture - centres of excellence with established supply chains, infrastructure specific to products giving access to manufacturing and design expertise, equipment, raw materials and sub-suppliers not found in other areas. - collaboration on quality approvals and product design
Access to raw materials / components / sub-assemblies	- manufacturer took responsibility for supply chain management - manufacturer supplied materials to outsourcer for other projects. - collaboration to minimise the cost of materials by combining the best pricing for each component sourced in each region. - material economies of scale through manufacturer bulk purchasing the same material for other customers - secure supply from component manufacturers who work on allocation of scarce materials
Design for material supply	- manufacturer improved design utilising new/alternative materials - early design involvement to optimise materials - cost reduction through simplified supply route, lower cost material and lower cost labour to produce sub-assemblies by using local sources

	- cost saving by local sourcing of consumable items - secure shorter lead-times for materials - design for new materials and components not otherwise available - access to suppliers of sub-assemblies not otherwise available - develop products utilising the best material suppliers from the region of manufacture - establish new links and partnerships in the region
Logistics	- access to expertise and lower cost global supply network / infrastructure of bigger partner - manufacturer's logistics costs lower in lower cost countries - move outsourcer's logistics and warehousing offshore to save cost - late point customisation for shorter lead-times and stock reduction - centres of excellence reduce supply chain and lead-time - drop ship product by manufacturer to end customer - manufacturer carry stock of raw materials, WIP, partly finished and fully finished goods to enable outsourcer to reduce lead-times - manufacturer's 'factory next door' to outsourcers production facilities holds stock, WIP, delivering sub-assemblies 'just-in-time'
Access to capacity	- shared use of high volume and high productivity equipment - investment made by the manufacturer

6.2.2.2 Technology factors

Interviewees A1, C1, C3, F1, as well as the Tier 1 and Tier 2 manufacturers, stated that the manufacturer had used their knowledge to improve the design of the outsourcer's product, both in terms of performance and in terms of manufacturability which has led to reduced cost and improved reliability of the product.

Factors related to intellectual property (IP), utilising the manufacturers IP and jointly developing

new IP

- Interviewee E1 advised that “we learned how to make our in-house developed tablets cheaper and they learned from us how to make their products more advanced”. Interviewee E1 learnt a lot from how the manufacturer produces the product which has led to improving the design. Interviewee B2 enthused about how he had improved his knowledge of manufacturing and has brought back ideas to implement on their final production line in their own factory, “I have learnt especially a lot from the way they do their in-house manufacture…… setting up lines and that side of it has been a real help, I have really learned a lot which I have been able to bring back and put in place here”.
- In several cases, outsourcing companies have developed joint IP with their manufacturer that is specific to their product and agreements are in place to ensure as much as possible that the IP remains secure. Interviewee E1 stressed “we had joint development, we tried to keep our IP and also tried to protect ourselves with contracts”. In one case, the manufacturer has given new ideas and new perspectives on a product enabling the outsourcer to improve their product design. Both sides have IP. The outsourcer has product design and development IP and the manufacturer has process and manufacturing IP The Tier 1 manufacturer has “joint IP with customers and we also have our own IP and the customer has their own IP”.
- Interviewee A1 used the manufacturers IP in their product and the manufacturers tooling for certain components which saved the outsourcer investment in tooling and R&D and gave them protected functionality in their home market, and gave the manufacturer a product using their own IP for sale in their own market. “they have basically done the design and we have part funded the tooling with them…. It was their IP, it was our design”. Interviewee A1 used their manufacturer as an affordable way to develop a range of products to complete their range offered to customers “we cannot afford to invest in the R&D …… I a range of different types of technology, for digital we are the world leaders so we had to invest in that, after you have done that there is very little left” to complete the product range.
- The Tier 1 manufacturer has developed joint IP with some of their larger customers. They have their own IP, the outsourcer has their own IP, and there is jointly developed IP. In one case product was developed between the outsourcer, the manufacturer, and the outsourcers end customer.

- The Tier 1 manufacturer stated that to achieve long-term strategic advantage requires a real strategic alliance. “There must be trust and credibility” between the partners for the relationship to be successful. Developing joint IP, using joint development and sharing of knowledge is essential for success, it is a two-way low of information. Nevertheless, collaboration agreements and contracts need to be in place to ensure both parties understand the boundaries of what they are doing and what can and cannot be done.
- In all cases, contracts and agreements had been put in place which detailed the intent for the use of either sides IP and the limitations of that use. One outsourcer said that IP can be protected through contract but better to build trust and credibility through a longer term partnership for protection to be effective. Interviewee E1 advised “the best way to protect ourselves with the Chinese was with a partnership”.
- Interviewee B1 discussed how IP was jointly developed and the outsourcer could utilise it in their local market and the manufacturer could utilise it in their local market. The IP is effectively shared according to the market it is being sold to.

The IP of the outsourcer tends to be product design IP whilst the IP of the manufacturer tends to be manufacturing or process related IP. The manufacturers IP could relate to an area of expertise not used by the manufacturer, who then learnt about new process and learnt new capabilities based on the new technology.

Factors related to access to technology

These factors tend to relate to the usage of high volume assembly and test equipment that requires large investment and has capacity far in excess of the needs of any single outsourcer but can be utilised for more than one customer by the manufacturer.

- Interviewee C1 discussed their extensive and expensive test set-ups which can significantly reduce test times and consequently costs, for the outsourcer without having to invest in the equipment.
- Interviewee B2 stated that he had learnt from the manufacturer how to make products at lower cost and applied this knowledge to their internal production of other products
- Many outsourcers have gained access to technology that would not otherwise be available to them by utilising the services of a contract manufacturing firm, interviewee C2 stated

"we do not have the scale to do that kind of thing and obviously others have capabilities that we would use" and Interviewee B1 "without too much investment!". The Tier 2 manufacturer "invested significant resources into developing our customers' product for manufacturability and reliability". This has been through both formal and informal arrangements. This has brought benefits to both parties as increased yields and throughput times have reduced costs to all concerned.

- Some manufacturers have technology and processes which are not available at the outsourcers facility, the investment may have been too large and unable to justify in relation to forecasted requirements, and there is the initial capital cost to consider as well as the ongoing maintenance and support. Interviewee C1 advised that their manufacturer had processes that are "not available from other subcontract vendors who had standard processes". The Tier 3 manufacturer noted that "some manufacturers had equipment specific to the manufacture and testing of certain types of products that is not available to others".

- The Tier 2 manufacturer had developed a complete production line with many unique processes for the manufacture of one product for one particular outsourcer, and agreement was reached to dedicate this line to this customer and joint investment was made to purchase the equipment, "what we did…. was weird and wonderful and very clever". The outsourcer paid a raised unit price to cover the cost of the investment made by the manufacturer. The Tier 2 manufacturer also advised that can use the funds saved to invest in other things and that "the long term sustainable advantage of outsourcing is more to do with what you do with the money that you did not have to spend on manufacturing or logistics" and "to use these resources that you have freed up wisely to give yourself an edge in the marketplace".

- One outsourcer stated that their manufacturer gave them access to technology, processes and manufacturing equipment which was not available internally and "a limited number of suppliers …..can build your product and your competitors product and you secure the best one then you could secure an advantage".

- The manufacturer has generally more experience in specific processes than the outsourcer and one case cited advice was to given to lower cost, increase reliability and to provide other advantages

- The Tier 2 manufacturer has their own advanced testing facilities which offer automated test for a multitude of products at very low cost, much lower cost than the outsourcer could achieve elsewhere.

Outsourcers are able to utilise equipment that has far greater productivity and capacity than they could utilise if they had the equipment themselves. This capital equipment overhead can be amortised over many different customers by the manufacturing firm. Outsourcing has significantly reduced capital investment and associated risk by the outsourcer.

Factors related to joint process development can bring benefits to both capability and to productivity

- Manufacturers stated that they had established production lines dedicated to one outsourcer. This ensures availability of capacity and, in the case of the Tier 1 manufacturer, "trained staff dedicated to the product". The Tier 1 manufacturer had a "production line in a secure area away from other visiting outsourcers and limited access to other manufacturer's staff", this gave increased security of the outsourcers IP.
- Interviewee C1 said that they had a "dedicated production facility within their factory" effectively set up their own manufacturing facility within the manufacturer where unique processes had been implemented and their production was taking place in a security controlled room, and with one of the C1 employees overseeing the production.
- The Tier 2 manufacturer discussed exclusivity agreements where the manufacturer has agreed not to work with the outsourcers' competitors for particular products. The outsourcer then secured exclusive access to years of experience and knowledge the manufacturer has built up working on similar products, this would give significant advantage over competitors who did not have access to this knowledge and experience. Interviewee E1 set up an agreement with a manufacturing partner where they dedicated an OEM factory to their products only. In the outsourcers markets there are a limited number of manufacturers who have knowledge of the outsourcer's product and so it is possible the outsourcer can secure a significant competitive advantage if they secure an exclusive relationship and/or partnership with the leading manufacturer in the field, as did Interviewee C1. The outsourcer is also one of the leading suppliers to the market for certain products with the highest market share and consequently thee highest volume, so the arrangement was beneficial to both sides.

- Collaboration between outsourcer and manufacturer and sharing of IP has led to the development of new technology, this would not exist without the cooperation of two specific partners. Interviewee A1 co-developed a new product with their manufacturer through shared IP. Interviewee B1 jointly designed a new product with their partner. Interviewee C3 developed new products using their own IP and the manufacturers IP, and jointly developed new IP. Interviewee C1 advised that they had developed a new product using their own IP, the manufacturers IP and their end customers IP; a three-way development program.
- One outsourcer emphasised the problem of process technology changing and improving all the time, they cannot justify investing in high volume equipment for a particular technology because it will become obsolete before it pays for itself, whereas a manufacturing partner is able to utilise that equipment for production of product for a number of different customers. The manufacturer is the expert in utilising their own equipment and so they can have a dramatic effect on cost saving if they have early involvement in the design.
- In more than one case the outsourcer and the manufacturer had jointly invested in tooling. Including interviewee A1 who "part funded tooling" for a jointly designed product, and the Tier 2 manufacturer who had invested in a complete production line for one customer.
- In another case the outsourcer had used the manufacturer's IP in their products. The manufacturer had invested in the tooling and allowed the outsourcer to supply the product to their local market whilst the manufacturer supplied their local market with the outsourcer's product utilising their IP. This saves the outsourcer investment in tooling and product development and allows the manufacturer to sell products incorporating their own IP.

Factors related to joint product development

Collaboration and long term working relationships/partnerships has been cited by many outsourcers as being critical for achieving gains. Joint design work on the outsourcers product, joint sourcing of materials to optimise cost and lead time, sharing of the material exposure and risk.

- Interviewee B2 stated that they had learnt new methods and practices from the manufacturer that they had implemented in their own factory.
- All outsourcer's utilised a manufacturing partner that coordinated all activities in the

manufacturing region, including coordination and purchasing from subcontractors and sub-assembly suppliers.

- With Interviewees C1 and E1, the end customer was aware of the outsourcing relationship and who the manufacturer is. The end customer needed to approve the manufacturer as a supplier and they will also be looking at the relationship between the outsourcer and the manufacturer to ensure it is strong and stable. The end customer will not want to re-approve product or sub-assemblies if the outsourcer needs to change manufacturer. Strong close collaboration is required.
- The Tier 2 manufacturer advised that "if there is a collaborative arrangement where both parties are putting money into the venture then this is where sustainable competitive advantage can be achieved".
- One outsourcer stressed the benefits of working with a partner who has knowledge of both the production and the specific product being built, more advantage can be achieved if the manufacturer is suited to the technology and the application. The manufacturer can then give more input and advice on how to optimise the production and test of such products. For any given product, there will be a limited number of suppliers who have that specific product knowledge and so advantage can be achieved if the outsourcer is able to secure the services of the leading manufacturer in the specific product field and to prevent them working with competitors. The manufacturer stressed the importance to choose a manufacturer that is suited to the manufacturing technology as well as the product application and market requirements.
- The Tier 1 and Tier 2 manufacturers, as well as Interviewees E1 and F1 discussed the benefits of working with manufacturers who have experience of building similar products or products with similar capabilities. The manufacturer will then have knowledge and experience of working with similar products and be able to make a contribution to the design and development of the product. The Tier 1 manufacturer has a long term partnership with a multinational personal computer company where they "design the circuitry and the PC motherboards for them". Interviewee C1 stressed the importance of "working with a manufacturer who is able to support us in a niche environment" and that "the appropriateness of the vendor and the type of business is critical".
- Interviewee C1 has succeeded by outsourcing to a local firm in the US because they are

competing on quality and reputation, not lowest cost. The manufacturer has appropriate quality approvals and a very good reputation in the specific market for the products and the outsourcer has been able to secure new business by joint market approach and joint product development with the manufacturer.

- Interviewee E1 described the partnership as a joint development platform where they learned how to make their products at lower cost and the manufacturer learned how to advance their technology. This joint development work requires a lot of trust and contractual agreement.
- In one case the manufacturer developed new products for the outsourcer, the outsourcer was then able to extend their product range to then be able to offer a complete supply solution to their end customer by utilising the design skills and knowledge of the manufacturer. Without the complete product range the outsourcer was in danger of losing their customer to another supplier.
- Interviewee E1 signed “long-term agreements with main ODM suppliers” based on them jointly developing products. Each partner gets access to the others technology so both can learn from the arrangement, the long term agreement giving protection to each other’s IP and a clear intention to work together to gain commercially from the arrangement.
- The Tier 1 manufacturer has specific design skills for motherboards for personal computers. They formed an alliance with a major personal computer manufacturer where the manufacturer designed the motherboard for each generation of the product. The motherboard design IP and the manufacturing IP belong to the manufacturer, the product and industrial design belong to the outsourcer. The manufacturer provides a design service and sourcing of all materials for the highest cost sub-assembly. The manufacturer has the established supply chain and sourcing knowledge.
- The Tier 2 manufacturer formed a very strong bond with one customer and set up a design and development centre within the manufacturer’s office. This was led by the outsourcers research and development manager who stayed at the outsourcer for a period of two years, and was staffed by the outsourcer employing local and head office engineers to develop new products optimised for utilising the manufacturers processes, design for manufacture as well as designing replacement parts to cover obsolescence and repair and service of product in the local market.

- The Tier 2 manufacturer emphasised the benefits of cooperating closely so as to get the benefits of potential new materials and design for manufacture. The emphasis is on early involvement in the design of the product to maximise the potential benefits from joint development.
- Late stage customisation is cited as fundamental to the success of the business of Interviewee D2 and of Interviewee C1. Interviewee C1 advised "lead-time was 12 weeks…. And we managed to get that down to two weeks in the end and that was shorter than any of the competitor lead-times". They design core products which are customised just before shipping. This allows the outsourcer to build a stock of standard sub-assemblies which are customised at the end.
- Interviewee A1 is funding a local research and development engineer to work for them inside the manufacturer to "make sure we get the right level of service".
- The Tier 1 manufacturer said that they had several cases of the outsourcer making joint investments with them, the relationship becomes "an investment relationship investing in each other".
- non-standard process development – The Tier 2 manufacturer invested in a complete production line for an outsourcer and developed many new and unique automated processes for them. This line has been running for many years. Unique processes not available from other manufacturers who only have standard processes can give a clear advantage in terms of manufacturing capacity and cost.

Factors related to design for manufacture improving the manufacturability and the quality of the product

- The Tier 2 manufacturer emphasised that they are the experts in product design for manufacturing for their factory, they know better than anyone what is needed to optimise the product for their own production lines. This applies to mechanical parts, plastic moulding and tooling, and electronics. The manufacturer should be the source of knowledge to the outsourcer.
- The tier 2 manufacturer stated that it was not their job to design the product for the outsourcer but it was their job to give advice on better technologies and better materials to be incorporated into the design. The manufacturer has knowledge of suppliers, parts, materials and assemblies that could help the outsourcer to be more competitive in terms

of cost and in terms of excellence in design. The manufacturer stated that it was their own responsibility to minimise inventory, minimise lead-times and control engineering changes; these factors being just as important as being able to manufacture the product.

- One outsourcer stressed the benefits of the manufacturers test capabilities and design for test. Testing can be an expensive process and time for test can be reduced by utilising automated equipment, but then the product needs to be designed in a way that an automated test system can process that product in the shortest possible time.
- Interviewee C1 said design for late configuration has enabled them to deliver product with a two-week lead-time.
- The Tier 3 manufacturer stated that a lot of their customers "use them as an extension of their own capacity, to cope with peaks and troughs of demand". They use the manufacturing partner as a buffer.

Factors related to research and development.

The Tier 1 and Tier 2 manufacturers had undertaken some kind of research and development on behalf of the outsourcer. This ranges from adapting the design so that the product could pass some qualification tests, to another customer that set up their own R&D centre at the manufacturer's premises. Another outsourcer utilised the manufacturer to develop a new range of products to compliment the products of the manufacturer. This extended the outsourcers product range and increased the level of business the manufacturer receives from the outsourcer. This is often referred to as an 'original design manufacturer, or ODM, service.

- One outsourcer stressed the importance of working with a manufacturer of products in the same industry who has a knowledge of the application of the products. Outsourcers in telecoms industry and medical industry stressed the need to work with manufacturers who have experience of processes, especially test, of similar products.
- One outsourcer uses a range of ODM companies to supply specific building blocks of their product. One manufacturer supplies the highest cost building bock, or sub assembly, and they then assemble the complete product. The manufacturer coordinates all of the sub-assembly suppliers.
- Interviewee C2 advised their manufacturer continued the R&D process to shrink their design following the manufacturers developing design rules.

- The Tier 2 manufacturer provides a ‘black box’ design concept where they take a product from the outsourcer and reverse engineer it to provide design and documentation so that it can be built.
- Interviewee E1 utilised their manufacturer to improve the performance of their product by adding functionality that the manufacturer was experienced in. They had “a very strong cost-effective solution”.

Factors related to real economies of scale

A major benefit of working with a contract manufacturer is that they are able to achieve greater economies of scale by utilising higher volume automated equipment and purchasing resources to work on a wide range of customers who will share requirements.

- Interviewee B2 stressed the need for their manufacturer to have capacity far beyond what could be implemented in their own factory. Furthermore, the manufacturer will have further capacity that could be utilised during peak demand periods and for the ramp-up of production of new products. ”They can respond quicker than we possibly could here”.
- Interviewee B1 stated “without a shadow of a doubt” capacity and flexibility were by far the most important benefit he achieves by outsourcing. These factors give a huge competitive advantage over utilising an internal source.
- Interviewee E1 discussed overheads being amortised into many different customers reducing the burden on each.
- Interviewee D1 stressed the importance of bulk buying when purchasing of materials, “the manufacturer is likely to have several clients requiring the same materials and so this can vastly increase purchasing power”, as well as allowing the manufacturer to keep larger stocks of particular components that can be used on several customers’ products.

Summary of technology factors

The key factors identified in this section are summarised in the table below for later analysis.

Factor	Sub-Factor
Factors related to access to intellectual	- developed joint IP with manufacturer that is specific to a product shared IP allowed manufacturer to develop new range of products - outsourcer implemented learnt knowledge on own production line

property (IP)	- outsourcer utilised joint IP in their local market and the manufacturer utilised it in their local market
Factors related to access to technology	- Access to capacity o greater economies of scale by utilising shared high volume automated equipment and purchasing resources o Access to capacity far beyond that of the outsourcer and could be utilised during peak demand periods and for the ramp-up of production of new products. o manufacturer stocks components to be used on several customers' products. o manufacturer approved and qualified product in the local market reducing costs and logistics o manufacturer has appropriate quality approvals and a good reputation in the specific market for the products enabling outsourcer secure new business by joint market approach and joint product development with the manufacturer. - Access to sub-suppliers o Coordination of all activities in manufacturing region, including control and purchasing from sub-assembly suppliers. - Investment o access to technology without capital investment o manufacturer wholly / jointly invested in tooling o use manufacturers tooling saving R&D and giving protected functionality in their home market, and gave the manufacturer a product using their own IP for sale in their own market. - Advanced testing o use manufacturers test set-ups to significantly reduce test times and costs without capital investment.

Factors related to joint product development	- R&D o collaboration required to give end customer confidence of supply o secure the services of the leading manufacturer in the specific product field to prevent them working with competitors. o use knowledge of the manufacturer to reduce cost o manufacturer learned how to make their products more advanced from the outsourcer. o Choose a manufacturer that is suited to the manufacturing technology as well as the product application and market requirements to benefit from design knowledge o joint product development with manufacturer and end customer o manufacturer provides 'black box' design o manufacturer reverse engineering of competitor's product o manufacturer to improve the performance of their product by adding functionality that the manufacturer was experienced in o joint development platform where outsourcer reduced product cost and the manufacturer learned how to advance their technology. o outsourcer set up their own R&D centre at the manufacturer. o manufacturer developed a new range of products to compliment the products of the outsourcer to extend and complete outsourcer product range o work with manufacturer who has a knowledge of the application of the products, experience of processes of similar products. o Use original design manufacturer (ODM) as partner to supply specific building blocks of product o outsourcer expand product line by utilising manufacturers products o long term agreement so each partner accesses others technology

	○ manufacturer provides design service and sourcing of all materials - Design for manufacture ○ work with manufacturers who have experience of building similar products capabilities who make a contribution to the design and development of the product. ○ manufacturers knowledge and IP to improve product design and to pass qualification tests ○ manufacturer to continue R&D process to shrink their product design ○ access to manufacturers design for test capabilities ○ manufacturer advise on better technologies and materials ○ design for late stage customisation ○ outsourcer funding local R&D engineer at the manufacturer ○ collaborate through joint design work, joint sourcing of materials to optimise cost and lead time, increase yields, and sharing of the material exposure and risk ○ Manufacturer early involvement for design for manufacture ○ manufacturer provides repair service of product in local market. ○ work with manufacturer to get benefits of potential new materials ○ joint investments to exploit product R&D and new technology ○ Outsourcer optimised product for utilising the manufacturers processes, design for manufacture and design for obsolescence
Factors related to joint process development	- new technology development ○ collaboration and joint development of new IP and technology ○ use manufacturer knowledge to reduce costs ○ manufacturer able to invest in constantly evolving technology and equipment - dedicated production line development

	○ production line in secure area away from other visiting outsourcers and limited access to increasing security of IP. ○ agreement where manufacturer agreed to not work with outsourcers competitors giving exclusive access to experience and knowledge ○ outsourcer's employee at manufacturer overseeing production

6.2.2.3 Market factors

Several interviewees discussed how the outsourcing relationship had given them access to new markets, this includes access to new geographic areas as well as access to new customers through extension of their product range. In most cases this access has developed and evolved over time and had not been a factor in the decision making process when deciding to outsource.

Interviewee A1 built up a relationship with their manufacturing and utilised their knowledge of their local market to design and qualify product suitable for that local market, "we built up relationships with people in the Far East who knew about the bathroom industry and shower industry which may allow us to develop a presence for these products" and to "develop some innovative products not currently being sold in the Far East". Interviewee A1 is utilising some of the manufacturers IP, who already have products with similar technologies in their local market, to establish their brand overseas, "they can access the Chinese market using their brand as well as the local brand". They also used the manufacturers IP to improve the product for the market local to the outsourcer. Interviewee A1's manufacturer acquired a manufacturer of similar products so as to enable them to secure technology and the local customer base and slowly establish their brand over the local brand. In another case an outsourcer licensed the subcontractor to use their technology in Asia in the subcontractor's products and utilising the subcontractor's brand, they did not intend to establish their own brand in Asia. In these cases, the intention was to sell product technology to the manufacturers established customer base.

