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Research methods for the empirical investigation of the process of formation of operations strategy

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Abstract This paper reviews the methodological options for the empirical investigation of the process of formation of operations strategy. A case study approach is likely to be the most favoured research strategy for this type of work. Five possible methodologies that might be used within such case studies (ethnography, interviews, strategy charting, questionnaires and documentation) are critically reviewed and assessed. The advantages and disadvantages of each, together with circumstances in which they might best be used, are identified. The paper especially focuses on the practical implications for researchers using each of these methodologies.

Introduction

From Skinner (1969) to more recent times (e.g. Hayes and Upton, 1998; Pilkington, 1998), operations management writers have emphasised the importance of operations strategy in achieving corporate success. Hayes and Pisano's (1994) argument that in today's turbulent world, the development and exploitation of operational capabilities are the key to superior organisational performance has gained acceptance beyond the operations management academic community. Contemporary thinking about corporate strategy encompassing ideas about organisational capabilities (Stalk *et al.*, 1992), core competences (Prahalad and Hamel, 1990), organisational learning (Senge, 1990) and knowledge management (Davenport and Prusak, 1997) seem to have coalesced around Hayes and Wheelwright's (1984) stage four organisation. Thus the desirability of an organisation's operations playing the leading role in the development of its corporate strategy has now entered mainstream strategic management thinking.

Operations strategy literature has always acknowledged the distinction between content (i.e. what is done) and process (i.e. how it is done) but has tended to concentrate on the former, perhaps at the expense of the latter (Leong *et al.*, 1990). The best known operations strategy process literature (e.g. Skinner, 1969; Hill, 1985; Platts and Gregory, 1990) tends to be prescriptive in nature, being concerned with what should happen rather than what does happen. Also, this literature is firmly rooted in the corporate planning paradigm, which sees strategy making as a sequential process in which plans

are formulated and then implemented. Its major concern is thus to make better plans, or to improve the planning process. Implementation tends to be viewed merely as a matter of ensuring the plans are adhered to, by better human resource management (Kinnie and Staughton, 1991), better production planning (Gianesi, 1998) and so on.

This view of process, which dominates the operations strategy literature, is narrow when compared to the corporate strategy literature, which encompasses a broad and diverse range of views. For example, Mintzberg and Lampel (1999) identify ten different perspectives from which writers view strategy. Although this eclecticism might be interpreted as confusion and disorder, the fact that corporate strategy can accommodate such diversity, notwithstanding some vigorous debates (e.g. Mintzberg, 1994 versus Ansoff, 1994), is an indication of the health and maturity of the subject. One fundamental issue lies at the heart of most debates about the nature of the strategy process. That is the extent to which strategy arises from the intentions of senior managers, through planning or some other deliberate process, or in a more emergent process involving the on-going decisions and actions of people more widely dispersed throughout the organisation. Pointing out that not all planned strategy is realised and not all realised strategy is planned, Mintzberg and Waters (1985) argue that strategy may arise from a combination of the intended and the emergent. Consequently strategy can be viewed as "everything a company does or consists of" (Mintzberg and Lampel, 1999, p. 26). Mintzberg (1978) coined the term "strategy formation" to describe the process through which strategy is made, arguing that "formulation and implementation are intertwined as complex interactive processes in which politics, values, organisational culture and management styles determine or constrain particular strategy decisions" (Mintzberg and Quinn, 1991, p. xvii).

The first acknowledgement that the operations strategy process should similarly go beyond a consideration of formulation alone probably came when Hayes and Wheelwright (1984, p. 30) cautioned that "it is the pattern of decisions actually made . . . that constitutes a function's strategy, not what is said or written in annual reports or planning documents". Thus they accept the possibility that operations strategy might have emergent as well as deliberate features. This view seems to have gained more currency recently with Mills *et al.* (1996, 1998a) following Mintzberg and Waters (1985) in seeing strategy as a "pattern in a stream of actions" and Platts *et al.* (1998, p. 518) noting that strategy is "political, . . . socially constructed, continuous, . . . complex and beyond human cognitive capacity".