Factors related to logistics have enabled outsourcers to develop new markets:

- Interviewees D2 and G1 drop-ship to their end customers directly from a local manufacturer without shipping back to their own facility. This has reduced lead-time and logistic costs enabling the outsourcer to be more competitive in an overseas market. D2

stated “we will use Asian manufacturers to drop ship from the source direct to our customers. It will be too much cost to bring it back to Europe” and G1 advised “we drop ship to customers from Asia…. Direct to Australia, and New Zealand, North America and Germany. This includes reducing taxes and duties through utilising local labour in designated economic regions, such as supplying North America from Mexico. The Interviewee from the Tier 1 manufacturer advised that in some regions, such as Brazil and supply to North America from Mexico, it is necessary to have some level of local labour content to be able to supply that market and to enjoy tax benefits, “Brazil, they have government mandates where you need 10% of local content before you can enjoy tax haven or tax benefits”

- The tier 2 manufacturer described one outsourcer who operate their distribution to their customers direct from the manufacturer, especially when the customers are in the same region as the manufacturer, the manufacturer is “managing their worldwide logistics organisation”.
- The Tier 2 manufacturer stated that the location of the manufacturer in relation to the end customer and market is a factor that needs to be considered and may be a more significant contribution towards the cost of supply than the cost of manufacture
- The Tier 2 manufacturer advised that to “optimise all of the shipping, freight and storage costs …… seems to be an area of expertise that CEM’s are getting into and Is proving very interesting to OEM’s”. This reduction in cost through drop shipping from a manufacturer to the local market can give access to that market, access which otherwise would not be possible because of the higher cost and longer lead-time of supplying from offshore

Factors related to access to peers and other customers outsourcing to the same manufacturer

- Interviewee B2 established relationships with other customers, including of the manufacturer who had different products but had similar technology. The two outsourcers were able to share ideas and technology, as well as logistic costs. They had a very similar customer base and the products complemented each other so they formed an alliance where they could sell their products together to the same end customers.
- The Tier 2 manufacturer described how one of their customers had an advantage of selling their product with another one of their customers’ products in Asia.

Factors related to agility and flexibility can bring benefits as the outsourcer is able to capture

more market opportunities not otherwise available to them.

- Interviewees B1, B2, C1 and H1 commented that the manufacturer had significantly better economies of scale and more capacity than the outsourcer could ever implement because the equipment is shared with other outsourcers. Providing the manufacturer is not running at full capacity then capacity allocated to the outsourcer can be increased at short notice enabling the outsourcer to be more flexible and more agile.
- Interviewee I3 commented that "by increasing capacity then we are able to grab the market, once we have got the market then generally speaking customers do not tend to go away." This availability of suitable equipment at a manufacturer has enabled the time to market for new products to be significantly reduced. Increased capacity has reduced time to market and for some outsourcers, this is critical to the success of their products and maximising their market share.
- Interviewee B1 stated that the manufacturer's capacity gives outsourcer flexibility. Interviewee B2 stated "it has enabled us to react faster than we probably would have doing it here."
- The closeness of the manufacturer to end customers enabled one outsourcer to become more agile as a result of reduced WIP and stock as well as reduced shipping times.
- The manufacturer also carries stock of components for the outsourcer and so is able to bring total lead-time down. Interviewee C1 managed to reduce lead-time from twelve weeks to two weeks by utilising a manufacturer in the same region as their end customer.
- Manufacturers are tending towards a 'late configuration' model where a standard product is built and specific parts for particular customer are added as a final production stage. This enables cost reduction through efficiency in manufacturing a standard product as well as reducing lead-time as stock of the standard product can be kept. Interviewee C1 advised the late configuration model allowed them to "put product together within two weeks" and this "level of customisation which you could certainly argue could give you some kind of competitive advantage".

Factors related to quality approvals of the manufacturer and qualification of the product

- The Tier 1 manufacturer stated how they assist their customers because they work with local approval agencies because they have knowledge, experience and contacts to gain

compliance

- Interviewee C1 advised that working with their manufacturer was “definitely a competitive advantage because our customers have a relationship with them because they are qualified with them it made our product qualification much easier”. The manufacturer was already approved by C1’s end customer through supplying other products. This has made it easier for the outsourcer to supply their customer and has given the outsourcer access to new customers through the manufacturer’s contacts.

Factors related to extending the product range to enable the outsourcer to give a fuller product offering and to capture new market opportunities.

- Interviewee A1 built a relationship with a manufacturer who knows their product market to “allow us to develop a presence for our products in these markets”
- Interviewee A1 also built a relationship with a manufacturer who has their own products that complement those of the outsourcer. The outsourcer then licensed these products and offered them under their own brand in their own market place to extend the product range without investing in R&D. They used the manufacturer to complete the product range so the outsourcer could satisfy every need of their customer. Offering a ‘complete solution’ to their customer mean that their customer does not need to source from the outsourcers competitors. “We built up relationships with people… which may enable us to develop a presence for those products in these markets….. we cannot afford to invest in the R&D in different types of technology”.
- The Tier 2 manufacturer said how they worked with outsourcer to reverse design competitor’s product and then badge it as outsourcers own product. “They wanted us to design and build the product ….. and badge it or tweak it a bit”.
- The Tier 2 manufacturer stated that they source local products suitable for the outsourcer who then badged them, the manufacturer then managed the local relationship and the product supply chain
- One outsourcer worked with a manufacturer who has design knowledge of the same type of products, who has knowledge of design requirements and established relationships with specific component suppliers, to design new products to complete outsourcer’s product range. “The product range was not wide enough…. We started working with ODM’s to expand the product range…… to have an entire range of product”.

- Interviewee F1 allows their manufacturer to use the outsourcers IP to build products suitable for the local market, selling the technology instead of the product. “sell the product in Asia. It is a joint thing where both parties benefit”.
- Interviewee I2 “sold the design rights and licensed our components…… and they are going to manufacture that for themselves”.

Factors related to local knowledge can really help an outsourcer to establish business in a new geographic region giving access to a whole new customer base

- Interviewee C1 stressed the importance of the local knowledge of the manufacturer in giving support in the local market. The manufacturer gives competitive advantage through their knowledge of local market forces, regulations, product qualification is much easier, the manufacturer has built a relationship with the outsourcers customers enabling business growth
- Interviewee A1 stated how the local knowledge of the manufacturer enabled them to focus on products suited to the region and to avoid making unsuitable or unworkable products “not appropriate to be used”

Factors related to reputation of the manufacturer which can bring acceptance and credibility to the outsourcers’ product

- Interviewee A1 discussed utilising the manufacturers brand on their product to gain access to the market, sell or licence the technology. “It would be a technology sell, probably with somebody else’s brand. Our manufacturing partner could give us access to the markets”.
- Interviewee C1 discussed how their manufacturer approved by outsourcers customer and with good reputation reduces qualification time. “They are qualified with them, it made our product qualification much easier”.

Summary of market factors

The key factors identified in the above points concerning factors relating to the market are summarised in the table below for later data analysis.

Factor	Sub-factor
Access to new markets	- access to new geographical and product markets - end-customer relationship with the manufacturer easing the

	qualification of the outsourced product. - utilised manufacturer's knowledge to design and qualify products suitable for the local market. - utilised manufacturers IP to establish their brand overseas. - licensed technology to subcontractor for use in Asia - access to manufacturer's experts with knowledge of local markets and product qualification
Logistics	- drop-ship to end customer from a local source reduces lead-time and logistic costs enabling the outsourcer to be more competitive in an overseas market. 'Drop-shipping' reduces stock holding and work in progress allowing faster response to changing demand. - reduced taxes and duties through export from utilising local labour in specific economic regions, - utilise manufacturer's global distribution network - consolidated warehousing, shipping and freight costs - manufacturer located close to the end customer and market - factor that needs to be considered and may be a more significant contribution towards the cost of supply than the cost of manufacture
Access to peers	- outsourcer established relationships with other customers, who had different products but had similar technology, to share ideas and technology, as well as logistic costs.
Agility and flexibility	- utilised manufacturers economies of scale and capacity through equipment shared with other outsourcers - access to extra capacity at short notice without investment enabling the outsourcer to be more flexible and more agile. - use manufacturer as extension of internal capacity to cope with peaks and troughs of demand. - availability of suitable equipment at manufacturer reduces time to

	market for new products. - closeness of the manufacturer to end customers enables a reduction in WIP and stock - reduced shipping times enabled outsourcer to become more agile. - manufacturer stock components reducing lead-time - 'late configuration' enables cost reduction and reducing lead-time - reduced time to market, compared to using own internal manufacturing, for new product launch
Approvals and qualification	- manufacturer able to work with local approval agencies and have knowledge, experience and contacts to gain compliance - tax benefits through local labour content enables reduced costs and approval to supply - manufacturer already approved by outsourcers end customer, enabling the outsourcer to supply their customer - access to new customers through the manufacturer's contacts.
Access to new customers in current markets	- extending the product range - manufacturer helping to build presence and establish outsourcers brand locally - branding manufacturers products under own brand in own market place to extend the product range - using manufacturer to reverse engineer competitor's product then badge it as own product - badging local products sourced and managed by manufacturer - using manufacturers knowledge to design new products to complete product range - using manufacturers reputation in a specific product market and quality approvals to secure new business through joint approach to specific customers

	- sell technology and IP for manufacturer to build products suitable for the local market manufacturing in the target customer's economic region to allow sales in that region
Market intelligence	- manufacturer facilitates sales in local market through understanding of market forces - manufacturer assists local product qualification; manufacturer has relationship with outsourcers customers facilitating business growth - outsourcer's local knowledge enabled manufacturer to focus on products suited to the region and to avoid making unsuitable or unworkable products
Reputation of supplier	- utilise manufacturers brand on outsourcers product to gain access to the market, sell or licence the technology - manufacturer approved by outsourcers customer and with good reputation reduces qualification time

6.2.3. *To what degree has competitive advantage been achieved through outsourcing and how sustainable is it likely to be?*

The responses to this question were not specific. Advantages were cited as part of a much bigger picture.

Two interviewees reiterated that an advantage can only be created if it cannot be copied by competitors. Interviewee C3 advised that a firm "cannot get advantage if benefits sold to everyone" and that there is a need to "move to a collaborative arrangement where both parties are putting money into the venture then that is where sustainable competitive advantage can be achieved". Interviewee C2, from the same firm, also stated "to achieve any long term strategic advantage will require a real strategic alliance".

Interviewee G1 stated that "technology outsourcing worked very well. There are definitely two reasons to outsource, one is for cost and the other is for capabilities".

Interviewee F1 enthused "their process knowledge and depth of experience can give an

advantage", and Interviewee E1 advised that their manufacturer "improved our design by making it more cost effective and they basically took our technology and they improved it"

Interviewee C2 traditional products have become commodities and low cost high volume – shipped these out and made room for new core products. "to achieve any long term strategic advantage will require a real strategic alliance".

Two found no competitive advantage but found outsourcing a necessity to reduce costs to be able to compete in their market place.

Interviewee E1 advised that cost reduction is not sustainable, "they suck you in and screw you in the end", "capabilities is the reason" to outsource but "if you are no good then you will die".

Interviewee H1 competitive position changed. The firm did achieve lower cost but real benefit was "the capacity we have freed up has been used for higher margin production". This meant they did not have to invest in new factory or facility which improved profitability. I1 also cited the benefit of not having to invest internally. This resonated with the Tier 2 manufacturer who advised that competitive advantage may come from the money that a firm did not have to invest in internal production capability and capacity.

This is really focused on core competencies

Interviewee I2 "licensed our components which …..they are going to manufacture for themselves". This licensing of technology meant that I2's firm secured an 80% share of the market in China, through another firm's products and brand. Interviewee F2 also advised that "our partner is focused on the Chinese market and we have a kind of joint venture arrangement. They use our IP for the Asian market"

Interviewee A1 focused on a 'technology sell' to Asia, developing new products specifically for that market where "our manufacturing partner could give us access to the markets" through their local customer and logistics knowledge.

Interviewee B1 used their manufacturing partner to increase their product range to give a complete solution for their customer, all from one company so customers do not have to work or contact with their potential competitors. "We have developed some products which allowed us to offer a full product range" and to give "a better solution for the customer".

Interviewee B2 outsourced product is their "lowest manufacturing cost for our entire product range" and they are able to offer their product through distributors because of the increased

margin made it affordable. This increased sales and profitability enormously

Interviewee I3 advised that their competitive advantage is “our ability to produce a lot more ……. and to get the product onto the market quicker than our competitors”. This has enabled them to increase their market share.

The Tier 2 manufacturer said that it is necessary to “find a manufacturing partner that is a good fit, not too big or too small”, and that advantages come from the relationship from design and from logistics, not just from the manufacturing itself.

The Tier 1 manufacturer recommended that “there must be trust and credibility between outsourcer and manufacturer to build long term partnership which will bring benefits. Needs to be an ‘investment relationship’ investing in each other”.

6.2.4 Problems experienced in the outsourcing process

The previous section investigates benefits perceived to have been achieved by the interviewees, but the interviews also revealed a number of problems experienced during and after the outsourcing process. This section summarises those problems. This will give balance to the research, which is focused on the benefits achieved, by highlighting potentially negative factors experienced by interviewees.

Poor match with manufacturer

- problem to secure production slots because business was not big enough to influence the manufacturer
- Manufacturer claiming to be experts in particular products but in reality are not

Inability to insource

- Loss of capability
- Companies that have outsourced for a long period of time have lost some of their expertise and experience of manufacturing, and design for manufacture.
- Reduction in capability and understanding of materials and the manufacturing process by the outsourcer if they do not maintain a strong and close partnership with their manufacturer. Inability to meet costs set by the outside manufacturer
- Loss of manufacturing people and associated skills

- Loss of labour flexibility
- Loss of supply infrastructure, component supply chain, subcontractors and network
- Loss of control of the design once the manufacturer has implemented changes to the product, especially to improve manufacturability

Unable to achieve expected cost savings

- Increasing costs due to faster inflation in developing economies.
- Hidden costs of manufacture including overhead of maintaining the relationship.
- Increasing price of the manufacturer over time.
- inability to assess outsourcers own costs
- managing and training the manufacturer on outsourcer's products.
- Many cases cited that they had not achieved expected cost savings.

Extended material pipeline

- If there is a problem with the product, then it is not discovered until there is a large stock of WIP and goods in transit.
- Stock increase due to the pipeline from the manufacturer to the customer and creased lead-time to deliver to the market of the outsourcer and difficulty in planning leading to buffer stocks
- Project termination costs if the manufacturer has large minimum order quantities for the product and the demand reduces, the manufacturer will end up with a stock of components and materials that will need to paid for
- Difficulty in sourcing materials for outsourcing of mature products whose components may not be freely available in the region of the manufacturer

Loss of customer confidence

- outsourcer's customers ask why product is manufactured in another country or region

IP protection

- potential for the outsourcer's competitors to see their products in production in the manufacturer's facility, and see better ways of manufacturing their own product.

- IP protection from the manufacturer who may build similar products for themselves or for the outsourcers competitors. In one case the manufacturer became a competitor of the outsourcer.
- IP becoming less of a problem as more of it is buried in microprocessors and software.
- transient workforce requiring the outsourcer to keep training new people to make their product and potential leakage of IP.

Communication difficulties

- Communication problems and cultural differences giving different understanding of requirements and expectations
- Delivery planning more difficult if the outsourcer cannot physically see where the production actually is. Takes time to gather information from outside the company.

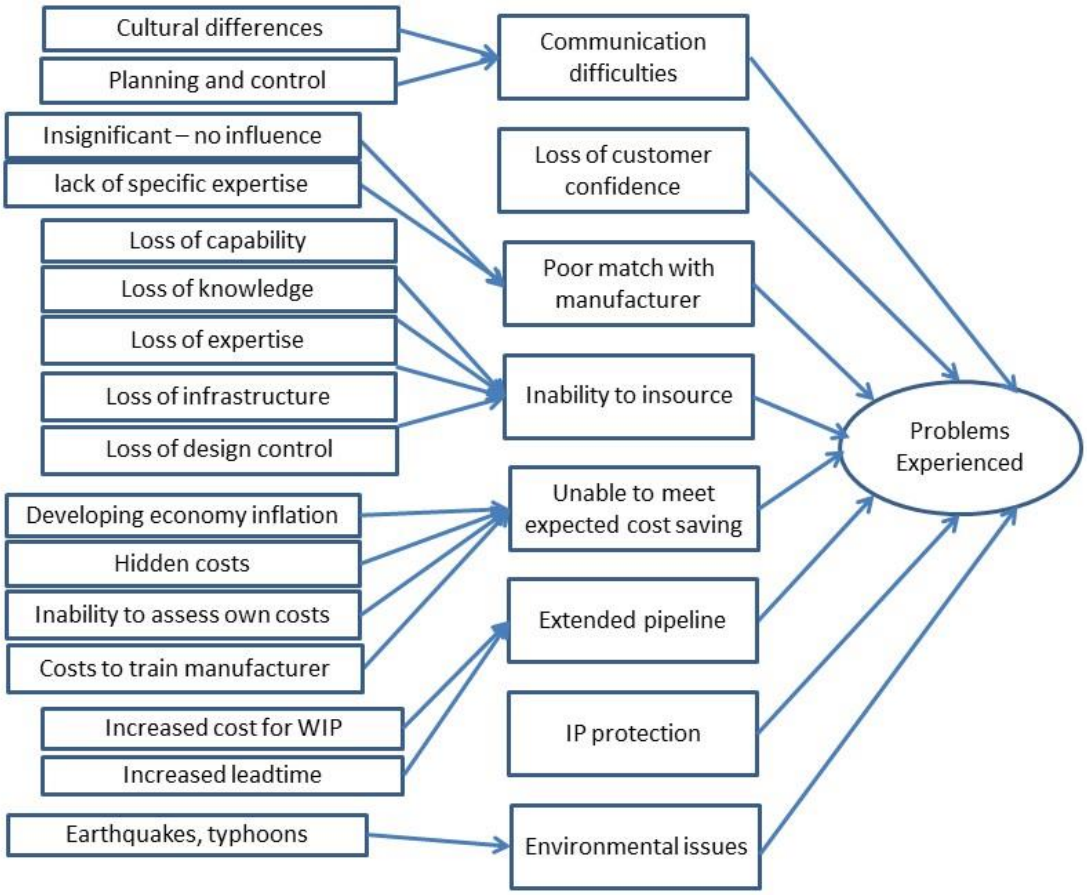
Environmental issues

- Earthquakes and typhoons in region of manufacturer

Manufacturer unable to provide after sales service in their region meaning the outsourcer either has to replace product or arrange to service and repair themselves

The problems experienced by interviewees in outsourcing their production are summarised in Figure 28.

Figure 28. Problems experienced in outsourcing by interviewees



7.0 Data analysis – analysing qualitative data

7.1 Data analysis in relation to the research questions

7.1.1 Data analysis in relation to the research question '*To what extent do decision makers consider competitive advantage when deciding to outsource?'*

In all but one case, the decision to outsource was a proactive one, in only one case was the decision reactive and made at a time of crisis, this is consistent with the findings of Drucker (1980). Also, from the interviews, it was found that the decision to outsource was ultimately made through a consensus of agreement at Board level and involved senior decision makers of the organisation who set the strategic direction of the firm, and was driven by the Managing Director or the Engineering Director.

Outsourcing has a major impact on the firm in terms of re-allocation of resources, including equipment, people and shop floor space, as well as significant investment, and so it was expected that the decision would be made at the highest level even though Board involvement ranged from detailed investigation and analysis of outcomes, to a formal approval of the proposal made by those instigating and driving the change.

Outsourcing was considered to be a strategic decision and there was evidence that firms considered manufacturing as part of the overall company strategy as manufacturing capability determines the ability of a firm to grow.

Firms considered objectives such as working with manufacturing partners who could produce products to complement the firm's existing product line and to work with partners who could give the firm access to new markets. Outsourcing was also undertaken to allow a firm to reduce costs of established products with low margin and to focus internal resources on developing and manufacturing new higher margin products for different markets.

In summary, the main considerations cited for making the decision to outsource were to reduce cost and to focus on core competencies, increasing capacity and flexibility, and to increasing capability with minimal investment. These factors are consistent with the factors found in the current literature (Ehie 2001, Metty 2006, Canez *et al* 2000). There were, however, several other reasons cited to outsource that were related to achieving some kind of advantage in the competitive environment. These reasons are focused on strategic growth, growth was achieved through expanding product ranges and addressing new markets, both technically and

geographically.

7.1.2 Data analysis in relation to the research question '*What competitive advantages, or partnership value, can be created by and can be attributed to the outsourcing partnership*?'

The Partnership Value framework (figure 22) formulated from current literature was used to guide the research and the data gathered from the interviews was collated and broken down into the three considerations: the advantages or 'value' created by sourcing factors, market factors and technology factors.

Sourcing Factors

In two cases, it was found that to be competitive in a particular market for particular products, it was necessary to manufacture in a particular region where 'geographical centres of excellence' exist. These centres provide formidable barriers for manufacturing these products anywhere else. These areas are by their nature, however, accessible to many outsourcers in the same field and so, on their own, do not provide an advantage but they do provide the base line for manufacture.

Many references were made to reducing costs, but again this will not result in competitive advantage if other competing outsourcers have access to the same manufacturer. Advantage can be achieved by securing some kind of exclusivity where the outsourcer can take advantage of lower sourcing costs, but to do this the outsourcer will need to be a leading provider of the product and have significant influence to form such a partnership.

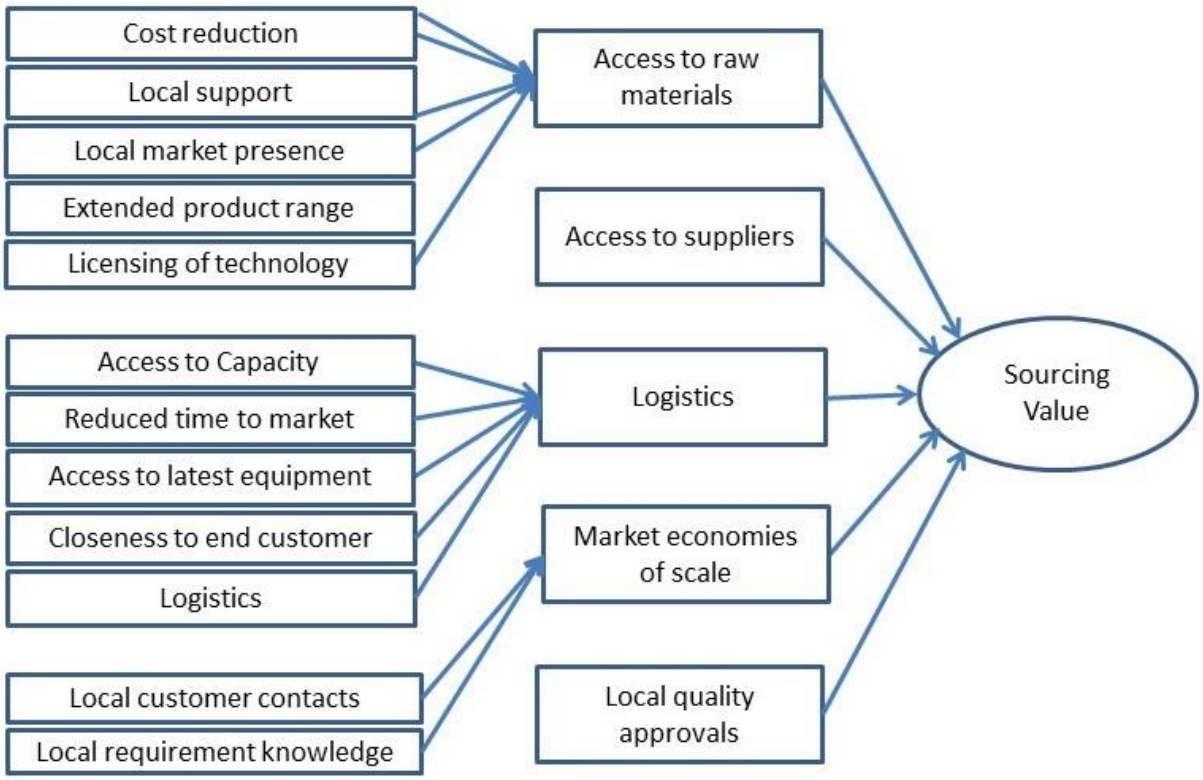
The summary of the sourcing factor section was used to form the basis of the key factors listed below

- Access to raw materials
    - Better performance
    - Reduced cost
    - Reduced lead-time
    - Economies of scale
- Access to suppliers
    - Security of supply
    - Alternative components

    - Capacity
    - Centres of excellence
    - In depth manufacturing knowledge and expertise
- Market economies of scale
    - Consolidated use of high volume and high productivity equipment
    - Similar products and processes
    - Bulk purchase of components and materials
        - Open book pricing
    - Design optimisation for standardised components and material supply
    - Geared-up local supply chain
    - Quality control
- Logistics
    - Bulk shipping
    - Knowledge sharing
    - Late point customisation
    - Local supply network and fully developed supply chain
    - Reduced lead-time
    - Manufacturer raw material, WIP and finished stock holding
    - Manufacturer drop ship to local end customer
    - Low cost warehousing
    - Factory next door
    - Outsourcer local office in manufacturer
- Local quality approvals

The factors identified above are summarised in Figure 29 illustrating potential sources of value from factors related to sourcing.

Figure 29. Sourcing Value



Technology Factors

Many advantages were gained through joint design and development of product, as well as in sharing and having access to intellectual property. Considerations will need to be made in relation to the level of exclusivity and security of the IP involved. This has come from the development of the manufacturing relationship, and growing partnership of the two firms involved into a collaboration. It is not something that has happened at the start of a relationship or when making the outsourcing decision. It must also be considered what is actually being outsourced as it becomes more than the outsourcing of manufacturing, it can also be the outsourcing of R&D and/or product development. The level of success of this kind of collaboration is dependent on the manufacturer's level of experience and knowledge of the functionality of the outsourced product.

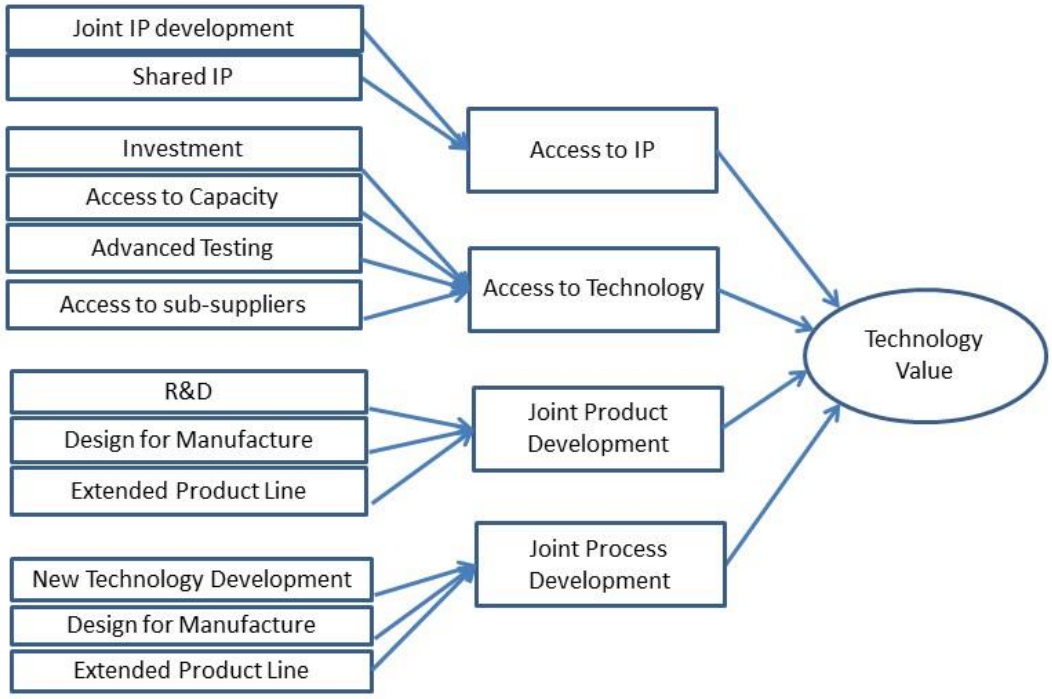
The factors related to technology are listed below:

- Access to IP
    - Joint IP development
        - New functionality
    - Shared IP
        - new product development
        - new market penetration
        - exclusivity
- Access to technology
    - Investment
        - capital equipment
        - shared amortisation
        - capacity
    - Advanced testing
        - Automation
        - Capacity
        - Functionality
        - Design for test
    - Access to sub-suppliers
    - Access to capacity
        - Economies of scale
        - Automation
        - Quality control
        - Efficiency
        - Purchasing power
- Joint product development

    - R&D
        - Shrink design
        - Exclusivity
        - Extend product line
        - Improve product performance
        - Cost reduction
    - Design for manufacture
        - Late configuration
        - Design for test
        - Cost reduction
        - Product qualification
        - Quality improvement
        - Security of material supply
- Joint process development
    - New technology development
        - Cost reduction
        - Increased capability
        - Leading edge
    - Dedicated production lines
        - Security of supply
        - Non-standard and unique process development
        - IP protection

The factors identified above are summarised in Figure 30 illustrating potential sources of value from factors related to technology

Figure 30. Technology Value



Market factors

The outsourcing relationship has given several firms access to new markets, including access to new geographical regions and access to new customers through extending the current product range or creating new product ranges. Another instance was cited where an outsourcer licensed their technology to a manufacturer in a different region.

Manufacturing is certain regions also gives access to those regions where a local labour content is required to reduce tax and duties, and to have the approval by governments to supply those regions.

Logistical benefits relating to 'drop shipping' reduces lead-time, costs as well as stock holding and work in progress and allows faster response to changing demand. Utilising the global distribution network of the manufacturer can bring significant benefits where having worldwide logistics can be considered to be far more beneficial than the actual manufacturing and give an

advantage over competitors. The delivery of product with warehousing, consolidated shipping and freight costs can bring significant competitive advantage.

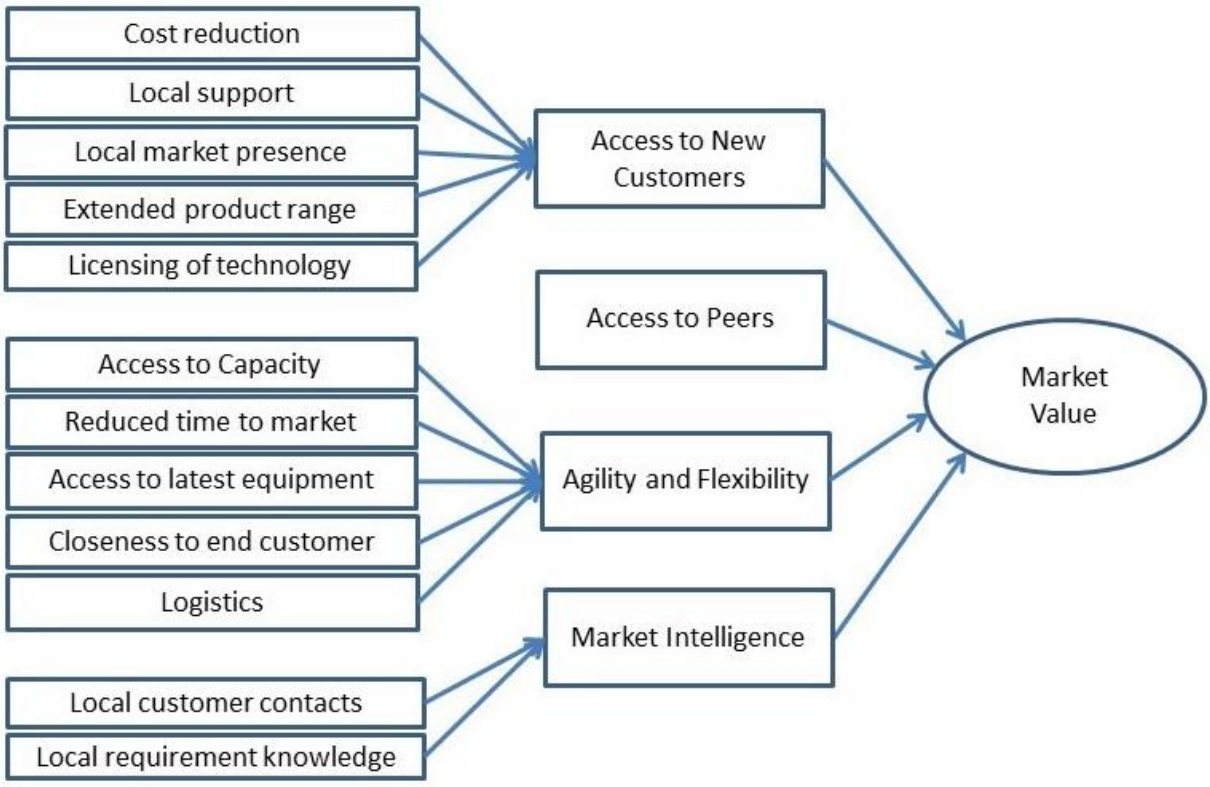
Factors relating to advantages related to the ‘market’ have been extracted from the previous summary and are listed as follows:

- Access to customers
    - Local market presence
        - Acquisition of manufacturer
        - Build on manufacturers reputation and brand
        - Access to service providers
        - Legislation
        - Local approvals and product qualification
        - Increased market share
    - Extended product range
        - Innovative products
        - Manufacturer design products
        - Badge manufacturers product
        - Badge local products
    - Licencing of technology
    - Local support
        - customer service
        - Product repair
        - Product service
    - Cost reduction
        - Lower labour costs
        - Lower overhead costs
        - Lower materials costs

- Access to peers
- Agility and flexibility
    - Logistics
        - Drop ship
        - Reduced lead-time
        - Reduced tax and duties
        - Same region
        - Stock control`
        - Reduced stock and WIP
        - Global supply network
        - Access to service providers
        - Late configuration
        - Reduced pipeline
    - Reduced time to market
    - Closeness to end customer
    - Access to capacity
    - Access to latest equipment
- Market intelligence
    - Local customer contacts
    - Knowledge of local market requirements

The factors identified above are summarised in Figure 31 illustrating potential sources of value from factors related to the market

Figure 31. Market Value

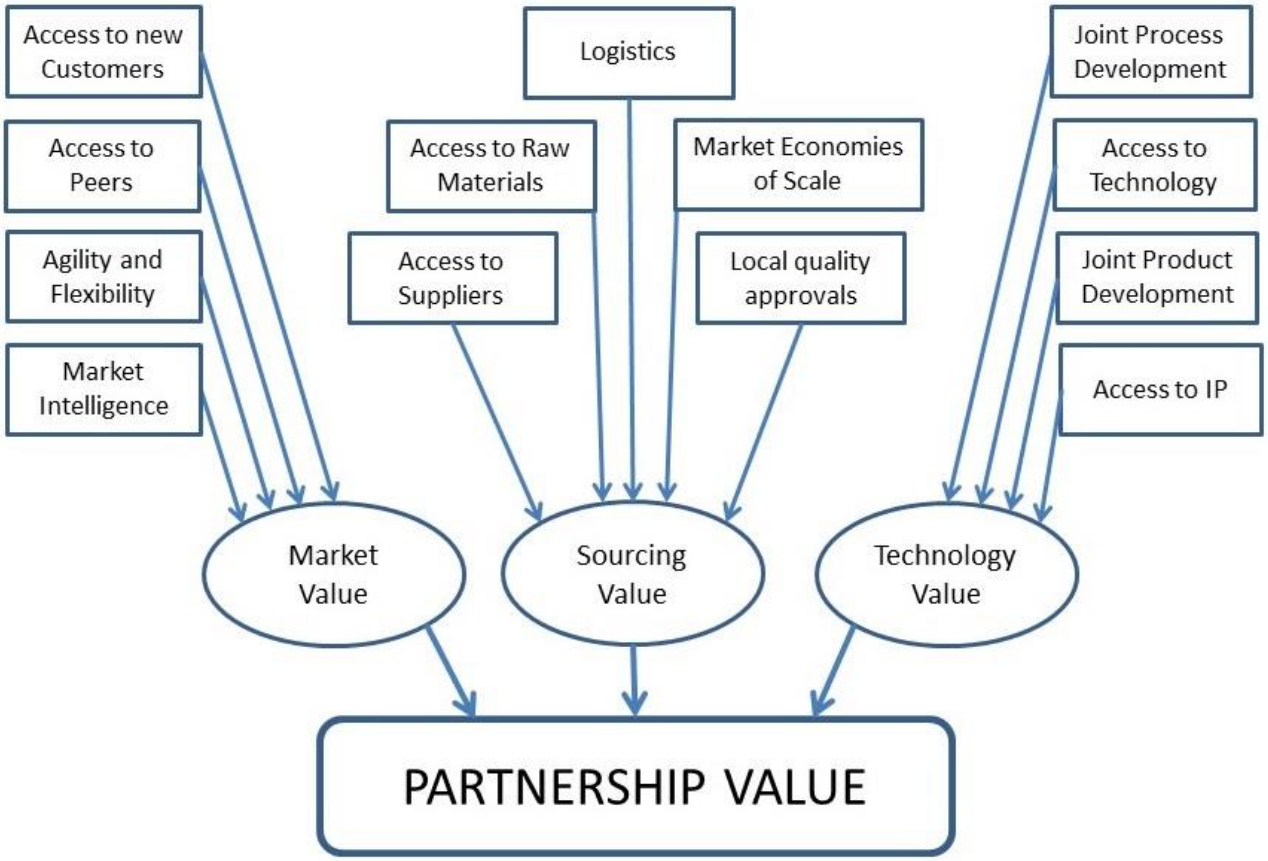


Partnership Value

The value diagrams from the previous sections are combined to give the Partnership Value diagram below (Figure 32). This illustrates the first level of contributory factors only.

Partnership value can be defined as the value created by the outsourcing partnership which gives a level of competitive advantage through the exploitation of factors related to sourcing value, technology value and market value.

Figure 32. The Partnership Value Diagram



7.1.3 Data analysis in relation to the research question '*To what degree has competitive advantage been achieved through outsourcing and how sustainable is it likely to be?*'

This question did not bring forward any quantifiable answers from interviewees.

The perceived competitive advantages identified in the previous sections relating to partnership value relate to sourcing, technology and market value. What the question did highlight was a clear distinction between those firms that never had an internal manufacturing capability and those that previously did have.

Interviewees from firms that never had a manufacturing capability stressed that without outsourcing their firm would not exist. They simply did not have the resources available to invest in internal manufacturing, in terms of capital equipment investment as well as employing and training staff to operate that equipment.

For those that previously had their own internal manufacturing and had now outsourced, responses ranged from 'not much benefit' to 'benefits from a long term partnership with both sides gaining advantage'.

Two interviewees stated that their firm had decided to outsource to achieve cost savings to enable them to compete in the marketplace. On its own this gave some firms a temporary advantage over their competitors but in some markets all firms outsource and so cost saving is not a sustainable advantage, it is a necessity to be able to survive. Other benefits were achieved alongside the cost saving which did, however, give competitive advantage, even though the decision maker of a firm did not set out to achieve that benefit when making the outsourcing decision. Competitive advantages have arisen from long term partnerships with both sides, the outsourcer and the manufacturer, gaining an advantage.

The issue of sustainability is difficult to quantify as the electronics industry is one of fast moving technological change. To create sustainable competitive advantage through the partnership will require collaboration and ongoing research and development to keep a firm in a competitive position.

7.2 Analysis of the research in relation to theory - Partnership Value in relation to McIvor's outsourcing framework

Referring to Figure 15. McIvor's outsourcing framework, it can be seen that the decision making process has been broken down into four stages.

The first stage is to 'Define the core activities of the business'. This research is focused on the outsourcing of manufacturing operations, and for the purposes of this research analysis, manufacturing is considered to be a core activity. For those firms that have never had internal manufacturing operations, manufacturing may still be considered to be a core activity that has been strategically outsourced following a cost and investment analysis under Stage 3 of McIvor's framework (2009:32), where the analysis has resulted in the decision not to invest on internal manufacturing capability.

The reasons to outsource given by interviewee's falls into three main categories:

- Capacity
- Cost reduction

- Access to technological capabilities

It could be considered that all three of these reasons are related to cost and investment. To increase capacity internally will require investment in equipment and manpower; to implement new technology internally will also require investment in equipment, manpower and training. Investment in internal capacity and production equipment may give a firm a technological 'edge' but it will also result in increased overheads which will contribute to costs and may make the firm less competitive than if the firm outsourced the production capability. Zhu *et al* (2001) stressed the need to compete in today's fast-changing environment and promotes the concept of buying technology and service from an outsourcer.

Nevertheless, the interviews found that the primary focus on outsourcing is to achieve cost reduction. Cost reduction may give a competitive advantage in the short term, but it may also be necessary for a firm to outsource to be able to survive and compete in the marketplace, especially if all competitors outsource to lower cost manufacturing bases. McCormick (2006) stated that cost competitiveness does not lead to sustainable competitive advantage and leads to 'downward spiral' of ever decreasing prices.

Stage 2 and stage 3 of McIvor's framework relate to evaluation of value chain activities and cost analysis of the core activities of a firm, but McIvor (2000) concluded that most firms do not have a formal outsourcing process and that they do not perform a comprehensive and reliable cost analysis. Most interviewees cited that cost reduction and the need to achieve greater competitiveness were the driving forces for the outsourcing decision but some interviewee cited other factors, such as entry to new markets, development of new products and access to new technology. Some interviewees found other benefits, that had not been considered in the initial decision making process, that emerged once the outsourcing process had taken place. These are the benefits coming from Partnership Value and are not represented on McIvor's framework.

As stated when defining the research problem in section 2.11, McIvor's diagram is 'inward looking'; it is focused on the core activities of the firm, how the firm may do things more efficiently internally and by using outside resources to lower cost. This process can be considered to be a 'resource analysis' as it does not consider the external competitive market.

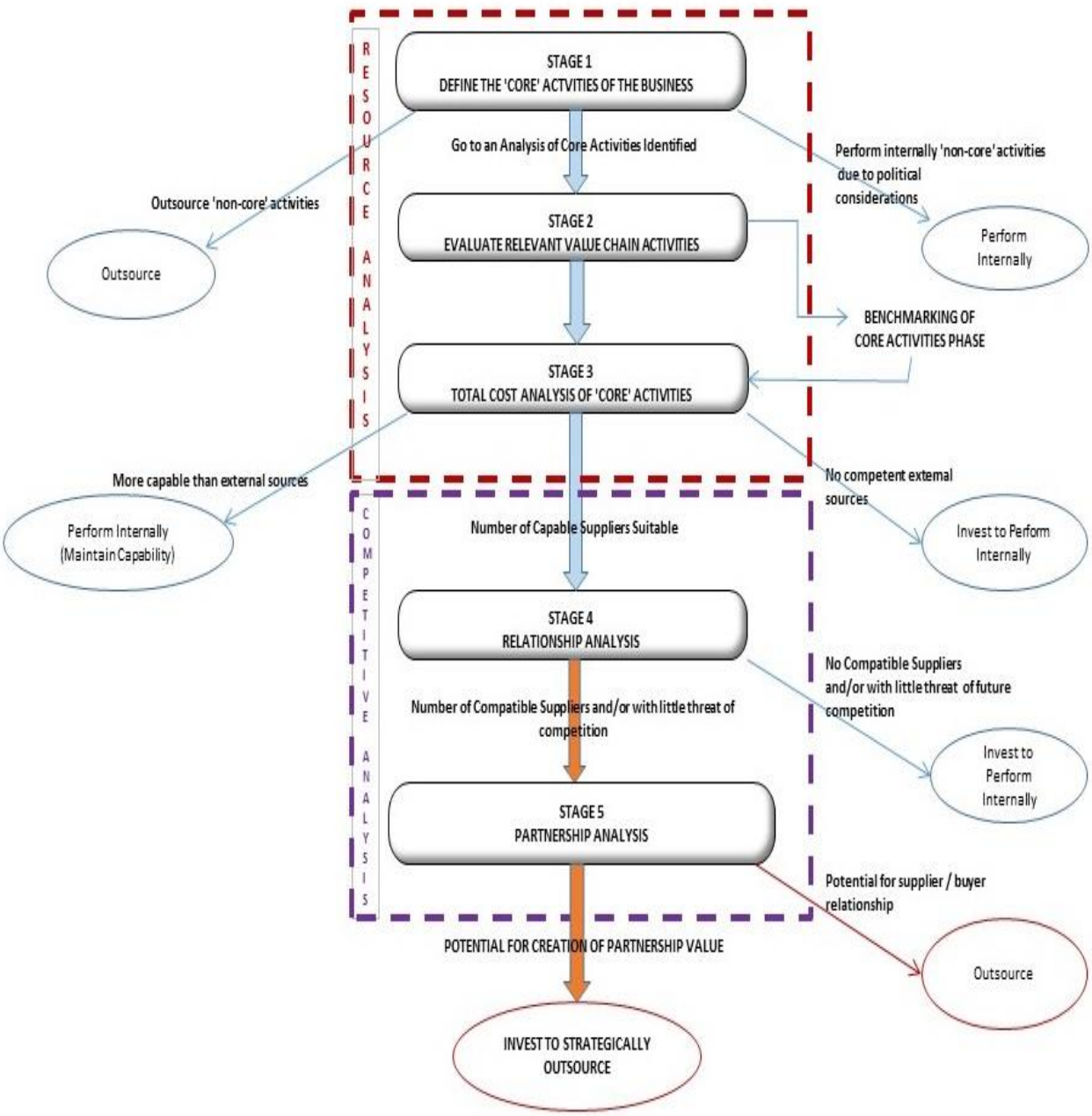
Stage 4 of McIvor's framework is a 'Relationship Analysis' which is primarily concerned with finding 'compatible suppliers with little threat of competition'; this stage considers whether a

potential partner is a threat but does not consider what can be built from the partnership with the supplier or the market opportunity. The research has identified factors which can be considered to bring value to the partnership and are created by the partnership. These factors are summarized in the Partnership Value Diagram as 'Technology Value', 'Sourcing Value' and 'Market Value'. Stage 4 of McIvor's framework is looking at the external environment in so far as it is considering the suitability of external suppliers. Partnership Value also considers the suitability of external suppliers in terms of finding competitive advantage. The research suggests that if a firm decides to outsource some or all of their manufacturing operations, and if a number of suitable suppliers are found that give little threat of competition to the firm, then these potentially suitable suppliers may be evaluated in terms of their potential to provide a competitive advantage under the heading of Partnership Analysis. A further stage, Stage 5 Partnership Analysis, may be added to McIvor's framework.

Stages 4 and 5 of the framework consider the external environment and the ability of the firm to secure competitive advantage and so this part of the analysis may be grouped into a section referred to as the 'Competitive Analysis'.

The contribution to theory is the extension of McIvor's framework to include consideration of the competitive market, a consideration of potential partnerships which could result in competitive advantage.

Figure 33, The Outsourcing Framework incorporating Partnership Analysis



7.3 Analysis of the research in relation to practice

7.3.1 Stumbling into competitive advantage

The research found that the majority of firms outsource primarily to save cost and to focus on in-house core competencies, it also found that expected cost savings were often not achieved and in some cases capabilities were irretrievably lost. The research also found that a number of firms had achieved some level of competitive advantage through the relationship with their manufacturing partner. These competitive advantages had emerged during the course of the partnership and were not considered in full when making the decision to outsource. The outsourcing firm had performed a 'Resource Analysis' and had considered optimising internal operations to achieve improved competitiveness but had generally not considered a 'Competitive Analysis' and the value that may be achieved in the competitive marketplace through the relationship with the manufacturing partner.

7.3.2 Outsourcing for advantage

When deciding to outsource, a firm should first consider whether current manufacturing capability is able to meet the strategic objectives of the firm. A firm should consider what products to supply, at what price and to where. If current manufacturing capability is not able to, or is not best suited to, meet the company strategy then outsourcing could be the best manufacturing strategy.

Outsourcing can bring benefits to the firm by potentially reducing costs and freeing-up resources to focus on core competencies, and the firm should look beyond this and consider what may be achieved through exploiting the relationship with a manufacturing partner to create competitive advantage. Longer term benefits may come from the external environment in the form of 'Partnership Value' which may arise from 'technology value", "market value" and/or "sourcing value". Partnership Value and ways of achieving competitive advantage should be evaluated when considering to outsource and when considering which manufacturing partner to engage with.

The firm should consider manufacturing strategy as an integral part of the overall strategy and make a conscious decision during strategic planning on what to manufacture internally and what to outsource.

7.3.2.1 The decision

The decision to outsourcing is strategic and should be formal and taken at Board level, with inputs from manufacturing, engineering and marketing. The decision should be based on benchmarking and follow a defined procedure and analysis.

Success factors:

- Decision made at Board level
- Pro-active decision made on structured situational analysis
- Manufacturing strategy to be part of the firm's strategy
- Early involvement of employees

The decision to outsource should be taken at the highest level of a firm and decision makers should make a conscious decision on how to maximise the potential for achieving competitive advantage from manufacturing.