Nonetheless, most research into the operations strategy process seems to have had a prescriptive intent. The reason for this is not entirely clear. We can speculate that it may be due to a practitioner orientation, which leads many operations management researchers to focus on developing solutions to aid hard-pressed managers. As Hendry *et al.* (1993, p. 5) argue, while such "research may be valuable if it searches for relationships for prescription, it can also be valuable if it seeks to clarify complexity, provide understanding and

offer challenges to both the academic community and the thinking manager". Thus gaining an understanding of past and current strategies and how they were formed may be immediately and directly important, as this is an essential prerequisite to the development of an appropriate strategy for the future (Mills *et al.*, 1998a). However, researchers can also increase knowledge of the operations strategy process, by following the long-standing research tradition of the liberal scholar, pursuing knowledge for knowledge's sake (Weber, 1946). Thereby they can benefit practitioners in the longer term by providing them with a deeper understanding of the strategic processes at work within their organisations.

However, there appears to have been few attempts to undertake empirical investigations into the operations strategy process. For example, Minor *et al.*'s (1994) review of empirical manufacturing studies published in the principal refereed journals identified only eight examples which investigated process issues. They join other literature reviewers (e.g. Adam and Swamidass, 1989; Anderson *et al.*, 1989; Swink and Way, 1995) in arguing for more research in this area. Leong *et al.* (1990, p. 116) typify this when they call for more "basic descriptive research ... on how manufacturing strategy is conceived and implemented ... [especially] ... to test whether ... [Skinner's model] or some other process model adequately portrays practice". This call is still largely unanswered.

Developing a deeper understanding of the operations strategy process in practice remains a task that requires further attention from researchers, whatever their motivations. It is also a task that represents a considerable methodological challenge, as there is a dearth of exemplar studies in the published literature.

Aims

The aim of this paper is to review the methodological options for the empirical investigation of the process of formation of operations strategy. It is not our purpose to engage in a philosophical debate about the merits or otherwise of particular research paradigms. (Those interested in these issues as they apply to operations management are recommended to start with Meredith *et al.*'s 1989 paper.) We approach this matter from an essentially pragmatic standpoint, from the perspective of someone considering such research to gain a better understanding of the process of operations strategy formation in practice. The paper is particularly aimed at helping researchers make a more informed methodological choice. Any research method inevitably has both advantages and disadvantages, and there is unlikely to be one best way of approaching the task. As Silverman (1993, p. 2) puts it, "methodologies, like theories, cannot be true or false, only more or less useful". The paper will critically review and compare a number of possible research methods, and where relevant, will draw on the author's experiences in recent research projects.

Methodological requirements

An appropriate research methodology for an empirical investigation into the process of formation of operations strategy must meet a number of requirements:

- First, as realised strategy may be formed from a combination of the intended and the emergent, the methodology must be capable of distinguishing between these different facets. It must also be capable of acknowledging that not all managerial intentions are expressed in formal plans, and that those intentions may or may not be subsequently realised.
- Second, as Mills *et al.* (1995) note, any consideration of the strategy process at the operational level, like that at the corporate level, should also take strategy content and organisational context into account (Pettigrew *et al.*, 1989). Thus any methodology should enable data on the internal and external context to be gathered, alongside that of operations strategy content, as these may indicate contingent variables within the process.
- The third requirement, complementary to the previous two, is that the methodology enables an adequate level of detail to be gathered to meet the purpose of the research, whether that be descriptive, explanatory or testing (Meredith *et al.*, 1989). Even to adequately describe the complexities of operations strategy process in practice requires considerable detail. To go beyond that, to begin to offer some level of understanding must surely place even greater demands on those responsible for data gathering.

Methodological options

Robson (1993) argues that there are three traditional research strategies for real world social research: experiment, survey and case study.

It seems unlikely that experimentation is appropriate for investigating such a complex and multi-faceted phenomenon as the operations strategy process. Even if it were possible to manipulate one variable to observe the impact on another, it would prove impossible to control for all other possible variables. It should be noted that Action Research (Susman and Evered, 1978) is not included in this categorisation. Although it has been used to research the operations strategy process (e.g. Platts, 1993; Platts *et al.*, 1998), it is not truly experimental as the researcher quite deliberately engages with the research setting rather than remaining independent from it.