7.3.2.2 Key factors to consider when deciding to outsource and when selecting the manufacturing partner:

A partner will need to have the capability to support manufacturing now and in the future

- Process capability
- Capacity
- Cost competitiveness
- Stability
- Accessible language and culture
- Non-competition

Competitive advantage achieved through Sourcing Value factors by working with a manufacturing partner:

- Local quality approvals
- Access to raw materials
- Access to suppliers
- Logistics

- Market economies of scale

Competitive advantage achieved through Technology Value factors by working with a manufacturing partner:

- Joint process development
- Joint product development
- Access to technology
- Access to IP

Competitive advantage achieved through Market Value factors by working with a manufacturing partner:

- Access to new customers
- Access to peers
- Agility and flexibility
- Market intelligence

7.3.2.3 Avoiding and overcoming potential problems

The firm must ensure that from a resource perspective and from a competitive market perspective that outsourcing is the correct strategy as it may be impossible or extremely expensive to 'insource' after equipment has been sold, skills have been lost and infrastructure supporting the product has gone. The research identified a number of considerations to overcome potential problems relating to the outsourcing process:

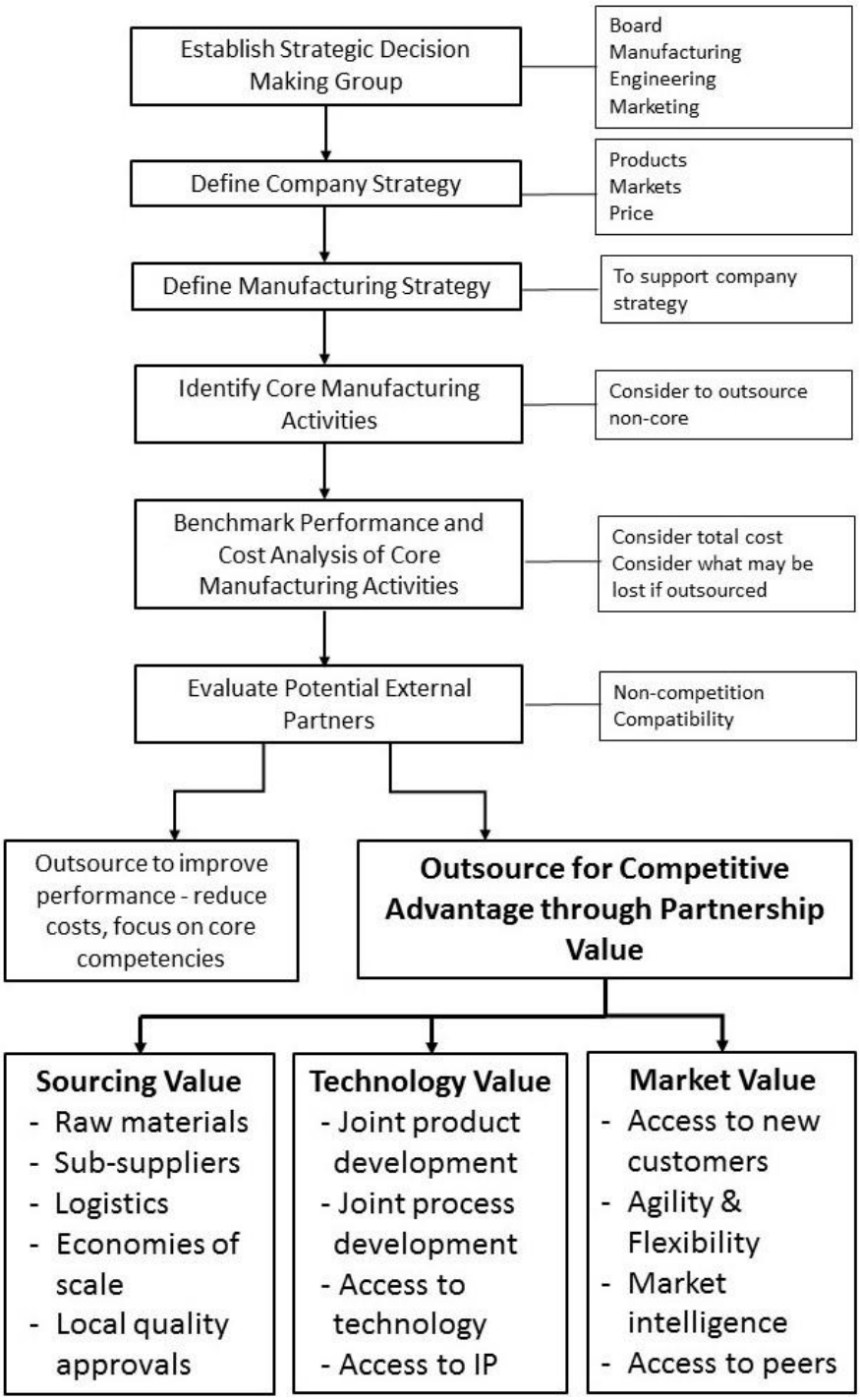
- Maintain relationship with suppliers and retain key manufacturing engineers
- select a partner matched to expertise and business scale
- consider the costs for outsourcing as well as product unit cost
- consider communications in terms of cost, time differences and cultural difficulties
- protect intellectual property
- risk analyse the manufacturer in terms of natural environmental threats
- consider the extended pipeline of product in terms of stock holding and lead-time
- consider the attitudes, expectations and needs of customers

A firm should consider how to retain key capabilities, which may be lost, when deciding on what to outsource.

7.3.3 Outsourcing for competitive advantage

The factors considered in this section are summarised in Figure 33, and shows the process and steps recommended for making the outsourcing decision.

Figure 33. Outsourcing for competitive advantage



7.4 Research limitations

The research is limited to the electronics industry and is applicable to 'western' companies partially or completely outsourcing their manufacturing operations.

The research was also limited by the number of interviewees who found the time and agreed to be interviewed. The nature of the research dictated that the interviewees need to be senior people in their organisations who make decisions that direct the company's strategy, such people tend to be busy and difficult to contact. In many cases, interviews were rescheduled on multiple occasions and many confirmed interviews did not take place. In effect, interviewees were chosen due to practical reasons related to access and availability. The interviewees that did participate, however, were keen to share their views and thought deeply about their contribution. Semi-structured interviews were thought to be the best method to capture the thoughts and views to build data for analysis and this did seem to be a good method for the task. There were instances where interviewees did not understand what was being asked and it was difficult to ask interview questions in a way which did not influence the interviewees answer.

The framework and the conclusions of this research can be used by those considering to outsource electronics manufacturing. This is applicable to those who currently manufacture in-house, those who wish to outsource some but not all of their manufacturing, and those who do not currently manufacture at all. It is also applicable to organisations operating in the consumer, telecoms, computer, medical or industrial electronic market segments.

The framework has limited benefit to those operating in market segments where free competition is restricted by government intervention and stringent approvals, such as the automotive and military markets.

The research was undertaken during the period 2008 to 2016 and is based on the inputs and ideas of interviewees discussing their past experiences. The electronics industry is one of rapid incremental and step-change and the findings of the research are applicable to the current state of the industry. It is considered by the researcher that the findings will remain relevant, even with this rapid change, so long as there are global markets and global manufacturing companies.

7.5 Future research

The contribution of interviewees was based on their understanding and opinion of what was achieved and was not supported by 'hard' financial data. The exact effects of outsourcing on a firm over a significant period of time are complex and difficult to quantify due to the influence of many variables but the benefits and problems experienced by the interviewees were identified and evaluated. The research does not investigate the longer-term sustainability of any competitive advantage achieved due to time limitations but It does, however, identify where competitive advantage may be achieved and puts this together in a framework.

Future research could be focused on identifying measures of competitive advantage in electronics manufacturing companies, investigating whether there is correlation between competitive advantage and the outsourcing of manufacturing, and quantitative investigation into how a firm has benefited from the contribution of Partnership Value. Future research could also investigate how Partnership Value is relevant to the automotive, military and aerospace industries.

8.0 Conclusions

This research explored how a firm may achieve competitive advantage through the relationship created with a manufacturing partner when outsourcing manufacturing operations. There is very little published research relating to companies outsourcing to achieve competitive advantage as a direct outcome of the resulting outsourcing partnership.

The research found that the decision to outsource was made at the highest levels of an organisation, after significant situational analysis, and usually part of a strategic plan for growth. The expectations of interviewees in the research when deciding to outsource were to reduce costs and to invest in core competencies, such as new product development, and to penetrate new markets. The reality was, however, that expected cost savings were not achieved and firms gained very little, in some cases key capabilities were irretrievably lost. This is consistent with current literature which is focused on resource based benefits perceived to have been achieved within the firm, in the form of cost reduction and focus on core activities. This is summarised in McIvor's framework (2000:22).

The research found that advantages were achieved through building a close relationship with a manufacturing partner. These advantages were not considered when making the decision to outsource, but emerged as the manufacturing partnership grew. The advantages are grouped into three factors or 'values' in the research, namely:

- Sourcing value
- Technology value
- Market value

Collectively the researcher has termed these as 'Partnership Value'. Partnership value is related to the competitive environment, it is the competitive advantage a firm achieves in the marketplace through outsourcing manufacturing and collaborating with its manufacturing partner.

The 'amount' of competitive advantage achieved in outsourcing is difficult to quantify as there are many variables to consider, but to be a success it must have some degree of sustainability. Technology in the electronics market is constantly developing and, consequently, the success and sustainability of Partnership Value is dependent on the ability for it to change and adapt to changes in the external environment.

The research was used to extend McIvor's Framework to include considerations related to a 'competitive analysis'. This extended framework was then developed to give a practical

framework for making the outsourcing decision which can be used as a tool to analyse and identify internal resource factors, as well as to identify the potential to create Partnership Value and, consequently, competitive advantage through the outsourcing of manufacturing operations. The potential to achieve competitive advantage is greater if a firm plans to utilise and has access to rare materials, if it plans to utilise unique process and if it plans to operate in different markets.

When the outsourcing decision is being made:

- Decide at the highest level
- Consider how manufacturing strategy can contribute to the firm's strategy
- Consider what may be lost by outsourcing
- Pro-actively consider how to build Partnership Value

In a world with global markets and increasing global competition, manufacturing is becoming increasingly important as a source of competitive advantage and manufacturing strategy should be an integral part of a firm's strategic planning.

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Appendix A - Information and consent form for Interviewees

INFORMATION

Research Project - Exploring Outsourcing as a Source of Sustainable Competitive Advantage

The purpose of this research is to explore the relationship between outsourcing and competitive advantage, and to investigate whether sustainable competitive advantage can be created through the relationship between the outsourcer and the manufacturer. It is expected that the research will give insight into the potential strategic benefits achievable through the partnership.

Researcher	Dennis Hayler
Research Program	Doctor of Business Administration, Kingston University, Surrey.

CONSENT

I confirm that I have read and understood the above information regarding the research project

I understand that my participation is voluntary.

I understand that my participation will involve being interviewed, that the interview will be recorded, and that the information disclosed during the interview will be used for the research analysis on an anonymous basis.

I agree to take part in the study.

Participant	Name	Date	Signature

Researcher	Name Dennis Hayler	Date	Signature

Appendix B. Transcript of Interviews

Interviewee A1

Did XXXX manufacture internally and then decide to outsource

We have a mix now. We pretty much used to make everything here ourselves we still do some things inside the business but the majority of our value and products come from outside of our factory. We still do a bit now but most of it has been outsourced. Mainly to the Far East but also others to UK and Europe.

When did that take place?

It started in the late 1990's when there was a change in the emphasis in the business, and regrettably since that time more and more of our stuff has been outsourced. There are other things we have outsourced, by the way, but that is to do with product design. We do not do our own market research for instance because that is not really... that is services rather than our products. We have outsourced a lot of our sources and that has been since the beginning of the company.

What is the value of your business outsourced in relation to your partner?

We probably outsource 80% or 90% now

Is it significant compared to your partners?

Because we have a number of outsourcing partners, it would generally be small. It would be less than 10% in any instance

And what you outsource, is it generally high volume low mix?

I would say it is mixed, there is a quite a varied range of products compared to other competitors and other types of products, it is probably fairly low volume. You know the volumes for EEEE and there our other partners as well, but it is less than 50,000 units per year.

How would you say XXXX compete in the market place?

The competitive advantages we have are the technical innovation of our products and the brand that sits behind it, or at the front of it. Those are the two reasons why XXXX has been successful.

Were you there when the decision to outsource was made?

No I wasn't but I came here about a year afterwards and it was started two or three years before I arrived so I had some understanding of what happened and there was a sort of err...

Do you know who was driving it?

It was the Managing Director. The Managing Director was driving it. The two reasons, the size of the plant we have here was completely constrained and we had to keep growing so we had to find another manufacturing location or we had to think of another way forward. And we had such growth on so many of the internal processes, we had a brass casting that was very small and very rarely paid for itself, we had a machine shop here that was not big enough really to do a particular job and did not allow us to invest in plant, so there were some good sound reasons why outsourcing was the right thing to do. And then there was the big opportunity that came from the Far East where you could look at a much lower labour cost, there were other factors in moving to the Far East, as you will understand, the supply chain, different cultures, understanding about the quality levels required by a western market, communication issues, I mean I could go on, but certainly there was a strong drive to move to the Far East because we could derive benefits from that. The other thing that happened was that we were changing the type of technology we were manufacturing or designing into our products. We were a mechanical type company in the past where we made mechanical type systems, then with digital and electric showers we then moved into an arena that then required PCB assembly, electronics and test, and cable looms, and it was not an area of expertise that we had here so there was a natural decision point to be taken. Do we do more of this ourselves in the UK, or do we take this as an opportunity to move elsewhere? and that is really where EEEE came along.

Was there a lot of support for that decision?

There was very little anti, people acknowledged that it was an approach that we needed to take. There was still some concern, people who were closer to manufacturing here themselves felt uncomfortable because they thought they might be losing their jobs, but most of people with a level of authority found that they were dragged into the outsourcing activity anyway because their expertise was needed to make it successful. So, for example, product engineering were thinking 'oh my god my job was going away', but what they ended up doing was flying out to Malaysia to help set up production lines, and then to audit those production lines, their roles have changed to accommodate the different environment we are working in now.

Would you say it was successful?

With some qualification I would say it was successful but I do not think we understood some of the pitfalls. We have had to learn those pitfalls and we have probably not derived the kind of cost savings that we thought we were going to get when we sat down and did those calculations. The costs have decreased in things like direct labour and so the product cost and the bills of materials if you like, but what has increased is some of the indirect costs. Overall it is still cheaper but it is not quite as simple as we thought it might have been and there is a level of complexity as well because the planning of deliveries now are much more complex now than it used to be when we could just walk down a production line and simply say we will make two more of those today. You cannot do that and there is an inertia in the system we have to build up stock basically to accommodate the vagaries of demand coming from the market place. We have all the product shipped back to the UK except for American business, all US stuff is shipped direct to America. We are basically a UK business, we have some small US activity but it is mostly UK.

What benefits do you believe you have achieved through outsourcing?

Moneywise?

Generally

There have been some financial benefits but I find it very hard to quantify. It would be more than 10% product cost benefits, possibly more. In fact it is substantial, it has made a big difference. The other thing is, more obvious now, it is a shame if you like, the UK manufacturing industry has been weakened so much that in some instances it is very difficult, not impossible, to get the level of quality and service required of UK suppliers of components, I will give you an example, we chrome plate plastic, we specify chrome plated plastic. That is something very difficult to get at medium volume from UK suppliers. You can either get very low volumes where someone wants to chrome plate their motorcycle or something, or very high volumes that is going into automotive, but nothing else. We fit into the middle of those and going to the Far East means that we have access to a much more vibrant and indeed knowledgeable supply base, hungry as well. There are now some things we get done in China that we do not think we could get done in the UK. We have not tried that hard, to be honest with you, but the feeling is that the manufacturing supply base in the UK in certain areas may be permanently damaged and very difficult to recover. I think printed circuit boards are another example, you can get PCB's from the UK but we have had some pretty difficult times with some company, we started getting something done by a company in the UK thinking that it was going to be great but it fact it turned out that it was useless and we ended going back to EEEE even for low volumes to get it done for us. That's another thing for

us, the UK ability and the local supply chain. The other thing that is related to our industry is that there have become centres of excellence of the shower market in the Far East. And there is an island called Xiamen, a specific place in China which has become shower city. There is a shoe city, a jeans city, and lots of things like that where everybody has come together next to each other to support one big company and that means there is a level of expertise in all the things that we want and all close to hand. You can drive around in your car and see three or four suppliers in a day. So that is quite powerful and that is because the Chinese industry has been so successful in that one particular area. There is injection moulding at very high precision because there has to be chrome plating on top, and the history of technologies behind it. This is something we are just getting into, and you alluded to it at the beginning, and that is what we are finding now is that there is a manufacturing base in the Far East and people are starting to ask us, you are bringing all this stuff into the UK and why can't we start selling this here, and Peter SSSS had asked about that and we found that the electric showers that EEEE made were to bespoke for the UK market and was not appropriate to be used elsewhere. But some of the things that we were doing elsewhere, even if we had to ship stuff from the UK, we had built up relationships with people in the Far East who know about the bathroom industry and shower industry which may enable to allow us to develop a presence for our products in these markets

Do you think that would give you an advantage over your competitors?

Because we have some innovative products which are not currently being sold in the Far East, I think that puts us in a different position. If all you have got is a strong brand.... let me start again. The people in our market who have got strong multinational brands have invested heavily in the Far East and it is started to pay dividends. What one company has bought a Chinese business, I think it is one of the biggest sanitary ware businesses so that they can then access the Chinese market using their brand as well as the local brand. So there is a backflow if you like of their brand back into the market by someone who just used to be the manufacturer of their brand, and we are starting to get into that. We are different because we do not have an international brand but we have got technology which is of interest for those markets. So it would be a technology sell, probably with somebody else's brand. Our manufacturing partner could give us access to the markets.

Has your manufacturing partner made you more agile?

I think what it has done is enable us to do more, and the business model has changed slightly to what we have done at EEEE. EEEE was our first big and is still our biggest outsourcing activity, what we did was take our intellectual property and our design and got EEEE to subcontract manufacture that for us,

and we were the design authority. What we have done in other areas is that we have gone to specific companies who have expertise in our business of bathrooms. As an example we have gone to a shower handset manufacturer and co-developed with them a range of new handsets. So our intellectual property is at a much lower level. They have basically done the design, we have part funded the tooling with them, and the quid quo pro is that they can sell that in their market outside the UK and we can sell that exclusively in the UK market, and that is by leveraging our capital expenditure and our R&D resources. And we have done that in another area with an electric shower. The IP is shared, effectively shared, it is divided up by them and us and we have exclusivity to use it in our market and they have exclusivity to use it in their market. We have done a similar thing with an electric shower, we worked with a Chinese manufacturer of electric showers, and they have an expertise in electric showers, they have the test equipment and they have the R&D guys. That is different to EEEE, EEEE does not have that, and they might think they have but they don't. So we went for them and they offered us a range of electric showers that they have already developed, so what we did was tart them up, make them look suitable for the UK market. So it was their IP, it was our design so we could register the design of the product in the UK, but it was very much their IP and they paid for any tooling that was required. So it is moving to a different relationship, and again the reason for doing that was for capital expenditure saving and it was R&D saving a well. They were very good and they invested tons of R&D to make sure it was good enough, even though we did not know it at the time. In the future there is an exclusive arrangement where they will develop a new range of showers with our involvement and there is a clear definition of who owns the IP and stuff like that, which we will probably follow through as well. The reason we have done is that way is that we cannot afford to invest the R&D that I would aspire to invest in a range of different types of technology that we now have to support. We cannot do a range of electric showers and digital showers at the same time and given the opportunity and the one that is more valuable to us, for digital showers we are the world leaders so we have got to invest in that, and after you have done that there is very little left over for the other technology. So we have got to leverage our suppliers, and there is nobody we can go to in the UK because they are all our competitors so we have to go to abroad. So that is a different type of outsourcing where you are not only outsourcing the manufacturing but you are also outsourcing the design as well. EEEE are very keen to get involved in this and they have given us some quotes recently so we will consider that, we are considering that at the moment as an option. I know there is the Penang facility which may be able to offer something in EEEE but they are not experts in electric showers, they are experts in lots of things.

Manufacturing things primarily, and designing things that can be manufactured?

Yes, I agree with you. They are very good at that. So that is how we are extending our way of managing these suppliers. It is to outsource not just the manufacture but to outsource some of the design as well.

Has it given you access to raw materials or to components?

In certain areas, there has been, that is actually a good point, what we have found in the Far East is that the cost of raw materials, is that sometimes, but not always, it is cheaper. For plastic polymers we have found that it is cheaper to buy through Singapore say than compared through buying them in the UK. We have not found in other areas, in electronics and thing like that, what we do find is that there is.... tool making, tool making now in the Far East has always been pretty good, but now it is as good as anywhere else in the World. You need to choose your toolmaker pretty carefully but the tool making can be first class, they may be using Swiss or German CNC machines or spark eroders or whatever it might be and that means that they can be very good going that fast, Though the UK has been coming along very fast behind, it has had to adapt pretty significantly so cope with the threat from the Far East.

Has it brought you access to any manufacturing or technology capability that your competitors may not have access to?

Good question, I do not think it has.

My final comment is that I do not think outsourcing on its own, you cannot just outsource, as the world becomes much more complex, and the number of product ranges and sku's we have expands, there has got to be a very important part of the supply chain is the logistics management. And something has to be done in the UK, late point customisation is the only way you can make a more complicated logistics channel work. We cannot predict our sales accurately, we are now going down the track of next day delivery and if we are not careful then the only way to manage that is to have an enormous amount of finished goods stock which will then take cash out of the business, so we have got to find ways to manage the outsourcing through clever logistics and late point customisation, and that goes back to modularity and that goes back to design. You have to get all those things together to make it work. One of the things that is changing is that it used to be blatantly obvious that moving to the Far East would save you money, it is not so clear cut now. There was a project last year where we were looking to bring back quite a lot of the outsourcing we had done. Now that project has not been completed yet, now my mantra was how are you going to manage the difference in labour costs between the Far East and here. That is basically the difference, it is slightly more complicated than that, but how are you going to do that and they have not been able to come back to me yet to say why it

might be better to insource. So that is a big thing at the moment, insourcing back into the UK, and for us I do not think it makes sense yet. One day it might if our business becomes more complex and we have this logistics we cannot manage then I think we might change our mind, but at the moment it is clear that we will remain as we are now.

The expertise that you have in manufacturing in particular, production engineering, work study, all those sorts of things, flexibility of labour, we do not have in the UK anymore, it is very difficult to get that. People with degrees here do not go and work in factories, and so the level of expertise that you have in that area is nowhere near as good as somewhere like EEEE.

The other opportunity that we have in the far East, and it is not only in the Far East, I have not spoken much about the outsourcing we have done in Europe, has not been as successful but there is a different spin on that, and that is about quality and low volume and style, things like that. Speaking about the Far East, the people there are a lot better than you can get in the UK and they cost a lot less we are actually funding an R&D engineer in a company in China now, we are going that far to make sure we get the right level of service.

Interviewee B1

Have you ever manufactured in house?

Yes

When did you outsource?

Around 10 years ago. It is all over the world, mainly all over Europe and Asia.

Is the business significant compared to your manufacturer's turnover?

It is interesting that it has changed over the years. We were extremely influential at one point in time with EEEE but over time they have found bigger customers and we have become smaller to them and a bit further down the pecking order. But some of the manufacturers we use in Europe, we are still quite significant.

Do you outsource high volume low mix or low volume high mix?

Both. Absolutely everything is outsourced and there are definitely some of the unit we have got are extremely low volume but high mix and some are even made to order. Some of the units we have got are high volume low mix, such as the Icon range.

How would you say compete in the market place?

The market is very competitive, especially the market that is new to us at the moment which is heat recovery. It seems everybody is getting into heat recovery at the moment and everybody is starting from a blank sheet of paper. It really is at the moment an emerging market in the UK. The advantage we have got is that we have got established contacts with established products that we are bringing in from Europe. It makes it easier having those relationships to be able to offer what the customers want.

Were you there when AAAA decided to outsource?

Yes.

Who made the decision?

It was the owners at the time. You may remember Jonathan and Hamish. They decided that it was time to outsource. I think the reason for that was that they had quite a large portfolio of properties in High Wycombe and they bought a business which was not doing very well at all and so they decided to bring

some capital back into the business by selling some buildings, they sold the buildings and at that point they decided to cut the overhead as well and find partners offshore.

I guess there was a lot of politics involved at that time

There was because now we are a substantially smaller headcount company than we were 10 years ago, slashed substantially, maybe only 25% of what we were. And that is really from manufacturing.

Was there consensus with the manufacturing managers for instance, was that yourself?

I do not think there would have been consensus, I was only party to some of the decision making at that time and one of the reasons was that I was needed to help with the outsourcing. The part I was involved in probably took 3 to 4 years in the planning because of all the machinery involved, it was not just a case of finding a light partner. It was done probably in 2006 whereas it was a lot easier on the plastic side of things. I do not think it went down very well, purely on the amount of people who would lose their jobs, including the manufacturing managers.

Would you say outsourcing has been successful?

Yeas, pretty much, pretty much. Our manufacturing partners are all over Europe and we pick and choose the type of partner we get involved with. I would say that there is a call to bring some of the work back on-house. One of the driving forces is that I think we could keep a lower amount of component stock. It will enable us to give a higher mix, so a higher mix of our products with lower stock of components.

Is all of the product built in Asia sent back to you or is some drop shipped to customers?

Some of it is drop shipped.

Has this given you an advantage, if the manufacturer is in the same region as the customer?

To some degree. But it depends on what you call as an advantage. Yes, obviously there is an advantage where lead time is concerned. But having said that, many of our competitors manufacture in the UK so lead-time is less of a problem for them. The downside of the outsourcing is lead-time stock holding. The shipping time from Malaysia for instance is 5 weeks door to door. And if for any reason that delivery is delayed then it could get to 8 weeks that means we need to keep a minimum amount of stock of around 8 weeks' worth of products. And if you are selling tens of thousands per month and you need

two months' worth of stock then that is a lot of stockholding that is one of the downsides. If you are working with a European CEM then the lead-time and cycle times are that much shorter.

What were the benefits you anticipated when you decided to outsource?

Without a shadow of a doubt we were expecting lower costs and lower overheads. Obviously we had to get rid of several buildings to get cash back into our business, and we could then reduce our overheads significantly, including power, electricity, gas, and rental.

Do you think you have created any competitive advantages through the partnership?

That is an interesting question, probably one that I am not best to answer. From an operational point of view, we have developed some products which have allowed us to offer a full product range to the market. Now whether you see that as a competitive advantage may be debatable. To a degree it allows us to offer a complete solution to our customers, I am thinking particularly the heat recovery products, where we are working with several manufacturers, probably with four different manufacturers in different countries, some of these are building product to our design, the design is led by the market and so it is providing us with a better solution for the customer.

Do you have any joint IP?

No

Has it brought you access to raw materials or secondary suppliers which could give you an advantage?

That is a tricky one to answer, everything we do tends to be... it is a global search now and so when we are looking for a solution, we are looking for the solution, we are not looking at what country they are in, and it is the supplier that makes the difference. To a degree it is almost irrelevant which country they are in providing the supplier is correct, then it comes down to working with the partner and making sure the deal is right, and the cost. Now having said that it is not all about cost. We do not go chasing cost, so there is absolutely no point for example going to India where the quality is poor but the cost is low. We have dabbled, we have tried that, but we just do not maintain the quality standards that we demand from our suppliers so you tend to go to different countries where the quality and the repeatability of that quality is sustainable but they will not be the cheapest. They are not always the most expensive and there is this balance to be had. We have changed suppliers many times for some of our components, we have a triangular relationship with our supplier and their secondary suppliers

so we want to be involved with some of the secondary suppliers for example for some of the more important components such as the motor, or the electronics. We have got to be part of that relationship so that we can affect that relationship.

Normally what happens is that we have the relationship with our main suppliers and we have built relationships with the secondary suppliers and then introduce our secondary supplier to our main supplier. Now we know it can work, we have worked with both of you, now go and make it work together and that is important for us to have a certain amount of control for some of the components. Some of the plastics for instance, the low level plastics, it is just not a problem, but for some of the components like the motors and electronics it is extremely important that we are involved with that.

Has the relationship given you access to technology that you would not otherwise have?

Yes, without a shadow of doubt, especially with the electronics. We have got a small engineering thing here but we rely on some of the secondary suppliers, but that is their business so we do develop things with them but we always keep the IP.

Have you ever benefited from any of your manufacturers IP?

That is a difficult question to answer and..... I do not know. I cannot think of anything that has directly benefited us but there might be something in the background that has aided the design process if you like or the manufacturing process for our components.

Do you have any exclusivity on that?

No.

Anything else you would like to add?

Please remind me of what you are doing.

I am doing a doctorate and I am investigating what long term benefits may be achieved through outsourcing.

I do believe that the initial reason for us to outsource was to keep the business going, it was for survival, and as a business we are having double digit growth year on year at the moment again in this particular environment it is pretty good going and I do not think we could have done that unless we outsourced.

So it has given you capacity and flexibility....

Without a shadow of doubt. Capacity and flexibility are by far the biggest benefit we get from outsourcing.

.... without investment?

Without too much investment! Funnily enough we have just launched a new product which we designed jointly with a company in Poland, but again the IP remained ours. The good thing about Poland is that they have huge great warehousing and instead of storing the product here, we store the product in Poland and the cost of doing that is substantially lower cost as an overhead than doing here and we can call that product into the UK within 2 or 3 days and that is important. If you imagine the cost per square foot of a warehouse on the CCCCCC in HHHHH YYYYYY compared to the cost of warehousing in the middle of nowhere in Poland it is significantly different.

Does that product go to the UK or do you supply any into Poland?

Purely to the UK that one, because it is a branded product so it is something that they ship here.

Have you been to Poland?

Yes, lots of times. We deal with Czech, the Germans, Finland, and Poland. Poland is very good. Their quality and their work ethic is superb. Their quality is very good too. We have two main manufacturing partners, some people are just suppliers. We have some suppliers from the Ukraine but they are just suppliers, the manufacturing partners are people we work with to develop products.

Thank you Paul.

Interviewee B2

I am interested in outsourcing and the benefits achieved through the relationship. Did you manufacture in house before outsourcing?

We manufactured internally first and I suppose the prime reason for outsourcing was to try and get a competitive edge. At that time we had around 150 people working in the UK and they were split up over three product lines that was domestic fans, industrial fans and instruments. The two new guys that came into the business then saw an opportunity of making some money fairly quickly with minimal investment on the domestic fan line because we were losing market share because at one stage we had 14% or 15% of the market which went down to 2 or 3% and we realised that if we could manufacture a competitive new domestic fan they would get some of the market back and also make a bit of profit. We looked at manufacturing internally first but they realised that we had to take it overseas, to China or Malaysia or somewhere mainly for cost reasons.

Was it to introduce new product as the primary driver?

It was trying to get market share back, that's what we were trying to do with the new product range. That's when we got in that new Icon product range that we put in to EEEE. It was a unique product, and they did realise that it was unique, and that if we could come up with a really good cost base for it then they would definitely get market share back. And that has proved so, they have got a good market for that now, I think they have more than a million sales for it now. I have seen them in hotels but I do not think that it is a product that is going to compare with the cheap end of the market, it is a better quality fan. It is a not bog standard ordinary fan that a lot of the sheds have got, I think there is a cheaper range of Expelair and Vent Axia fans which are build them high and sell them cheap. I come across them now and then but it is the quality that is the key thing.

How long ago did you decide to outsource?

Let's have a think about that for a minute, now is 2013. It must have been around 2002 somewhere around then, it must be 10 or 11 years ago we first went to EEEE originally,

Their turnover was around 200million, and In terms of turnover our product was around 1 million.

Did you outsource everything or did you carry on making some things in house?

We carried on making the older product ranges. Well we assembled them in house, we just buy the parts locally with mouldings and we put them together but eventually those models, because of the

lower quantities, EEEE agreed to build those as well. It was mainly for cost, and we ended up shipping the tools over to where they were manufacturing those.

So these were low volume high mix?

Yes

So how would you say your company competes in than marketplace? what are your competitive advantages?

Well, certainly our costs. If we spin in that away to TTT, obviously have products manufactured in the Penang office out of Malaysia for our instrument range, it is called an LCXXX which is a rotating vane and a thermometer. If we look at the base price of that, because they manufacture the printed circuit board and the mouldings for us and send it in nearly fully assembled but we have to calibrate it, so we put on an impeller and calibrate it here. But basically all the parts come in from this guy, and basically because it is very low cost, it's a fairly low cost instrument anyway, but our manufacturing cost is you know a good deal lower than if it was done over here.

Who made the decision to outsource?

Erm, I think that came from originally we already had the contact with EEEE from the previous owners of AAAA and the writing was on the wall really because we were losing market share and we had to do something so we had a meeting, I had a meeting with the MD and said that you know, we were manufacturing these things in-house and we were actually making our own motors at that stage and the typical cost for a motor to be made in-house was £12 to £15 and we could get them for £4 from China. So I said to him, and I went through sample motors, got them in and tested them and they proved to be OK, so really the decision was a forced decision by AAAA, that was back in late 1998, sometime around there, 1999? I was Engineering Director at the time. I was working closely with CCCC HHHHHH who was the Marketing Director at the time and he wanted more share, you know, so we obviously had some input into getting that new product designed and manufactured for a set market really.

So was it a formal decision?

It was, it was made at board level decision, and that the company would invest a serious amount of money. It was always a bit of a problem at AAAA because we were so diverse it was difficult to support three product ranges as you can well imagine, with instruments, domestic and industrial fans, and so

they had to make a, you know, difficult decision. That's when the instruments were sold off to TTT. So that was a good decision for them.

Was there much company politics involved?

Err, yes. Throughout. The company policy, you could imagine. Actually I nearly got the sack, at one stage because I was getting sample motors in and some of our factory was making motors and I was asked by the guy who was a Director at that time who was asking what are you doing? because we had thirty staff here making motors, but I was getting motors from China at a third of the price. So there was certainly the politics between him, me and the MD. I had to say 'what do we want to do?'

In the end the MD said well, we cannot survive with the market share we got and the people we got so crucial decisions had to be made, and in the end we closed that company down and moved our manufacturing overseas.

Where is your market?

Mostly the UK. The domestic fans at AAAA were mainly for the UK, but obviously we could use a different voltage motor and supply to most of Europe. Whereas our instruments here are worldwide, so a big market in the UK and a big market growing worldwide certainly middle east, china. We are opening offices all over the world to get local support. Our LLL which is manufactured in Malaysia goes all over the world, so there is a massive market for that.

What benefits have you achieved through outsourcing?

A big cost advantage.

Any negatives?

The volumes sometimes, certainly on the domestic fans. When we started getting the domestic fans in, before we went to EEEE we went to a company in China, and obviously when you have a big volume of fans coming in, if there is something wrong with them then there is a big problem. With EEEE it has been a bit better because their quality is very good as you know, they flag up issues before they happen to us. With EEEE there are not too many issue. Sometimes with components when we have had to buy more components that are on long lead-times or they have gone obsolete. Sometimes when you have to buy big inventory then that is a bit of a bind. I think the positives outweigh the negatives.

Do you think the outsourcing relationship has brought you any competitive advantages?

Cost is the major one, and as I say the quality is very good.

Have you had any collaboration?

Unfortunately when we were taken over by TTT, the American company, they keep things very local to them, they do not often go overseas to get things manufactured

I have tried desperately to try and get more product out there, more new product but it has fallen on the ground really. Jointly we could do a lot better, a lot more business with them.

For the Icon was there some joint development?

There was some joint design work on the IP on it. It had to go through a water test and there was some last minute design on the manufacturing we need to do to get it through one of the British standards. There are some things like that that we did with them, but there is nothing on the instruments that they do for us.

Do you think the manufacturing partnership has made you more agile?

I think it has enabled us to react faster than we probably would have doing it here. In that if we hit a peak in our volume they can respond quicker than we possibly could here. It is capacity that we are talking mainly so that is a good advantage, if we were today that we want to ramp up something then they would probably react quicker than we would.

Has it brought you closer to your customers in any way?

I do not think so. I know that some of our customers have asked why it says 'made in Malaysia' on our product and why it is not made in the UK, so there has been a couple of questions that we have had to answer.

So is your market mainly UK?

What for the instruments? No, it is worldwide

I remember that when we were discussing the Icon you were considering having a relationship with XXXX showers?

Obviously we are separate companies now but I still talk to JJJJ KKKKK who is the Marketing Manager, I still have an association with him. But the only, I do not think they have any relationship with XXXX now. I had a bit more of an advantage because XXXX was one of EEEE's customers and so I bumped

into quite a few of the people who were travelling when I was at the Hotel so we sought of grew up a relationship and it got us to things like materials and the plan, we shared that material but that is as far as it went because I went to TTT. As soon as I went to TTT then I think that relationship was probably dropped, which was unfortunate because I was talking to Directors and all sorts that were in there from time to time and built up quite a good relationship but it is a people thing so I think that disappeared I think

AAAA is very much focused on manufacturing and not necessarily so much on market opportunities?

Yes, that's right, they missed that.

Are there customers in Asia for IIII?

I don't know, I would think so. I think it is a worldwide product but voltage comes into play. I would suspect that the Icon is mainly UK, that is their biggest market.

Do TTT have customers in Asia?

Yes. We have an office in Beijing and we have opened an office in Singapore now. What we are doing is we are expanding so that we have that local support We have what is called channel partners, so instead of trying to open an office in every single country, which is expensive, we set up a channel partner in a particular country who is already selling that type of product into their area so they know the area and they know the business. If the business is looking really good then we may set up an office like we have done in Beijing and Singapore, and that works really well because if people buy products of ours then they want us to service and calibrate it, basically. It is important that you have that local support there.

So for TTT, do EEEE send everything back to you?

Yes, they send it all back to us and then we finish it by setting it up and then we calibrate it here and then ship it out to customers to all over the world including our head office as well, they sell it on our behalf in America and Canada, and we do the rest of the world.

Has it given you access to suppliers of raw materials?

All the raw materials and everything, well let's say 90% of them, are purchased by EEEE, there are one or two of the items they come to us for because they cannot get hold of them locally and we can get

hold of them, there are one or two components and we send them out free of charge and they take it off the invoice. But basically they work through our bill of material and they source it all locally for us.

Has that brought you new suppliers that you would not otherwise use?

Well we do not class them as our suppliers because you know, obviously, EEEE is our supplier and it's up to them to source the local vendors themselves. If there are any change to major components obviously we go through that sampling, we leave them to do that. Originally we set everything up with them and said they can go out and find their vendors, we are not going to tell you who you need to use, we still sign off on things once we have tested and approved it. So if there is a major change to, say, the printed circuit board and they want to change manufacturers, they have come back to us with some samples and say look, here is a different manufacturer, here's some samples, can you approve these? so we leave that sort of side of it to them. We do not really have any contact with any of their vendors, so that has not given us any strategic advantage.

Has it given you access to processes which you would not otherwise have?

In house processes, with the way that they produce the product, I have learnt especially a lot from the way they do their in house manufacture. That has helped me with some ideas on the way we produce here. To do with setting up lines, the documentation and that side of it has been a real help because, well we both know that they are pretty good at that type of thing. I have, going out there, and working on the lines with them, hands on, I have really learned a lot which I have been able to bring back and put in place here

Have you shared or crated IP with EEEE?

We certainly had discussions about IP. We really needed to get confidence at the beginning that the products we got really are unique to us and everybody is sensitive to who else is coming in to EEEE and looking around the building, and who are their other customers and have we got any that are potentially ... could cause a problem if they saw anything, so we certainly had that discussion over the years and I know EEEE are very very sensitive on the type of customers they have got and who could come in and what have you. For example the XXXX AAAA, when we were talking to them about that they said how would we feel if XXXX saw some of our stuff. A lot of it is fairly open, it is in the public domain and if somebody wanted to buy a fan and take it apart, or an instrument, you know, you could see it, it is just the documentation you got to be careful of, the supplier’s documentation and costs. We did not create any IP when we were working with EEEE. We certainly got ourselves covered with

the Icon fan in the UK with patents and things and before we went down that road to go out to EEEE. That was one of the reasons we did not go to China either, we ended up on Malaysia because we felt more confident that the IP for that particular product was going to be safe.

So is there anything else about the manufacturing partnership that brought you any competitive advantage?

Well, no, I think, the costs, they can turn out products fairly quickly which I think is important, the way they do business and the forward planning and that sort of thing does give an advantage, delivery performance, there is nothing much else that does really stand out.

Product introduction, time to market and reactivity?

Yes, certainly. They got that product to market probably quicker than we would have done with our moulding company over here, when we were looking at the launch of the product that was the fastest we got for a launch. For making tools and what have you, and if we needed to do a major change to a tool then that side of things was very good because it was all within the control of one company, that was an advantage. Once you get into manufacture of course then that kind of thing goes away.

How has the company's competitive position changed through outsourcing?

Well certainly for this particular product range, we are probably with the lowest manufacturing costs for our entire product range, which means we make more profit on that range. I mean typically we are asking for 60% margin for our product range. I think for the range that we are talking about, it is well over 100% so tit is a huge advantage for us. We could never get it manufactured in this country for those costs, so that is a big advantage for us. I mean typically the biggest discount we can give on that part is 30%, I mean for a channel partner, so if we had a channel partner who came back to us and said here is an order for 200, can you give us a discount of 40%, then we can do that on that product because we know the cost base is so low, but on a lot products we know we cannot do that. That is a big advantage for us, for that product range.

That is TTT stuff?

Yes, but there must be a similar thing with the Icon and the old products put out there, the low volume stuff, you know, and I gave them a target to come up to for the manufacturing cost and they met that after some negotiation which would have meant that, I worked it out on the volume, would have made AAAA a lot of money in the twelve months. It just gives them a bit more flexibility to get the orders in

by being able to offer a lower price. Flexibility is very good. TTT are reluctant to outsource, it is an American company and very reluctant, I mean we are trying to manufacture a few things for them over here but it is very difficult to get them to outsource even simple products and even to us in the UK. We are still doing the hand-held stuff but that is it, we do not do anymore.

Do they use Mexico?

No. We get parts from Mexico, cables and things from Mexico, but there are opportunities out there, but I think it is a quality and reliability and those kinds of things and emotional thing for them. I personally have developed a very good relationship with people out there and I know it is first class. If there is a problem then I know I can talk directly to the guy that is making them and get an answer. That is crucial when you subcontract overseas. Relationship and communication has got to be good, and with EEEE we get advance notices of things are going obsolete, or they have got difficulties with lead-times and they want to give us an early warning and flag it up. They might ask us to pull forward 2000 components. All that kind of collaboration is vital.

I am really trying to find how people have found new market opportunities through outsourcing

I know. I met a lot of different people when I went out there. I met people from DDDD as well who helped me with some personal things at home. So it is all about building relationships and with a company like that who are dealing with big companies, then there are lots of opportunities, there really is, and it is just taking them.

Interviewee C1

We use FFFF for the optical cables and modules and I think ermm, the normal reasons for outsourcing such as cost advantages, accessing cheaper labour markets, looking at internal resources etc. but I think the FFFF model was slightly different in that they operated in a way that you effectively had a dedicated production facility within their factory and I think this could have given us potentially some other benefits which are not as obvious at times and not available from our other subcontract vendors who had standard processes. So some of the things that we did there, you could argue, could give us in a sense a competitive advantage. Things like being able to ermmm, dictate or work with the subcontractor to give a different set-up than they would offer as standard so what I am thinking about there is, for instance we put in, one of the major things which is always touted as being the niggler of that business is that prevented it from succeeding was the long lead-times associated with the manufacture of the product just did not work with the market and the competition so typically you may be looking at something like twelve weeks as a standard lead-time, most of which was production in one way or another, errr, and we managed to get that down to two weeks in the end and that was shorter than any of the competitor lead-times. So we beat them on lead-times, the way we did that with FFFF was just by changing the nature of the supply chain which we, well generally, called a late configuration model and also we built a lot of base parts and then they would select the cable ends and the fibre type etc. and put them together within two weeks and away we go. Now of course that would not be possible or would be much harder to achieve if you were on a share production facility because you would not necessarily have the freedom of manufacturing slots etc, now that is something that we initially placed with other subcontractors, like the subcontractor I was talking about this morning actually before speaking to you where we had difficulty there, we have long lead-times primarily because of production slots available to us, and so I do not think that necessarily with all subcontractors you get the same service and the same facilities, but the particular production model offered by FFFF certainly gave a level of customisation which you could certainly argue could give you some kind of competitive advantage. Now, that is competitive advantage over the competition and their use of outsourcing, what would be interesting of course is if you could argue that this could give a competitive advantage over any internal source, and probably not because you configure your internal resources more easily than a subcontract resource but given that you probably need to use low cost Asian manufacturing and not home based western manufacturing, the base line is that it has to be done in Asia so you are not really competing against other people's internal resources because we knew that the major competitor, who it turns out was Tyco, they were also using ermmm, they

were not manufacturing the cable part internally either, they were using, they did a lot of subcontract manufacturing as well, so I do think we beat them on lead-time, unfortunately we did not beat them on price so it did not entirely lead to winning as much business on that part as we envisaged. In the end Tyco bought that bit of business from ZZZZ at the time.

So did you drop ship to customers?

We did yes, we drop shipped to customers, that is a model we pushed forward in the majority of our subcontract relationships. So we drop ship to customers now out of Singapore by working with a subcontractor for high end module products, but I struggle in the latter cases to see the competitive advantage over the standard model because it is a more standard relationship where we share manufacturing resources with other customers.

Are your customers in Asia? where is your main market?

For the Singapore based work, which is a medical module, it is the major use we make of that subcontractor, they manufacture it and they test it for us, the argument for competitive advantage in that case is that we could probably do that at least as cost effectively ourselves, we do not because of the qualification would be a major pain to bring it back in house.

So you qualified them instead of yourselves?

Yes we did, the reason that we chose, I guess what we be of interest to your research is why we chose to do it externally instead of internally even though there would not be a significant cost advantage, this is one where I think that what was an advantage that could also be an advantage I suppose to a competitor, the product we manufactured there originally was intended to be of a volume where we would not put in resources in place internally and that was why it was put out, of course that could be an advantage but it would be an advantage that would be available to competitors and so would effectively be nullified.

Were they qualified to ISO13485?

They were not, no. they do not need to be for that product.

The customers for the optical product, where there is a stronger argument for competitive advantage, were worldwide. There were customers in Asia, customers in US and in Europe.

I can see that there can be certain situations where there is a strong argument that subcontracting can give you access to market and clearly that is the case in a number of arenas but in my experience that has not been part of the rationale for the outsource decision because our products tend to be quite specialist and not, were not particularly gaining a market share or access by the outsourcing activity itself. MMMM is more widely is a largely outsourced business form the manufacturing people and by far and away the rationale for that is cost, as you may probably expect but this may be overplayed at

times. The other major argument would be access to technology, so if you look at some of our supply lines the technology available which we do not possess ourselves, manufacturing process, and which we would never possess going forward and so those things are clearly very relevant. Going back to where you started, Dennis, I don't see that those things would not be available to our competitors, they would be. There is one relationship that MMMM has that I am not so closely involved in , that is with ASE in Malaysia, think there could be an argument there that the closeness of that relationship does give us an advantage over and above what might be considered the standard relationship. We are in one particular plant area with one largish customers, it's a relationship that has been built up over a long period of time, I think we get better pricing as a result than some of our competitors and we get more influence there and get things achieved which we probably could not do otherwise. We would put somebody there at the end of a quarter for weeks at a time and effectively act as if it was our own facility. Now that I think is .... the strength of the relationship there probably does give us some advantage over and above that which a smaller customer in that facility would have, now that is not true with other subcontractors we use because we are not a dominant player there. I think there would certainly be a link between your relative size and the influence you would expect as a result of the size and the importance to the facility and the advantages you could obtain from them. That is probably a fairly obvious statement but it is true.

It is not that obvious, a lot of people try to put a small amount of work into a large manufacturer.