It is also extremely doubtful whether survey research would provide the rich data set required. Survey research is here taken to mean the use of large-scale data gathering techniques such as questionnaires administered from a distance, typically by post. This approach, usually involving sophisticated statistical analysis, remains popular with operations management researchers (Scudder and Hill, 1998). Hill *et al.* (1999) attack this tendency, advocating

greater use of on-site plant-based research, arguing that this is more likely to ensure relevance and validity. Survey research risks superficiality, and may be unreliable if reliant on a single respondent from one organisation (Bowman and Ambrosini, 1997). This problem might be particularly acute when investigating the strategy process, as the perceptions and interpretations of events by individuals are likely to play a key role. There is a risk that respondents might proffer politically inspired answers based on a desire to protect their own personal interest, that of their work group, or that of the organisation as a whole (Easterby-Smith *et al.*, 1991). Surveys seem best suited to large scale data gathering, especially where factually based data is required, as would be the case when investigating the content of operations strategy (e.g. Flynn *et al.*, 1997).

It therefore seems that a case study methodology is likely to be most appropriate. Yin (1994) defines a case study as an “empirical inquiry that investigates a contemporary phenomenon within some real-life context” (p. 13). Also, the case study methodology “is particularly well suited to . . . research areas for which existing theory seems inadequate” (Eisenhardt, 1989, p. 548), as is the case for the process of formation of operations strategy. Use of the case study methodology involves use of multiple sources of data (Yin, 1994) to gain the fullest understanding and to improve validity through triangulation. This might involve use of multiple respondents within the organisation or multiple data collection methods (interviews, questionnaires, documents etc.)

Case study methodology of this type is firmly rooted in the phenomenological paradigm (Easterby-Smith *et al.*, 1991). It has a long history within management studies (Gummesson, 1988), as well as in the social sciences more generally (Silverman, 1993). However rationalism has long been the dominant research paradigm in operations management (Meredith, 1998) and there is very little tradition of field based empirical studies (McCutcheon and Meredith, 1993). This is particularly true in America where the overwhelming majority of operations management literature is produced. For example, Voss (1995), found that US publications were dominated by modelling and simulation research and Meredith (1998) points to the continued paucity of case and field research in operations management.

Potential case study methodologies

Five methodological options for the conduct of a case study to investigate the process of formation of operations strategy will be considered in more detail.

1. Ethnography

Ethnography has its origins in anthropology, and involves the researcher becoming deeply involved within the organisational setting. By immersion in the research setting, the researcher comes to an understanding of the actions of the research subjects from their perspective and of the context in which those actions occur. The ethnographic researcher normally needs to spend extended periods of time within the organisation, in the role of an observer or a

participant-observer in order to gain the necessary depth of understanding. Data collection usually relies on the researcher's field-notes, perhaps supplemented by interviews and organisational documentation. The attraction of ethnography lies in its ability to generate extensive, rich and detailed data. In advocating its use for researching the operations strategy process in practice, Misterek *et al.* (1992) note that this method can provide a basis for distinguishing between the intended and the emergent, and the realised and unrealised dimensions of strategy.

However, while there can be significant advantages of real time data collection, strategic actions may extend over several years. Few academic researchers are likely to be able to commit to fieldwork for such an extended period. There may also be problems of access. The ethnographer needs to get close enough to the key actors who shape a firm's operations strategy. As Tranfield and Smith (1998) argue, these are most likely to be the senior operations managers and other senior executives of the organisation. This would therefore seem to exclude the researcher accessing these levels of the organisation covertly. Negotiating unlimited on-going access to such executives may be problematic. Even if appropriate access can be obtained, the researcher may come under pressure to show senior managers in the best possible light. Continued social interaction with organisational members may also risk the researcher going native, that is of accepting the primacy of the subject's perspective and thereby losing their own objectivity. Defenders of ethnography however tend to reject the notion that "the truth is out there" merely waiting to be discovered, arguing that reality is socially constructed (Berger and Luckman, 1966). Similarly, they would reject concerns arising from the impact of the researcher on the researched. Rather than try to eliminate this, they would encourage the researcher to be reflexive, that is to attempt to understand their impact on their subjects, and even use this role as a means of gathering further data (Hammersley and Atkinson, 1983).

Despite its attractions, and perhaps as a result of its many potential problems, this author is not aware of any published empirical studies of the operations strategy process that use an ethnographic methodology. However Gill and Johnson (1997) provide many examples of its use in the study of management, both in the boardroom and on the shopfloor. As a thorough understanding of the operations strategy process in practice is likely to require data from both these sources, this again reinforces the method's potential.

While ethnography is seemingly an extremely effective way of obtaining high quality research data, it is also highly inefficient of researcher time. The only exceptions to this would be if a researcher has other reasons to spend extensive time within the organisation, perhaps in the capacity of a practitioner-researcher.