Yeah, it's a big fish in a small pond argument. We as what was the former ZZZZ bit of MMMM was not an enormous company all together, we were trading at around 200 million dollars so, you know, if we spread our net too widely then we would get very diluted in the subcontract community where typically there business is bigger than that of total ZZZZ.

So you have been choosing partners which are suited to the technology and application?

Well absolutely, and if you can do that and put all of that business in one place then it can certainly help. One of the mistakes ZZZZ has made over time, especially in the module arena, especially in the medical module arena is that it has chosen people for the supply chain of those modules, not just the modules themselves, who don't always make sense and flipping your question a little bit on its head I think you can in that sense get a, if you do not choose appropriately and I can give you some examples of this, you can definitely have a competitive disadvantage as a result and I think if you back to the Kano model with the qualifiers and the delighters and all that stuff, this is quite an interesting topic where a lot of things we gain with contract manufacturing become a base line which you have to have before you even have ...

So it becomes a qualifier?

Yes, a qualifier. This is not a competitive advantage but you cannot compete without them, full stop. So there is, a lot of those things become qualifiers and it's trying to find out what are those things, if you talk in the Kano model terms, they are the things that take you beyond the qualifier level.

If there are a limited number of suppliers who qualify to build your product and your competitors products and you secure the best one then you could secure an advantage.

You could indeed, and I think 'the best' becomes an interesting term here because earlier you mentioned appropriate suppliers and that has been a hugely important thing. I will give you an example of an ..... the supply chain for medical products, the issue we have in the main there is that it is a strange market from a semiconductor point of view for the IC part of the process is very, very low volume and can be very slow for the different stages of the supply chain. So if you think of one of the processes, say the solder bumping of the IC's we could generate potentially millions of dollars of sales of the products for us, but for the supplier to provide the funding for 1000 wafers may only be adding a few thousand dollars of value for them. So what is hugely important to us is not very significant for the supplier and that could be the same or similar for other operations such as sawing wafers. So one of the issues we had was selecting the right supplier who is able to support us in a niche environment. I would switch away, we have struggled a bit in some of these large Asian subcontract manufacturers. Where we have succeeded with actually outsourcing not Asian but in the US, and they are not particularly competing on cost, they are competing on quality and reputation and reliability so we used a long term collaboration with a company in California called Callwell for their IC processing capabilities that could definitely be a competitive advantage because our customers have a relationship with them and so because they are qualified with them it made our product qualification much easier if we used them. They have the medical certificate that you mentioned, and they also perform a high degree of, with a high level of quality. Perhaps more importantly, because these are very niche businesses and difficult to qualify, it is difficult to react to the changing demands of the business and it is difficult to get responsiveness from the contract manufacturers and so for any very short-term call-ins or increase requests they will take people on to accommodate this without contest, and this you do not get from the large Asian subcontract manufacturers if you are a small player. There are disadvantages with working with large manufacturers, there are advantages with working with smaller ones who are much more niche and much more specialist and are much more focused in their offer. We have some activities with CCCCCCC which has resulted in joint development.

Have you collaborations with your suppliers?

In some circumstances yes, with varying degrees of success

Has it brought you closer to your customers?

If you take the FFFF optical example, the CCCCCC one then the answer is definitely yes. For the Singapore one and some of the other larger vendors we use then the answer is no. I think the appropriateness of the vendor and the type of business is critical in that.

Has it given you access to raw materials or pricing for materials that you would not otherwise have had?

I would say to a limited extent that it has. If we take the module that we have made in Singapore as an example, we own the pricing on the job and for the PCB itself we use another supplier and we do get a better price as a result because they produce a lot more than we ever would from that supplier, so to a limited extent yes, I would say we do. That is relevant to the cost, I cannot think of anywhere where we would not be able to get supply by using that subcontract vendor

Have you done any joint R&D with a supplier?

That development of that module in Singapore was a three way development with the customer and the supplier. Whether that resulted in a competitive advantage I am not sure. To be honest I was not close enough to that part where I could really comment.

Any joint IP?

Not yet. There are some things that are going on where you may need to talk to Martin. We have a product under development with a European collaboration with a German supplier where there is joint development and shared IP but this is probably not looking for competitive advantage.

Interviewee C2

Did your company manufacture and then decide to outsource?

Erm, yes.

How long ago did this take place?

I would say that the program started 10 years ago

To what country or region do you outsource manufacturing?

Asia

What is the sales turnover of your manufacturing partner?

Given that I do not deal directly with them.....

Would you say it was USD10m, USD100m or USD1bn?

I would say around USD1bn+ for assembly and for fabs it would be more than that actually.

What is the size/value of the business being outsourced in relation to your total manufacturing volume/spend? Typically we outsource almost everything, I would say 95% to 100% depending on product range

Are your products generally high volume/low mix or low volume/high mix?

We are very much high volume low mix, especially for the products we outsource.

How does your company compete in the market place and what are your competitive advantages?

I would say it is a technological value proposition, a technological marry. The prime focus is beyond the technology alone. And then we get into the commodity business then it is straight price.

This part of the interview concerns the decision making process

Who was involved in the decision to outsource and what was the process?

I would say that it was mainly driven by CEO and the Ops Director.

Who were the decision maker(s)? Management level, amount of involvement, breadth and size of decision making group?

The decision was really handled through their respective organisations. Sales would have a knowledge of what was going on and so would Marketing who would understand a lot of the customer perspectives on particular outsourcing decisions. But the main driving force was through the operations team who would plan with purchasing, the finance guy who would all make respective decisions.... and obviously the quality guy.

What length of time was given for the decision to be made?

The decisions varied depending on products. Some of the decisions were really simple, you get to certain moments of truth with some of the manufacturing plants, typically with the fabs and when it comes to big investment, the next big investment becomes the decision point on whether we do it in-house or go outside. We had some competitive advantage in keeping some of the products inside because a lot of the products we were doing were dying off in the market place and it was important to keep those processes inside. Outsourcing works better with high volume products that do not change very much. The products that the in-house manufacturing facility were doing were much more custom products because there was a competitive edge for having those processes internally, but this advantage became less and less.

Was there agreement, consensus and/or compromise on the decision?

It was a compromise because of the vested interests of keeping manufacturing in-house, some people are more comfortable of having a captive supplier, and obviously there are issues around IP protection which come to the fore really when outsourcing product. The types of products we ended up outsourcing were not particularly IP sensitive in relative terms, you know.

Influence of the decision makers in relation to the company's strategic and operational management

It was Board level that set the strategy and it was the operational people who executed that over a number of years.

What was the level of formality/informality of the decision making process?

It was very formal at Board level.

What factors were considered when the firm decided to outsource?

We did a lot of benchmarking in terms of costs, especially the main operational costs, and quality and delivery performance, that kind of thing. Information was gathered on a number of options; we looked at internal supply, international investment profiles, prices going forward for particular products being sourced, we looked at technology roadmaps, we looked at vendors in terms of potential competitors, and issues of IP protection. We looked at cycle times and service level agreements that type of thing.

The decision was cost and investment driven.

- what situational analysis was carried out?

- what type and how much information was collected?

- what consideration was given to internal factors?

Was consideration was given to the external environment?

Certainly, the marketing and sales people had their input in terms of impact on customers in terms of re-qualification and those types of issues, the more sensitive customers, with custom products who did not want to transfer went to a last-time-buy program and a lot of those products were killed off.

Would you say that outsourcing was successful? why?

Erm, hmmm, I would say certainly in terms of most products it was, we go in a situation where cost per layer gave us a 70% saving, and it made a huge difference. On the assembly and test side of things it was more of a mixed bag, some of the products were at a mature stage from a cost perspective, and we made some mistakes in terms of partners and materials for certain products. For assembly and test side of things where there are more varied activities in terms of platforms and technology, that was more of a mixed bag of successes and failures .We measure success in terms of cost, quality achieved, service levels and the supply buy-in we were able to secure. To give you an example we were running at a twenty six week lead-time for around two years, then we found another vendor who could run at four week cycle-time with minimum order quantities of one months' worth. It was the more recent supply chains that were the more successful ones

The compromise we had to make was over our own internal source, it varied where we could achieve lower piece prices and lower costs and improved service levels, we have typically seen that our subcontractor lead-times are a lot longer than our own internal; there were also a lot of hidden costs in terms of prototype runs and hot-lots, or re-training the workforce. People are a little bit transient, especially in Asia, where we see people regularly moving between jobs and if they are particularly important to your product then you will incur a lot of additional costs in re-training people. So there are a lot of hidden costs, I would say, which makes the comparison a little more difficult but I would not say we have got to a situation where we have proved our competitive advantage because everybody else can go to these people and do the same, do exactly the same thing. Our competitive advantage is still technological as a prime, I would say. Our internal source is really just C now, and we are able to compete on service level for our customers because we are custom products and they are subject to a lot of change and internal controls, control of changes, guarantee of quality and the fact we can respond very quickly is a definite advantage that we can offer and that is why we still maintain an internal source.

So you do last minute customising?

Yeah, exactly, and there are a lot of, a lot of last minute customisation that we do that are not requirements of our outsource partners so its err, the outsourced models are much simpler and are higher volume

So what I feel is that your company decisions are based on cost and you have managed to reduce costs, you believe, and have managed to maintain the same level of service and flexibility?

II would say that we have compromised slightly on flexibility to get that cost gain

I am particularly interested in whether you have managed to achieve any advantages through collaboration with your partners which has given you something which you never had before.

Well certainly in terms of shrinking designs, I would say that this is probably the case. In the terms of our suppliers processes and design rules. I would say that we have gained in terms of risk management because obviously the bigger players have bigger facilities and distinct processes which would give us lots of redundancy in terms of equipment usage. Yeah, so from a risk management point of view it is probably less than an internal source, however you got to pick the right countries, we have just moved some stuff because of earthquakes etc.

Have you done any joint R&D with suppliers or manufacturers?

Erm, not that I am aware of. Certainly in terms of the vendors that we have got we tend to go from an established design, a decision was made that we would use vendors with processes that we did not have, such as a vendor with a six inch fab, we do not have the scale to do that kind of thing and obviously others have capabilities that we would use if we had that need. I can't really think of anything from the top of my head but there are certainly big players who have capabilities

Has outsourcing brought you closer to your customers?

We have some customers in Asia but I would not say outsourcing has brought us closer to them. It would be an advantage to have a local supplier but the converse is true because our customers are split forty percent Asia, thirty percent Europe and thirty percent in the US. Our partner has not brought us new customers. Our manufacturing partners have given us access to suppliers that we would not otherwise have, on the odd occasion this has given us access to interesting technology. I would say that access to suppliers local to the manufacturer has given advantage instead of forcing European suppliers onto them.

What I think generally is that it is horses for courses, I think a lot of people look at outsourcing as a panacea, I think you have got to tick a number of boxes in terms of what you want to achieve, think about the types of products you are making and the customers that you service and if it suits that environment then great, but a lot of people have found out to their cost that just going out blindly outsourcing , and in particular in Asia, it can be very dangerous task.

To what extent has the manufacturing partnership made you more agile; more flexible; closer to your customers. Has it brought any other competitive advantages?

Certain types of processes in this building twenty years ago gave us competitive advantages but now they have become commodities and they are high volume. This is no longer our core business to do those, so they are absolutely right to outsource and I think where we have struggled is on the types of products like I just mentioned where really we have not appreciated just how important controls in-house can give.

Our advantages really come from technology and technology solutions. There are quite a lot of different types of products here and we decide in each case whether we make it outside or if we make it in-house, so the arguments on outsourcing are always fresh in my mind. To achieve any long term strategic advantage will require a real strategic alliance.

Interviewee C3

Were you with the company when ZZZZ started to outsource?

Yes it was around 2004 or 2005. I was actually part of that original decision that was all driven by a need to basically move the stuff that had become competitive out, to make room for the medical stuff.

So were you outsourcing high volumes so that you could put high technology into your limited space?

That is a good question actually. The, I think what drove it was the, it was a mature product line with mature technology and very stable and what we wanted to do was to move the factory onto higher value, newer markets, with different kinds of technology.

So to keep it really simple, the mature product line that was fairly stable which had minimal changes in terms of design and anything else was subcontracted out. And that is a classic reason for people doing that, because I used to work for AB Electronic Tech who were in the contract manufacturing industry before

So who was involved in making the decision?

I would thought that was probably down to operations. Sorry, the decision to actually outsource was down to Jim at the end of the day. Who we actually went to may have been Jim, or the people who were in charge of the operations at the time. It would definitely have been a structured process. As part of that decision to outsource we would have been letting people go as well, it would have been a reduction in the workforce, so I would say it would have been a six to nine month decision process from when we decided to do it. To be honest it was up to two years beforehand that this was being talked about.

When the company decided to outsource, did the company consider internal factors, did you consider the external market, customers etc?

I think really what drove it was really, two things. One was the cost, I think it was more that our desire to move on to new markets. Our current products had limited life, at the end of the day and could not ensure any sustainable growth. It was part of a major shift. The stuff that was outsourced was mainly analogue telecomms products using thick film technology; and the products that we were introducing at the time were mainly medical high end products that have chip and wire and other new technology. It was a funny mixed bag of ideas. Primarily the end user prices were going down and there was a technology force, we needed to focus in different things. The same thing happened with them (new

products), Dennis, when we moved on, the stuff we subcontracted out for, the thick film stuff, that in itself was at the end of its useful life. The volumes dropped.

What benefits and advantages were considered or anticipated when you decided to outsource.

Not completely, but ignoring the answers you would get from JJJ or BBBBB EEEEE, I think it allowed us to focus our resources on new technologies and new products. The main thing was the shift change from analogue wired telecomms to digital wireless medical.

Was any consideration given to competitive advantage and sustainability?

I think it was mainly quality, cost and delivery. I do not think we were levering off of anybody's competitive advantage at all, or any of our suppliers IP. It is probably a different story now, what has happened is that from 2005 the decision was taken to do a lot more European collaborations. These tend to be research institutes or universities who are attached to OEMS and their manufacturing people and so what is happening now with the MP7 projects is that, what there tends to be is a supply chain and then the IP that is collaboratively developed within the framework of the program that both parties won, in that case both parties are levering off of each other's strengths, That really is more for the longer term. For die programs we wrote the applications in 2007, secured the grant in 2008 and 2009, the development in 2011 and now we are working alongside them with our suppliers for shipping the product to our customers from 2014 onwards, and that product will last through until 2018 or 2019.

So that is through joint R&D and collaboration with your suppliers?

Yes, that is where we have moved to. I guess everybody, each partner has trust there now. If you think about it, we talked about the product in 2007 and it lasts until 2018 then that is a 10 year partnership at the end of the day.

Is that using their IP or joint?

It is actually all of it, joint. In one product we own some background IP and the supplier owns some background IP and maybe jointly some foreground IP and the rules of how it may be exploited is written into a collaboration agreement that is written at the front end.

Is the IP all in the design and development or is there manufacturing IP?

In the product design and development the IP is with us, with the process it is with the supplier .And then the actual technology is jointly developed. They probably have the right to exploit the IP in other markets but the offset against that is that they cannot sell the technology to one of the competitors. That is a different scenario to the first time. The first time was a straight make or buy decision where we considered do we carry on doing it in house or subcontract it out. Subcontract if we want to focus on other things. And then we were working with suppliers to see what they had to offer. The OEM's in the automotive market are doing more with suppliers in R&D.

Has it brought you closer to customers?

No, I do not think outsourcing has brought us more customers. The frustration it has brought us. It is more collaborations. The supply chain is part of the collaboration. We got involved in the XP7. The supply chain is part of the collaboration. The component suppliers, the PCB manufacture is part of the end customer. We started the collaboration because we needed to move on. The things we have established have changed. Products change every five years and our base quality changes every ten years so we knew in 2005 that the technology had a limited life and we also have in chip and wire technology. In two years' time we will be doing very little wire bonding, what is driving it for us is a bit more fundamental. If I look at the original shift in 1999, if we look at our business then it was thick film, hybrid, analogue communications, high technology telecomms. If we look at 2010 it is wireless, digital and it is flip chip technology and no wire bonding. And if we go forward another five years then it will be silicon embedded in the printed circuit board and flip chip. And by 2020 I do not think we will be doing radio modules and wireless technology. the developments we are doing now we will be in high temperature electronics and go full cycle in that the thick film hybrid technology will be useful for high temperature but are fundamentally too expensive.... a lot of our research at the moment is looking at how to get organic materials to work at two hundred degrees centigrade and the only way we can do that is to look at our supply chain and work closely with our suppliers and our customers. We are working with EEEE for a replacement for tin lead solders for high temperature applications, Gwent electronics for material development we are doing the process development. We both own bits of that technology and we have got the National Physical Laboratories doing the testing for us. I just do not see us going back down that thick film route again.

In summary do you think outsourcing has given you any kind of sustainable competitive advantage?

I personally do not think outsourcing is a source of sustainable competitive advantage because the services provided are sold to everyone. Where it moves to a collaborative arrangement where both

parties are putting money into the venture then that is where sustainable competitive advantage can be achieved.

Joint collaboration, joint development, joint investment and access to technology?

Yes, if each partner gets access to the other partners technology. So a company that has not been used to dealing with wireless technology for instance then they get that expertise for wireless. The only other way you can gain competitive advantage from outsourcing is to get the company to chase for your technology, which is a competitive advantage in itself.

I think the focus from Jim is to relive himself of the old technology to allow us to move forward.

Interviewee D1

Has SSSS always outsourced?

We do not do any in-house manufacturing. We have never done that.

Do you think your company has achieved any competitive advantages by outsourcing?

I think by outsourcing it is easier, especially from the supply chain perspective because they have a much better supply system established when going to China, and they have much more experience of manufacturing which has disappeared from here. I do not see many companies... I know the volumes are very low, but I do not see that any companies in our field are doing anything else other than outsourcing.

So in your marketplace everybody 0utsorces?

Yes, in our market space. Yes.

Has the partnership ever brought you access to the market? New customers?

Not that I am aware of.

Has it brought you access to raw materials?

No not really, but if the EMS can do mass buying at the same time then they can help give you a cost advantage. The manufacturer is likely to have several clients requiring the same materials and so this can vastly increase purchasing power.

How about technology and IP?

Yes, especially with UUUU and their manufacturing knowledge.

Anything else?

I think it can be a dangerous, because our outsource partner can become a competitor at the same time as well. So it is a two way street, your outsourcing partner EMS could become your competitor but if you do not do it then you might not be competitive enough, I think it is a double edged sword and you need to manage that quite carefully

So it seems like a given, you need to outsource?

Yes. Our customers are worldwide.

What is your competitive advantage?

I think that a lot of it right now is that we are a machine to machine company so our advantage is our technology I would say. We do not have many competitors. We are a small company, USD500m, other companies are multi-billion dollar companies. In our space we are a niche.

Interviewee D2

My background is for 30 years in doing this, it is almost exclusively in small start-ups and so it is important to differentiate between that and the likes of the big guns who are doing this, who have decided to do it for other trading reasons. My focus is on small start-ups. I joined IP Access, before that I was with companies where I was the first guy involved in manufacturing, among the first half a dozen in the company. I think it is important to understand that differentiation as it will probably drive why we do things. It will be a different perspective where I am coming from than those working for big guys, the likes of Nokia. Fundamentally my reaction will be different because of my focus on start-ups and as you say some people focus on what they know instead of what they don't know.

Did your company ever manufacture in-house?

No, there's not a chance, I joined this company the company at the beginning. All the people here were a bunch of developers. There were two or three developers and a marketing guy that was it. It was my job to come in and sort out how we took the ideas and turn them into a product. There was not a chance of a manufacturing stream here at all. The company was formed back in late 1999 or maybe early 2000. I joined in October 2000.

Where do you outsource to?

A company in Taiwan.

All in Asia? I think you had some before in Mexico?

We used to use UUUU in Mexico but we transferred it all to a company Tailin in Taiwan.

How much is your spend in terms of percentage.

I think we are about fifteen to twenty percent of their turnover. We outsource everything. Our products are low volume and high mix. We do have a fundamental core product. This is built in batches and is customised at the end.

Did the whole of the company agree to outsource?

Yes, given the constraints, we did not want to make the investment as a company. We wanted to focus on what we do best and that was not focusing on the start-up of a manufacturing company. It was doomed from the start, we were not going to invest in this. There are companies out there equipped to do that and the people are doing that already. It was pretty much a no-brainer.

What would you say is your company's competitive advantage in the market?

Our industry is full of start-ups, these start-ups have developed their technology that has remained intact. They have different knowledge. Ours has stayed intact and those are the types of companies I like to join. Where you can take a product from development and take that through to production and out into the market place. That is what appeals to me really.

Your company advantage is in IP?

Ours is the first IP based base station in the world.

Was there any discussion about outsourcing or was it a foregone conclusion?

It has always been from the start. There was some discussion but we all had pre-conceived ideas but as soon as I reported to the Board it was just get on with it, just a case of tell me who, tell me when and tell me how much. There was never any focus on whether we do it in house or out house, it was always out house. They had their ideas on who it was going to be but as soon as I was brought in I changed their ideas and just did it really.

Would you say that you have achieved any long term competitive advantages by working with your outsourcing partner?

Competitive advantages..... to be honest, probably not. To answer your question I will look at it in a different way. Our advantage is that no one else is doing our product design and being first to the market place so we developed by ourselves the product design and we also developed the test equipment and how to test it which is our sort of know how. And because we got the product design and the test design and the knowledge of how to test it then the world is our oyster as to who we choose to manufacture it, the manufacturers is only there to provide work practices and to provide SMT and assembly, and those work practices related to doing the assembly and those work practices are the same no matter what product we choose. So that means we can get our best competitive advantage on that because we are not asking them to do anything new to what they have done before for anyone else in the market place. We are not asking them to do anything new for the design or the test equipment, if we did then they could probably charge a premium for those services.

So it gives you access to their test facilities?

Well we deliver the test to them, we design the product and deliver the test solution to them and train them on it so all the manufacturer brings is the know-how on assembly and that is available anywhere

in the world so that means that we have a huge choice and we can be very cost sensitive to who we go to and negotiate a decent view. If we wanted product design then we would have to partner someone who has know-how in test or 3G experiences and that would limit who we go to and possibly push the price up.

So you do not share or develop any IP with your partner?

To date we have not, they just provide an assembly service. And the service is a me too assembly service, there is nothing special about the service it is a bog standard assembly service that they currently provide.

Has it given you access to customers by manufacturing in Asia?

Not through the assembly house no, not through the manufacturer. Currently everything is shipped back to Europe and we do distribution from here. We are looking into doing distribution from the factory as our volumes are rising a bit so it is probably right to look at that now. But to date everything is brought back to the UK and distributed from here.

So you regard the manufacturer as a service provider to do just as you ask?

The problem would be is that as our company grows away from being a start-up into a company like Lucent Technologies or Nokia who have to churn out models and be creative on the designs as they enter the consumer market, it is a bit like handsets, handsets turn is quite quick, the investment in doing that is quite high so as the company changes focus from where we are now to mass volume producer then it may be that we have to start to reconsider that, we need a partner who has ODM experience and they can take on, then it becomes the design of a me-too product, because it is out there, lots of people are doing it, they become the best vehicle to take that product and do alterations to it which will allow us to concentrate on the next breakthrough. The next breakthrough product. We are looking at that phase now so the situation could change in the future. So we would go from using a basic service provider of manufacturing services to branching out into ODM where they can do the changing. It will give us the ability to focus our resources on the next breakthrough product

Where are your customers now?

We are all over the place now. We deliver worldwide. GSM 3G is a worldwide technology, our market is worldwide so we sell through sales people all over the place. Asian, Europe and North and South America. Our consumer product will go worldwide as well. For Asian customers we will use Asian

manufacturers to drop ship from the source direct to our customers. It would be too much cost to bring it into Europe I think.

We use contract manufacturers to provide an assembly service provider, if you talk to me in a years' time then it could be that we are using them for not only that, but as I said to you, for development of me-too products that will be taken on by the big ODM's and this will allow us to focus on the next big leap forward.

Could your manufacturer give you access to new markets?

The world that we live in, the GSM and the 3G world we live in, there are a lot of differences, the ODM's that say they do routers but they do routers or Wi-Fi kits for home use, their world is quite straightforward, the world of that technology is quite straightforward because you can sell from the likes of the ODM's to the shops and out to the street the route is pretty easy and well-trodden. The world we live is the 3G GSM stuff, you cannot do that, you cannot sell direct from the ODM's to the high street shops to the outside world because you cannot connect it up. You need the operator involved, you need the likes of T-Mobile and Orange. It is not so easy as selling through the Wi-Fi channels, you have to involve the operators. Currently the ODM's do not have any contact with the mobile phone operators.

I think it will change, the problem is that we make the BTS side but we also make the controller that the BTS talks to and that is a large computer system that processes all the data, and what is prohibitive at the moment is that when something goes wrong in the network is quite difficult to determine what is wrong, because there is a lot of hardware and software involved that they need somebody quote switched on to sort it out and the guys that are quite switched on are normally the guys that sell the products, the likes of Ericsson, Nokia, Lucent, IP Access. It is not generally the ODM players because they do not have the background and knowledge to support the network and so when the network goes down they are shouting at the ODM and the ODM says 'our kit is OK, I cannot help you'. The world that the operators live in is different to the world that the ODM's get into.

When we started to do outsourcing, basically in the tablet we can see there were some mutual benefits between AAAA and the outsourcing factory. At the beginning, it was really the very very beginning of the tablet, even the tablet world was not existing yet. We were talking about MID and connected MID. At that time at AAAA we had some technology to have very good quality video and very good quality for audio and also connectivity and the Chinese had a very strong cost-effective solution for MP3 player. During the discussions we had with the Chinese, it was obvious that MID, MP3 player, and all that was coming at that time had clear convergence so we started to discuss the whole supply chain from chipset markets to OEM batteries. The chipset suppliers we have now for tablets, they were all producing chipsets for MP3 players. So basically we learned how to make our in house developed tablets cheaper and they learned from us how to make their products more advanced in terms of technology and that is how we developed the relationship and signed long term agreements with our main ODM suppliers.

So you had joint IP and joint development?

We had joint development, we tried to keep our IP and also we tried to protect ourselves with some contracts because at the time we did not sell..... at the time they did not sell to AAAA and they could sell to another company, and at the time we did not want that because at the end we had the IP, and we had the idea to put soundwave on the MID in early 2009, so it was way before the iPad, the iPad was in the middle of 2009. So we did not want to the Chinese to sell the product and the IP to other guys and so we tried to protect ourselves by signing a contract, with China it is not so easy to sign a contract, and once you have it signed you can never have it. So we tried and we decided the best way to protect ourselves with the Chinese and contract was with a partnership.

Did AAAA ever manufacture in house?

So now, they do 100% outsourcing since I was there. We had in-house development, so some products were developed by AAAA in Paris and some products were outsourced. When I joined AAAA 100% was done in-house, the product development, and the manufacturing was done in China thorough ODM manufacturing. And then, at that time AAAA was not doing so well so we started to expand, we wanted to expand the product line, and to expand doing ODM is quick, because you just go to China and choose whatever product you want and buy it and sell it basically. At AAAA we used to have a very strong distribution channel and so the product we had at that time, the product range, was that the product

range was not wide enough. So we started to work with ODM's just to expand the product range and we started that with .... we started working with ODM's and the chipset makers and then we started working with tablet...

So the MP3 designers were also the manufacturers?

Yes, the ODM factories produced for many of their customers, and OEM factories were producing AAAA developed products only, for AAAA.

What percentage of their turnover was AAAA business?

At the beginning it went from zero percent and grew to now it is one hundred percent. Basically when we went to Asia we did not do any ODM. You either outsource production only or you outsource design and production. So when I joined, of course one hundred percent of the production was outsourced, most of the companies are outsourcing production now, I mean everybody is doing the same. At that time we were outsourcing production but keeping the design in AAAA. Then we started with MP3 to outsource design and production.

What is the AAAA spend in terms of your supplier turnover?

I know that now AAAA has more or less stopped all development in-house. That means that the manufacturing partners only do not have any business with AAAA anymore. I would say AAAA is doing 99% ODM.

What would you say is AAAA' competitive advantage?

AAAA advantage has always been the price. We have always focussed on pricing. I mean, when I was there, when I joined, the main problem was that the products were too high. At that time there was iPod touch and iPhone on the market and AAAA products were more expensive than iPod touch and less fashion, less design and so they were not selling. So we decided, number 1, to extend the range of products and number 2 to have an entire range of product. In the end when iPad came out, we decided to outsource. I think it was a good decision at that time. As for our competitive advantage, iPad was doing the marketing and the work on promoting the tablets. For AAAA to survive we had to sell lower end tablets for much cheaper price. We were working on where a guy goes to a store to buy a tablet, most of the time he will buy an iPad, and if we wanted for him to buy an AAAA product, which is less fashionable, it will need to be discounted. Most of the guys want to have the iPad just to have an Apple product, and we were thinking to get people to buy an AAAA product we have to be at least EUR150

cheaper than an iPad. If the guy wants to buy and iPad and we are EUR50 less then he will pay the EUR50, but if you are EUR150 then they will start to think about it, So we have always competed on price and now that is the drawback, now AAAA is not doing to so well anymore. In 2011 it was a great year, in 2012 Samsung has begun to launch a range of tablets that are good and cheap and now AAAA still has,.... not as good position as Samsung. Now the transition is shrinking, when you compete on price at one point you cannot go lower. It is not sustainable. It is always the same, when you sell and make money you can focus on the marketing and the promotion, but now the problem is different because now they are selling less. They shrunk the company size and less and less people are there. So maybe that is the reason why they do not do promotion anymore, or less promotion, I know they are cutting everywhere.

Did AAAA always outsource manufacturing?

Yes, now most of the companies are doing like this. If you are a company the size of AAAA to do manufacturing is something that is impossible. Even I worked for bigger company than AAAA called PPPPPP, even SSSSS which is a former Dutch company, even SSSS has sold some companies to another French company which has some production, even SSSS is outsourcing. I can see a massive transition from in-house production to outsourcing of production. It is always the same, you need to focus on doing what you are good at, on your core business. This I why I started my new company. Most of my customers have ideas, they have designs but they do not know how to find suppliers.

Are your customers designers?

They are developers and design houses and they have products, or sometimes they do not have products but they have ideas and they want me to make it real, to make it production.

Did your manufacturing partner give you access to supply chains that you would not otherwise have?

Yes. During outsourcing you do not want to lose your outsourcing partner, but of course you have to keep your eye on the knowledge of sourcing of major components, you have to keep your eye on pricing because you should not give everything to your outsource partner because they have a tendency to increase the price, you need to get the benefit of their breakdown because they are professionals in the purchasing for you, so every month they should be doing some negotiation with your main suppliers so you need to be aware they are doing like this and continue to push and challenge them otherwise you will not get access to that information.

Has the manufacturing partner brought you market opportunities in Asia, or anywhere?

We try to do it like this but it is more complicated. We tried to get an Asia footprint. We tried to discuss this with the manufacturing partner but as far as I know it has not been successful. We tried to discuss that with them but there was not much success.

Has outsourcing brought you a sustainable competitive advantage?

Yes, as I told you at the beginning we had guys to bring technology and ideas and in the end we also learned a lot form the Chinese people, we got some new ideas for purchasing and sourcing, and then we met new suppliers and this has helped us also to improve our in-house design of products. It has improved the design by making it more cost effective and also they basically took our technology and then they improve it., The good thing is that you can get you technology improved so for the next generation you can have a better product, or a cheaper product. On the other hand you also give something to them so they can make it. And if you want to bring it back, we are talking a lot about Made in France because of the economic crisis, try to bring back some of the workload to France and make some work. For example I know for the tablet I have some customers who are trying to bring back the production of the tablet to France. Now it is becoming really complicated because at one time we lost track of the technology in France because they took the basic technology then they improved it but we did not know exactly how they improved it or I would say the network, the supplier network in Shenzhen. If you want to develop a tablet in Shenzhen then within one kilometre you have a board maker at one end of the street and you have a semiconductor guy at the other end of the street. You have everything concentrated there. If you want to develop a tablet and you do not want to do it in Shenzhen then it will be much more complicated and the costs cannot achieved. If you want to take it back for local production then it is very complicated.

I found France the most nationalistic?

Of course everybody wants to make in France. Now I have a customer who wants to make in France, a tablet product. And the guy asks me why is the difference with the Chinese so big and you know if you take the bill of materials the main difference is not in the cost of the BOM, the main difference is in the overhead because you know the economies of scale seems like in China if you want to have it produced the manufacturer will take a 10 to 12% overhead including margin, including manufacturing cost including everything. They will amortise the overhead into many customers reducing the burden. In France it is much more than that, it may be 30%. In Shenzhen the whole supply chain is concentrated

and so you get economies of scale here and then the ODNM is doing the tablet for AAAA, for blah blah blah and so they spread the workload over many customers. My customer in France is the only customer doing tablet in the factory and all specific investment is amortised into him and on top of that the workforce cost is more expensive in France. If you add everything like this then France the manufacturing cost is much more than in Shenzhen. On the other side you can say that in France you have a lot less logistic cost than if you are making in Shenzhen. The cost of logistics is increasing rapidly every day and I think will continue to increase. That is a good thing for manufacturing in France or Europe but unless you can bring back massive production and massive supply chain here locally then you will never succeed to bring back production in good economical position. Of course you could if you put the tablet in the main supply in France.

It seems it is a necessity to produce tablets in Asia and the advantages AAAA have achieved is through joint development and joint R&D and the long term success of that depends on the strength of the relationship.

Yes. Exactly and the cooperation and relationship with China, you have to maintain it. You have to have relationship with the people and go and meet them face to face. If you do not do that then you cannot say you have a relationship with your supplier. You need to really be like friends and if you do not meet your friend for 10 years.

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Interviewee F1

Did TTTT ever have in-house production?

No, we never had. TTTT was always a development company really, and in order to manufacture in-house would involve an awful lot of investment. We would have to move to larger premises, employ more staff and invest in equipment. So it is a large investment and even then unless you have got form, unless you have got experience then you will always be on a loser with regards to skills and experience. It is basically like fixing your own car really, do you do it yourself or put it in a garage, and you put it in a garage. It is generally cheaper to go to a specialist.

Are your products low volume/ high mix?

It is relatively low volume but not necessarily high mix, it is relatively low volume compared to the leaders in this market.

Do you know what percentage of your manufacturer's turnover you are?

With Asteel Flash at the moment I think we are probably their major customer, but that is more to do with their business than the business we provide them. We probably give them, I don't know, two or three million pounds or something like that. If we were to go to UUUU for instance, we would be a very small percentage of their turnover. When we go to the Far East we are looking at the smaller players in the contract manufacturing field. We are not an Apple or a Sony or anything like that. We are small players really.

When you went to Asia what were you looking to achieve?

Low cost and quality. Primarily low cost but we know from experience that we get quality as well.

How would you say TTTT products compete in the market place?

We compete reasonably well, we compete in the niche requirements of end users. Basically we compete on the basis of customisation according to customer's needs. For example their might be a retailer called A to Z payment terminals, we will do a special product according to their company name, we might do software applications according to their needs, we would customise the product with their logo, things like that. We would charge a bit more than someone like Ingenico, but we would be willing to provide them with a thousand terminals customised, whereas Ingenico would say that

minimum order quantity is half a million. We are a supplier who will provide tailor made products for the customer, that's where we compete really.

So the sales price of your product is?

It is relatively high. It gets us in the ball park for the product and the customisation is the advantage.

Have you had any negative experiences from outsourcing?

The only negative experiences are the hassle we get if.... in order to get low price, the CEM will probably insist on having fairly large MOQ's on materials so whenever we bring a project to an end there is always a relatively high cost, a termination cost, generally we have to argue over the cost for that figure. Generally speaking no, I have certainly not had any performance problems or communication problems or anything like that. Just the negative aspect of the termination.

This may be similar if you did this in house? You would still have the material cost.

Yes, you would still have that cost, but your costs are going to be higher because we would not have to commit to very large volumes of components. We would not be able to anyway. Someone like Nestronics for instance, they would have 20 customers and they are likely to all use a similar range of components, you know, resistors, capacitors, diodes, things like that. So you can spread the cost of high MOQ's to many customers whereas if you do it in house then you cannot do that. It is definitely a benefit to go to a CEM for that reason.

Have you had any collaboration with a supplier?

Yes we dealt with a company in Penang. What we did when we first got project first got going, we said to these guys, look, at the moment the design is based on components bought in the UK. What you can do for us, which will give us both benefit, is you can look at the design and look to produce these component locally and at the same time we are looking to make some improvements. So for instance a key-mat assembly may have been designed and manufactured in the UK originally but when we moved into Malaysia they tweaked the design and produced it locally at a fraction of the cost.

So they introduced local suppliers to you?

Yes, but you could also do it in-house with regard to assembly methods and test for instance. They may turn around and say there are cost reductions if we use this automatic test process, and they say they will develop that for you, they say there will be a minimum initial cost but ultimately both parties will

benefit from reduced production cost. So not only on materials but on processes as well. The CEM should be able to help out.

So they may have processes that you do not have access to elsewhere?

Yes, they did.

Did you choose the CEM because of cost or their total capability?

It is a combination really. First of all you need to look for a CEM where your business contribution needs to be significant for them so you do not lose out to a larger customer just because they shout louder or because they give more business. It has got to be sized so that your business is significant, so that you have an equal standing in terms of importance, but also, they must have all the process in place that re required for your product file. For instance they need to have pick and place machines that are able to check your product all of those things have to be considered when, making the choice.

Have you ever created any new IP with your suppliers?

Erm.... no we haven't not to my knowledge. Not in my time anyway.

Has the supplier ever brought you closer to your customers?

Not to my knowledge no. But having said that, part of Spire business is designing making and selling POS equipment. With the Spire business they have a product which was designed to sell in Europe but now sells in Asia. They use their manufacturer to sell the product in Asia. It is a joint thing where both parties benefit.

Are there any other competitive advantages that you have achieved through outsourcing?

Yes, you get another input in terms of quality of design, build quality, materials and for instance if you go to a CEM that makes products of a well-known brand, you can say to them I like the design of that how do you achieve it . Generally speaking they will say they use these materials and this process and you can take advantage of that in your own product, their process knowledge and their depth of experience can give an advantage, certainly over doing it in house.

You do get good quality, as well as reduced costs. In our type of business you are generally getting suppliers who have a bigger range of experience because they are dealing with customers similar to ourselves. In the UK electronics these days tends to be very low volume and relatively low tech or very high tech. People either build burglar alarms or panic alarms or things like that in the UK, this is a very

low tech requirement and you tend not to get microprocessor based products that tends to be dealt with by the Far East.

Interviewee F2

Do you think your company has achieved any competitive advantages through the outsourcing partnership?

I do not think we have. A company our size would not do anything else other than outsource. We probably make around one hundred thousand units a year, or something like that. There is no way we could set up a production line and be competitive at those volumes.

So your company has never manufactured in house?

No

Do you outsource to China?

Our current product range is outsourced to Venture in Malaysia, and the new product range is Newland in China.

How would you say your company competes in the market place?

We are the small fry in the market place. In our market there are a few giants, like Ingenico who make a few million boxes a year, then there is Philips who make a few hundred thousand a year, then there is us. We make 100,000 per year or 150, 000 at the moment we compete on, we are price competitive. We compete on service more than anything. And giving the customer a better experience. The other guys are so big you tend to get lost inside their organisation, we hold the customers hands a bit more.

Do you have generic products and you have customise products?

No, they all have to be approved and that is very expensive so we have to make one product for the whole world.

Do you see any problems with outsourcing?

Not really, both our competitors outsource and so it is not an advantage, we are not in a situation where they are making products in house and we outsource. Not really any disadvantages. There is the control issue sometimes. Controlling the pipeline.

Do you have any collaboration with your outsourcing partner, any collaboration?

The new ones have a joint IP arrangement.

So you are sharing IP and sharing technology? is it your IP or their IP?

Yes, it is mostly their IP, we put some ideas in to the product but they are mostly the developer.

Do they manufacture for your competitors?

No, no they don't.

Has the partnership made you more agile, flexible or brought closer to your customers?

We are Europe focused. I cannot think of a way in which they bring us closer to our customers, unless I missed something. Our partner is very focused on the Chinese market and we have a kind of joint venture arrangement. They use our joint IP for the Asia market, and we bring it to Europe.

Has it brought you any sourcing benefits or supply chain?

I am sure it has brought us closer in all sorts of ways, they have sources of product that we would never find. Especially when materials are in short supply they have buying offices that, not always, but often they can get materials at shorter time than we can.

Are there any other advantages that it has brought you?

Well we could not have done out ourselves so everything. The thought of doing that ourselves is unthinkable. We have not got any of those skills whatsoever and we would not exist without a subcontractor.

Interviewee G1

Have you always outsourced or did you manufacture in house before?

We used to manufacture in house

When did the change take place?

Around 2005 or 2006

Do you still manufacture in house?

We assemble, we do not manufacture. We only have one manufacturing operation in house and that we will not outsource because it has our IP and it is quite hard to do.

Where do you outsource to?

China, Malaysia and Ireland

For your largest partner, what percentage of sales are you?

I would say well over 50%, with EEEE it is less. We do more in China, but well over 50% with the smaller guys. We have a lot of influence but it leaves us very exposed.

Are the products you outsource generally high mix, low volume or low mix, high volume.

High volume.

How would you say your company competes in the market place? What are your competitive advantages?

Ermmmm. I would say it is our heritage really, and our reputation. It is the quality of our products. we do not really compete on price.

Who made the decision to outsource?

I brought it to the Board and the Board agreed.

How much analysis did you do?

We did not do as much as I thought we would have done. You know the old rule is that people don't find the best first, they find the first best, you know! We were lucky enough that the main supplier we

got in China, He was a western based guy, a westerner, so there were no language problems. It has generally worked out OK for us from that point of view. We did not actually do that much searching, maybe a couple of months. We made the decision in end 2005 and 2006, and by April 2006 I was in China. By September we were up and running, within 9 months we were up and running.

Did all of the Board agree?

Yes, it was necessary.

Any problems?

Not with the Board, but one Manager left, well he did not leave, he was pushed. We had some union problems but that was easy enough.

What factors were considered when you decided to outsource?

Cost was number one because we just could not manufacture at the right cost in Ireland, and quality was second because of the ISO13485 approvals, those were the predominant ones. We mainly outsourced for cost. It is not just far eastern outsourcing, now we also outsource some locally to Ireland the printed circuit boards. The reason there was to some extent it was for cost but also related capital expenditure. A good surface mount line was two or three million and we should only use it for two or three weeks per year. The consideration there was not so much cost but technology. We did not have the technology internally to do the work and the cost associated with capital investment and support. There were two reasons for the outsourcing, one was going to China and Malaysia was for cost, and going to Ireland for the technology and the capital expenditure.

Did you foresee any problems when you decided to outsource?

We did visualise problems but not as many as we subsequently had. The thought process and the interaction... sometimes we were talking to these people and you get the feeling they are living in a completely different universe. A lot of stuff they come out with is very strange at times. There were huge cultural issues. I have been there many times, three or four times, but I only stayed at meetings and not at the coal face, but even today there are issues.

Have you achieved any competitive advantages with your supplier?

We have, especially with the cost of consumables. We estimated that by 2009, for what we would have sold comparing the cost of what we did in China and what we would have done in Ireland we have saved around four million in three years

Where are your customers?

Everywhere, global

Do you have everything shipped back to Ireland?

No, we drop ship to customers from Asia. From Asia we ship direct to Australia and New Zealand, North America and Germany. These are all consumables, not so much finished products...

Has the partnership made you more flexible or agile?

I would say the opposite actually. The lead-times are very long so there is a lot more stock. So no matter what you do it is a long way away and it is always going to take seven weeks by sea, and air is too expensive. Definitely has not made us more agile.

Has it brought you any supply chain related advantages?

Not really. But we do now know a lot more about global shipping so we have got an advantage there for bulk shipping of products and where to get the best pricing so that would be an advantage

What about approvals?

Slightly a problem but we are quite picky. EEEE had ISO13485 and our Chinese factory also has ISO13485 and FDA approval, and they have been audited by Perdi auditors and have done quite well.

Real auditors?

Yes, real auditors. We have not had a problem from the supply chain point of view with approvals.

Has it brought you new customers by being in Asia?

Oh, definitely yes. Through cost. By making in Asia has enabled us to reduce our costs to be able to penetrate those markets. We just did an exercise in January just gone to looking at a new product to manufacture in Ireland with automation or to move it to China and it is still cheaper in China but it is getting closer now.

Has your manufacturing partner ever brought you customers?

No

And have you ever shared technology? Shared IP?

No. No joint IP or R&D. They are purely service providers.

Anything else? Generally speaking it has brought you new opportunities?

Yes. But the only thing I would say that the costs in China have risen fast and we are starting to look somewhere else.

In Asia?

Yes, and we are looking at automating ourselves. We have got the numbers up to automate. We could bring it back to Europe. We are looking at Eastern Europe. We are struggling with India and Vietnam.

Definitely the technology outsourcing worked very well for us. There are definitely two reasons to outsource, one is for cost, pure driven by cost, and the other is for capabilities. I think the capabilities one has worked very well for us, we have three manufacturing partners; one in Ireland, one in China and EEEE in Malaysia. They are all very good companies. We get quality product and we can rely on them. If they say that are going to do it then they do it. I do not know if that is a feature of the beast or the fact that we have good ones. I have a funny feeling thought that think if you outsource for capabilities then it is a very Darwinian market place, if you are no good then you die very very quickly, you know. Whereas on the cost side then you are always able to suck you in and screw you at the end, which is what the Chinese do. For capabilities if you are no good then you will die.

Interviewee H1

Did you manufacture in house at all before?

Yes we did, we actually carried on the in house manufacture. The outsource was both to take advantage of low cost manufacturing and also to bring up capacity for other things.

How long ago did you decide to do that?

Probably initially it would go back 20 years, because initially it was UK outsourcing, then European outsourcing the Far East outsourcing. We went through those stages.

Now you outsource to Asia? How much of your spend as a percentage of your manufacturing partners turnover?

Probably 1%.

What percentage of your business do you outsource?

We outsource around 5%. It is mostly high volume.

How does your company compete in the market place?

We hold stock. We give very good technical support. We have a very good reputation with a lot of referral and a lot of word of mouth. We give good quality of product and service

When you decided to outsource, who made the decision?

It was made at board level and I was one of the parties.

Who was driving it?

It was principally me at that stage.

How long did it take to evaluate options?

It was initially around 3 months.

Was there consensus about the decision?

There was consensus but there was concern about quality of service and delivery times.

Was it a formal decision?

Yes it would have been.

What external factors did you consider?

We considered the ability of that company to make the product that we are outsourcing. We also considered the ethics of that company.

What potential benefits did you anticipate when you decided to outsource?

Two I think, price advantage and offering us capacity that we could better utilise.

Did you foresee any problems?

We had concerns about reliability, I suppose quality of product and service**.**

Did you achieve the benefits you set out to get?

Yes we did.

Did you have any negative experiences?

Not with the ultimate decisions we made. I suppose that in one case there was a bit of a disaster but generally we were very pleased with what we got. I think we chose wisely. I think during that during that decision making process we had a bit of pain with people in the Far East promising more and delivering less. Unfortunately you will know that in the Far East they have a habit of saying yes to everything. We had one disaster in the early days and that was with an American subcontractor who had a factory in Wales. That was when we were still setting up things on-shore. Well, the disaster was that they were very late on delivering and very poor on quality and they, after the initial order they saw no more business. But I think we only had that one disaster, all of the other companies we have partnered with and have delivered. Well I suppose we will give everyone a trial batch, but generally we have got it right on seeing what they do and who they do work for.

Do you think you have achieved any competitive advantages through the outsourcing relationship? Have you had any collaboration with manufacturing partners?

Not really, I mean they.... I suppose in one or two cases they have helped us with cost down, but fairly low key, we tend to specify the components to be used in the products quite carefully and we already know what they should be costing. There have been one or two cases where suppliers have come back to us and if we use Part B you can save X %. We have looked into that and there have been cases where

we have agreed and some where we haven't. There has been a little bit of benefit in that respect but we have not gone as far as allowing these parties to redesign products or totally re-specify.

Is the product shipped back to you or has any of the product been shipped directly to your customer?

No we have not.

Has it given you access to technology that you would not have here?

No.

Have you done any joint R&D?

No

Have you developed any joint IP?

No

Has it given you access to technology that you would not otherwise have?

No

Has your company's competitive position changed through outsourcing?

Yes I think it has because it has enabled us to buy at an advantageous price. And also the second benefit is that the capacity we have freed up has been used for higher margin production. It has also meant that we have not had to invest in expanding our facilities for the higher demand. We have chosen wisely and you were part of that process. It has been a long term partnership. The partnership we have established lasted a good 15 years and I think we would potentially use them again but I think they have lost their direction a bit and they have sourced the telecoms market and they have acquired technology for higher value parts and I think that has gone wrong for them. They have given us several contacts who have said that our business was valuable for them and that they want it back.

Interviewee I1

Were you at XXXX when they started to outsource? Were they already outsourcing?

Well, electronics we outsourced, certainly.

Do you know who made the decision to outsource?

Well XXXX has never made electronics.

So you have always outsourced electronics?

Setting up to make printed circuit boards was not deemed to be a core competence.

Do you know where you outsource to?

UK mainly. Certainly that would have been the case for the last five years

The outsourcing strategy by XXXX was generally centred around a number of things. Firstly the location of the facilities. We purchase some printed circuit board assemblies from Sweden

We have also been doing some low cost sourcing from Asia, as you know.

Are the product low volume high mix or high volume low mix?

It is a bit of a mixture, there are certainly some work which would considered to be low volume. Then we have some which are 25k per month which would be considered to be medium volume. A bit of a mix

What percentage of the turnover of your partner are you?

With our main company we are in their top three which would represent around 10%

How do XXXX compete in the market place?

We are a high tech company.

When XXXX outsourced what advantages were anticipated?

Difficult to answer on the basis that we never insourced, we did not have to invest in equipment internally. We did have couple of box builds which could be considered to be internal

Do you think there is a strong link between the company's manufacturing strategy and the whole company strategy?

Yes I would say so

Do you think you have created anything with your outsourcing partner which has given you a competitive advantage?

Not particularly, no. They are a service partner.

Any access to raw material, suppliers? Joint R&D? IP?

No.

Interviewee I2

What is your role?

I am a senior sales engineer, dealing with customers and their issues. I have not worked in design for nearly two years.

Where do you manufacture now?

Mainly it is done in HHHHHHHH UK. I think we do outsource quote a bit to the Far East but I do not know exactly what is being done.

Do you see any benefit to your customers through the outsourcing?

Our customers have no indication of where the components and assemblies are coming from. As far as they know they have no indication of where it is coming from. We have not put anything out to say where it is coming from. the only thing we have done recently on some of our electronics is licensed it to one of our OEM's, who are then going to be manufacturing it and we will probably be purchasing parts off of them because they can get it cheaper.

Are they selling the product?

They use the product in their machines. The only place they can sell the product is back to us. They are in China. We have sold then the design rights and licensed our components which are part of the electronics and they are going to manufacture that for themselves because they can do it cheaper over there and then sell back to us those components that are cheaper.

They will use it themselves as well?

They will use it, yes. Which is kind of like a double whammy to them because they get to sell it back to us, we get a cost saving benefit they take care of the quality control of the components so if they are not working then they are not going to be working for them.

The whole company is growing exponentially at the moment. The business in China is growing very rapidly. In China we have 80% share of the digital printed ceramic market so the whole type of industry is switching over to digital printing.

So it is printing ink?

It is a form of ink, it is a form of blade as well. We are printing the ceramic before they are fired.

We are printing conductive tracks on circuit boards and if you look on the web you will see a joint venture with a company in the States which significantly improves silicon chip manufacture by using inkjet technology which will allow them to move from a nine inch wafer up to a twenty inch wafer which will make it much more economical.

So you are printing nanometre tracks?

To be honest I have not yet got my head around it. There is a press release the company put out with regard to Intel. I am not sure what else I can add.

Some companies do get benefits from manufacturing in Asia.

We ship everything back to the UK. We do not want our IP being spread out.

Interviewee I3

Did you always outsource or did you manufacture in house before?

We do a combination of the outsourcing of our manufacturing equipment and we do a mixture of outsourcing supply and manufacturing in-house of individual components. We outsource some of our materials now and we outsource the vast majority of our manufacturing equipment design, build and commissioning.

Did you manufacture those in house or did you take the decision to outsource?

I think it was more of as the company grew we went from a position of using very manual jigs and fixtures to now requiring semi or automated equipment to meet the volume and quality demands of the business, it was a natural progression of the business group. We decided not to invest in specialist skills associated with the design and manufacture and commission of assembly equipment.

What countries do you outsource to?

All over the world, all over the world. America, Europe, some in Asia but only materials that are required for sub-assemblies. But no equipment, no equipment in Asia.

What is the ratio of the amount you outsource compared to that you manufacture in-house?

If we are talking about equipment, as opposed to the product we produce, then we probably outsource in the region of 90% of everything

The stuff you outsource, is it high volume low mix, or low volume high mix?

Again, if its equipment for our factory to use in the manufacture, then 20% is jigs and fixtures, and 80% is semi-automated production equipment,

How would you say XXXX compete in the competitive market?

Our main competitive advantage is mainly associated with our technology and how it is applied to inkjet. It has unique capabilities.

When you decided to outsource, who made that decision?

That decision was made by the XXXX Board. I am not on the Board.

Was there consultation with operational people?

Yes. I am the operational people, so I had very much conversation with the Board and the outsourcing process was wholly owned by the operational people.

Was there agreement on the decision to outsource?

We had to follow a very rigorous process that we had developed. Which includes assessment of all potential vendors who could supply manufacturing equipment, the sign off to the specification for that equipment and the agreements that the equipment would be built. We tend to, we always follow this process.

When you decided to outsource, what potential benefits did you anticipate?

It was rather obvious really, we do not have the internal capability or capacity for the design or manufacture of the equipment, and if we wanted to get the equipment as fast as possible then we had to outsource it. The main benefits would be the ability to increase our manufacturing capacity and speed, and to increase our design capacity.

Did you foresee any problems in outsourcing?

Yes, there are always problems with outsourcing. The biggest problem is that outsourcing is not free, it is not free in terms of the cost of doing it and in the cost of managing it. It is not only the cost of the machine but the cost of the whole rack of experience that we need to put in to building it. There are a whole load of management expenses involved in the outsourcing process.

So you end up training your manufacturer?

Yes you do, that is an accurate description.

Do you think you have created any sustainable advantages from the outsourcing?

We have a lot of collaboration with our partners. I would say our competitive advantage is our ability to produce a lot more print heads than we would otherwise be able to do, and to get new print heads onto the market quicker than our competitors.

So time to market has reduced and capacity has increased?

I can't say time to market has reduced. Time to market includes all the R&D time and so I cannot say time to market has reduced. If you mean by time to market as the ability of a company to increase its

capacity, by increasing capacity then we are able to grab the market. Once we have got that market then generally speaking customers do not tend to go away.

Has it given you access to materials or suppliers that you would not otherwise have?

Yes. I would say yes. Materials probably not, but other suppliers, yes.

Do you have joint R&D with your partner?

We have very tight non-disclosure agreements with our partners which allows us to have joint development and so we have that opportunity, yes.

Have you developed joint IP?

The vast majority of the time we use our partners IP and we try to protect our intellectual property associated with our equipment. It is not possible to not share that with our suppliers.

Is their IP available to your competitors?

I suppose yes. Anything they apply to our technology and our equipment could equally be applied to our competitors.

Is there anything else that your partner relationship could give you an advantage?

I guess you touched on most of the points already but there are obviously other ways of doing thing and once you get into a bigger pool of knowledge and experience and therefore it gives you the opportunity to learn other ways of doing things.

Tier 1 Manufacturer

Can you think of advantages that people may have achieved?

Cost saving is not the only factor but also compliance to local regulation. For example places like Brazil, they have government mandates where you need 10% of local content before you can enjoy the tax haven or tax benefits that is one reason.

So to sell into Brazil you get advantage by manufacturing there?

Particularly in Brazil, you need to have a certain local content as a percentage of the product cost in order for you to have access to that market, and other advantages are that you have access to the resources, such as materials that are only locally available. You are looking at easy access to those materials in a particular area or particular region where you outsource. These are the reason or factors or driving forces behind outsourcing activities. The cost and the access to market and the access to materials. Especially special materials need for certain products. These can be plastics or electronic components. For example all the electronics for all the information technology products, are the complete ecosystem in the Far East, all in China or Taiwan, or Hong Kong or somewhere in the greater China geography there is a tendency to get those parts delivered faster to you and at lower cost in that region. Have then delivered to you at lower cost of acquisition in the region than from the US or from Europe. So that is one of the benefits is cost and easy access to materials. There is also the lower cost of local logistics.

Are you aware of any collaboration between outsourcer and manufacturer?

Yes you can look at view that as a partnership or relationship type of a model to the extent where the customer will see the outsourcing partner as an extension of its own. That will bring a benefit to them because they have the flexibility or managing their resources internally. They do not have to hire a particular type of skill when the need arises, they can use the outsource partner as a buffer. The example you give is a good one. IBM have used a lot of outsourced ODM companies, including UUUU, to design the circuitry and the PC motherboards for them. Not just PC but also in the other products like smart phones and smart handheld devices where the customer may not have all the skill and knowledge they need such as mechanical, plastic, moulding and tooling and these are the areas they can leverage the outsource partner,. We set up a complete production line for MMMM, in a sealed room where only certain staff had access to that room. They were trained and dedicated to the

product. Many of our customers have an office in our company where they can run their ordering and logistics, these have developed over many years of working closely with our customer.

Do UUUU have IP that customers can access? or jointly develop IP?

Yes, we will ... it is quite common that we have joint IP with customers and we also have our own IP and the customer has their own IP. There is a delineation between the outsource IP and the customers IP. Basically the industrial design and the look and the feel is in the spec defined by the customer. So industrial design is customers IP but manufacturing know-how is UUUU's IP. That is pretty natural that there is IP that is jointly owned between the outsource partner and the customer, but there is also a very clear distinction between the ownership of IP with certain principles. The one that I mentioned is pretty typical example, that the product look and feel and the industrial design is the customers IP and the know-how of how to manufacture this unit or product remains UUUU's IP. This is a very very quick model that they complement each other, the customer and the outsource partner.

Can you think of anything else that gives long term advantages?

I think for long term advantage we have covered most of the key elements. The way that I see the relationship or partnership to last long would be very important between the mind-set of the customer and the outsource partner. Both need to be very open minded and have to be committed to the long term relationship with some give and take. This driving force for this partnership and relationship should be for it to last longer. If either party carry any mind-set or mentality then it will not last long. Put into simple terms there must be trust and credibility. This is a two way street, and it is not unusual to see a customer and an outsource partner, the relationship is so long it turns into an investment relationship investing in each other.

AAAA potentially had an advantage by working with XXXX by selling their products together and XXXX potentially had an advantage by using EEEE as a lever to selling their products in Asia.

So what sustainable competitive advantage could be achieved through outsourcing?

We had a company who market a range of home electronic products and they came to us and said here are the instruction manual for the product, we said where are the drawings and they said they do not have any drawings. They wanted us to design and build the product or to find a company with the product and to badge it or tweak it a bit. That is another whole area of business.

BBBB had a whole division that outsource product so they look at their product range and decide they want.... er, a garden hose reel for instance and they do not want to make it themselves so they find someone who makes garden hose reels and who is willing to put a BBBB label on it. In terms of our customers.....

For instance OOOO set up a design centre in EEEE and they sent the design manager there for two years.

OOOO set up a design centre in EEEE and they sent the design manager here for two years. But it is not working like that now. They are not a customer anymore, it is not here anymore. OOOO are having a bad time so it was not a really long term competitive advantage as they are hitting the problem of likely to become extinct. The last TV they launched died a death quite quickly, they now seem to be into two significant areas; one is trying to get in to automotive sound systems which is basically just trading on their name; and badged products like headsets and other sort of... ipod docs and so on badged OOOO which they do not even design anymore. They just go out and find something interesting and get the company to put their name on it. I think it is really difficult for them. It just does not seem to make any sense anymore, Samsung can make much better TV's just because they have go the economies of scale, the market size and they invest so much. How is OOOO going to come up with anything that much better anyway, and if you want real hi-fi then it is not going to be OOOO, if you want real hi-fi like you and I, then OOOO is just pretty stuff but it did not necessarily sound that great. We did set up a whole production line for an American customer where we invested significant resources into developing our customer's product for manufacturability and reliability.

It was based on looks and style. What do you think people set out to achieve when they outsource?

Well, thinking aloud, this whole thing largely started because of labour costs, around 50 years ago that major exodus of manufacturing to Asia got underway, now the situation has started to change and we see a lot of competition here in Asia from companies in Eastern Europe and in most countries in Eastern Europe they are not quite as competitive in terms of cost of operations as Asia is but they have one significant advantage is that they are located in a major market and are close to their customer. So that's all about where people are outsourcing and not shy. It is starting to shift where they outsource. The major reasons to outsource... well again I think it started off as more outsourcing to take up additional demand and fluctuations in capacity. Then some companies decided that they did not need to know about manufacturing at all so they could outsource all of it so they could focus on their core competencies of design and sales etc. Are there other reasons? other than being able to put all of your time energy and resources into your core competencies.

I believe that those advantages are not sustainable because competitors can do the same thing

But it has become essential unless you are a really big company and you are manufacturing a lot then you do not have the economies of scale your competitor can get by going to a contract manufacturer and so even though they themselves do not need a huge volume of manufacturing they are working with somebody who does who has the purchasing power and the infrastructure to look into new manufacturing techniques and to keep everything as efficient as possible.

Have any of your customers formed collaborative relationships?

Well OK, there is obviously EEEE have product development capabilities and service, but that is not what you are asking because yes we do have customers who come to us and asked us to design the product before manufacturing.

Who owns the IP?

In our case it is always the customer that owns the IP, they are not tapping into IP that we have got.

Does EEEE have any IP?

No, it deliberately chooses not to because most of the sophisticated know-how of manufacturing is on the automated equipment that you buy, in the laser market or the automated optical inspection equipment that you buy, in the SMT. Most of the patented know-how is just in the machines and so it belongs to Siemens or Fujitsu or whoever that built the equipment. We do not have any patents in manufacturing. Some CEM's that have product design services I do believe have some of their own IP,

and people like Cambridge Consultants do. It is a really interesting discussion you know. We have had the discussion here about what are EEEE's unique selling points and we have to actually conclude that there's probably not anything unique that we have got, not really. Strengths are different to what is unique that you cannot get from somewhere else. I am not being terribly helpful so far.

In terms of a long-term competitive advantage by outsourcing, I think it is in what you do with all the time and money you have saved by getting someone else to build the product. The long term competitive advantage is in using the resources that you have freed up wisely to give yourself an edge in the market place but I do not think you get it through the outsourcing. By definition, if you are DDDD, we are quite happy to see Hoover come through the door and say could you make some vacuum cleaners for us as well. We do not want it to be unique for DDDD.

On the other hand would you be allowed to engage with HHHH if you are working for DDDD.

We are quite sneaky, yes we can because the contract with DDDD is with JB and because we would put HHHH in another factory and we would be obliged for the two factories not to talk to each other.

DDDD could have established a long-term advantage by having the outsourcing relationship established with electronics and then moving their plastics into Malaysia.

I need to be careful because this is confidential. I am just thinking, in terms of long term competitive advantage DDDDD have decided to engage with Flextronics in a big way recently. But what they have engaged with Flextronics is not so much for manufacturing of their products but they want Flextronics to manage their worldwide logistics operation and this is a trend in the industry. The trend is that it is not actually often very difficult to manufacture a product for a customer but being able to offer a worldwide logistics organisation including being able to keep track of where their finished stock is worldwide, and know when it is time to order more production, and analyse what the sales trends are and how much is being consumed and to optimise all of the shipping freight and storage costs and so on seems to be an area of expertise that major CEM's are getting into and is proving very interesting to major OEM's.

I think there are three areas that competitive advantage could come from and one of those areas is logistics.

Yes, not just economies of purchasing power but also in the logistics of delivering the finished goods. One thing that is coming up with several customers now is a perceptible change in relationship or

attitude. the attitude used to be that you are a supplier do what you are told, we give you the drawings and we want the best possible price and deliver it to this place etc. and now they are beginning to ask more and more about what advice can you give when designing the product. Not to design it for them but to advise them on better ways of designing it or better technologies to incorporate in their design or better materials to be used in their design . They are beginning to realise that their suppliers of parts, materials and assemblies and contract manufacturers may have some knowledge which could help them to be more competitive and they are trying to dig it out, preferably free of charge...

It is like design for manufacture?

It is a bit more than that. They are actually saying , well, we have always used this kind of plastic for our vacuum machines but hey you are supplying all these plastic parts so you must know more about plastics than we do so are we actually using the right grade of plastic, is there a better solution? not necessarily cheaper but something that will give us an advantage, i.e. give us more reliability, or often lower cost, longer lasting colour or better bio-degradability, something that can buy them some advantage in the market place. I think they are coming to realise that they need to establish more cooperative arrangements with all of their suppliers otherwise they may miss out on something that the supplier knows and they do not find out because they have got their supplier in the mode of doing what they are told instead of cooperating in manufacturing the product. We have several big customers no*w* where they are wanting to move forward where they have a small number of strategic partners where the relationship is much more intimate in one way or another. It may just be sharing DFM or new materials or..... so, ... but none of this really quite answers your question. I think one of the problems is that unless..... there was one instance where EEE was talking to a customer that could have resulted in what you are talking about. the first problem is that all of the things we are talking about are actually things that are on offer but not exclusively to one customer, then by definition they are not necessarily giving any company a long term advantage over their competition because they are generally offered, so we did have some discussions with a company in Europe where we were talking about a joint venture in design where the set-up would have been much more exclusively for them. I think the only way you could possibly get some kind of competitive advantage would be possibly forming a joint venture with a CEM or a design house where you exclusively get access to a lot of experience which would take you a number of years to build up. Unless you have some kind of joint venture it is going to be offered to your competitors as well potentially. Or you are big enough to have some kind of exclusion clause in the contract which says that your partner is not allowed to work with your competitors but I guess a lot of companies, including us, are resistant to that kind of limitation.

This joint venture has not happened because the customer seems to be very unreasonable about it. They seem to want to have all of the advantages and give away practically nothing. The only thing they want to give away is the fact that we have up front knowledge of all their new products and therefore more potential to get the manufacturing. Apart from that they want us to do everything else without any return on investment. They will pay for the cost of doing the design work but not any profit element or return on investment. The return on investment would be simply getting to know them more closely and improving our chances of doing other things for them and that is not enough, at the moment the discussions are stalled.

Another potential area is access to market

Yes and no. We had a company here not long ago that is a subsidiary of BBBBBB. They do gun turrets on warships or something for the Malaysian navy and it had to be produced in Malaysia, but the volume was too low and we told them to go away.

I remember XXXX were trying to penetrate the Malaysian market and EEEE had knowledge of local voltages and regulations, because EEEE had local knowledge of Malaysian showers and regulations.

OK, yes. Location is becoming more critical because of logistics. There is the cost of shipping and the time for shipping and all the additional WIP that is in the system as well, inability to respond quickly to orders. There is a huge trend for companies to need to be able to respond to an order between one and four weeks and they do not want to build the stuff in advance because if it is not very high volume then they do not know what the profile of the orders are going to look like in the next month and they do not want to carry stock because that is just money....

They want you to carry stock?

No the do not even want us to carry the stock because they do not actually know what they will want. They will want us to carry stock if we took liability for it but we will not actually do that, well not for a sensible price. Location is a factor, and we are more competitive where the end product is being consumed or sold in Asia simply because if we can build a finished product and ship it directly to the customer or the end customer then that takes a lot of time and cost out of the logistics and supply chain. None of these are a unique and long term sustainable advantage and that is where I struggle..... OK, SSSS OOOOs and LLLL, LLLL decided to build a factory somewhere in China. Shanghai or Shenzhen? I think it was Shanghai and SSSS OOOO is a spin off from LLLL in HHHHHH, and had a factory in HHHHH and somehow SSSS OOOOs got convinced that they should go and build a factory next to in Shanghai.

This required an extremely good relationship and financial commitment which had developed over many years, but will take away cost from LLLL and reduce lead-times. It was like the supplier next door! They were very aggressive or brave or whatever, but to the best of my knowledge that factory has not made a profit or it does make a profit then it has not recovered all of the losses it has made. Then how does that fit in? Well for LLLL it was a good deal, by outsourcing the optics to SSSS OOOOs, which was a spin-off anyway, then offering SSSS OOOO a long term commitment to buy something from them if they build a factory in China next to their factory. LLLL had a really good deal I think. They passed the buck on all local sourcing problems that could have been a nightmare for them to SSSS OOOO who have somehow battled through. They got some kind of award from LLLL recently which was either for bravery or stupidity. For supporting them. I do not really know how to answer your question. I think the long term sustainable advantage of outsourcing is more to do with what did you do with the money that you did not have to spend on manufacturing or logistics etc. and did you invest that money wisely to do something for your company that cannot easily be copied or taken up by your competition. Everything is getting so competitive now, the only companies that make huge profits are the ones that have got the IP or the brand or the market name. So I am not too sure what you are going to discover. Are we going to find out what you discover?

Yes, but I need to finish it! It could be that there are no sustainable competitive advantages achievable through outsourcing.

Yes, and it depends what you mean by sustainable. Does it mean one, ten or hundred years?

I think what BBBB did at the time did last at least ten years. And I remember EEEE built a complete production line for SSSS with some unique processes for them

Yes, it is still running in low volume now. But the UK government announced a SMART metering program and they plan over the next five years to replace every meter in the country and SSSS are one of the companies involved in it.

Thanks DDDD

The other thing is that electronics is getting more and more a commodity. What we did for SSSSSS was weird and wonderful and very clever, and what we did for VVVVV for their RRRRRRRR was also clever. But the newer designs of all of these products are much more straightforward to manufacture because the functionality is much more buried in the software and the microprocessors and less buried in weird and wonderful bits of metal and pieces of wire. Buying manufacturing services is in many respects

getting much simpler in terms of the manufacturing and more complex in the logistics and the supply chain issues. Controlling engineering changes, minimising inventory and minimising lead-times is more of an issue that being able to manufacture the product. For our customers finding a CEM that is a good fit because if you are a medium size company and go to Flextronics then every feedback I get is that you will get pretty lousy service. If you come to us them I will make sure you get damn good service for ten million dollars, but Flextronics attract the business because of their purchasing power.

I know that when times are hard they will take on lower level customers. EEEE seem to be stuck at USD200m

Yes they are. If I am to stay here long term then I need to help them to break through that. I am fighting hard to stay where we are. Every year, either it is the same product we are making and people expect a cost down, so that reduces your revenue even though you are doing what you did before; or it's a new version of the same product which by design may only be two thirds of the price of did before, so that is a third of the revenue gone even though you are doing what you did before, so you have got to build a lot of business every year just to compensate for the cost downs, evolutions and redesigns and then there is some business that goes away for some reason. It is quite a lot of work just to stay still.

One thing that occurs to me is the difference between a leader and an innovator or a follower, so companies that lead and go to Myanamar or somewhere to make silicon chips, they may have some advantage but they will also be taking a big risk. The Chinese are everywhere now, they are building the second bridge here in RRRRRR and they just bought five percent of Ukraine land for food production. There are some huge things like that going on and China are making huge investments into infrastructure in Africa. They are buying Africa as they see it as an emerging market. It gets blurred into economics and politics.

Tier 3 Manufacturer

Hello PPPP

Hi how are you? I know we have this interview but I really cannot stay for long time.

OK, maybe I can just ask you if any of your customers gain sustainable competitive advantage by working with you?

OK, well, I am not sure about that. A lot of our customers use us as extension of their capacity, to cope with peaks and troughs of demand. They use us as a buffer. Do not know if that is a competitive advantage or not because some of our customers are competitors to each other. But some of our customers paid for equipment for use on their product, it is specific to the manufacture and testing of certain types of products that is not available to others. There they can have an advantage. I think customers can get more advantage with us if their business is good.

What do you mean by good?

I mean suitable for us, not too small and not too big. Better if they can sign contract. Sorry I need to go. Good luck with it all.

Thank you PPPP