2. Interviews

There are a number of instances when researchers have used interviews, usually with operations managers and other senior executives, as the basis of

their investigations of the operations strategy process. For example Marucheck *et al.* (1990) use an interview based approach in their empirical study. However their research is grounded in the formulate then implement model of strategy. Both Fine and Hax (1985) and Platts and Gregory (1990) also use interviews with managers to surface firms' existing manufacturing strategies. However, these take place with the prescriptive intent of formulating future strategy rather than describing existing strategy processes.

To gain the most complete understanding of the operations strategy formation process in practice the researcher must surely access a wide range of perspectives within the organisation. This requires interviewing a number of key players, striking a balance between those who can offer insights into strategic intentions and those who can reveal the extent to which those intentions have been realised. Thus it seems necessary to include those from a senior level who can offer a strategic view of the company's intentions and those who can report on realised operations strategy by describing what actions have been taken and the motivations behind those actions. Only in this way can the researcher obtain data on intended, emergent and realised strategy. The use of multiple respondents also affords data triangulation through the comparison of reports and interpretations of the various respondents. Within the inevitable constraints of the availability of, and access to company personnel, the researcher needs to ensure that those interviewed represent a broad range of perspectives from within the company.

Research of this kind lends itself to the semi-structured, open-ended type of interview to enable interviewees to expand on what they consider to be important and to frame those issues in their terms (Meredith *et al.*, 1989). Such interviews allow the interviewer to probe deeply, to solicit expansive responses, and thereby uncover previously hidden details and open up new lines of enquiry (Burgess, 1982). The disadvantage is that it provides large quantities of data to analyse, much of whose relevance and usefulness is difficult to discern. As Miles (1979) points out, qualitative data is an attractive nuisance.

As strategy is such an all-encompassing topic, there is a danger that researchers may be tempted to study everything and in so doing condemn themselves to discover nothing. In order to bring some order to this potential chaos, qualitative researchers are usually recommended to use a theoretical framework to "focus and bound" the data (Miles and Huberman, 1994). A suitable theoretical framework for the study of the operations strategy process seems best developed from the existing literature by building on commonly accepted concepts and models. Most operations strategy literature derives from operations management and as such offers only limited understanding of the operations strategy process in practice. The corporate strategy literature, on the other hand, offers additional insights that might be applicable to operations strategy. As such researchers have usefully drawn from that literature base to enhance that of operations strategy in constructing suitable theoretical frameworks (Mills *et al.*, 1995; Barnes, 2000). A theoretical framework can

provide structure to interviews, whilst still allowing the researcher to explore a wide range of topic areas.

It is advisable to tape record all interviews if possible. Detailed note taking is difficult if not impossible if conducting such interviews alone. Also if analysis takes place some time after the interview, recalling the details of the interview can be problematic without such a recording to augment interview notes. Subsequent transcription can then be undertaken to facilitate detailed content analysis. If interviews take place on site, supplementary data can be gathered by observation. This can prove valuable in two ways. First, it offers the possibility of corroboration of interview data through methodological triangulation. Second, it provides data on context, particularly internal contextual factors. Additional data for triangulation purposes might also be obtained from company documents.

Interview data can present the qualitative researcher with a major headache. As Strauss and Corbin (1990, p. 7) note:

Researchers who are interested in the qualitative analysis of data are dismayed not only by the mountain of data confronting them, but are troubled by the following questions. How can I make sense out of all of this material? How can I make sure that my data and interpretations are valid and reliable? How do I break through the inevitable biases, prejudices and stereotypical perspectives that I bring with me to the analytic situation? How do I put all of my analysis together to create a concise theoretical formulation?

There is widespread agreement that high quality qualitative data analysis needs to make use of coding techniques to classify or categorise groups of words (Miles and Huberman, 1994). This author has found it fruitful to follow Dey's (1993) advice in creating a "start list" of top-level codes, derived from the conceptual framework for the first stage of disaggregation of the data. Further disaggregation can then be undertaken using codes suggested by the data itself. Such coding enables data from different interviewees to be readily compared and emergent themes identified. Any linkages between and within the process, content and context of strategy can be analysed. This should enable the key features of operations strategy formation process to be identified and described. If the questioning has been directed to probing the causes of and influences on operations strategy it should also be possible to offer an explanation for the process observed. Used in this way the theoretical framework provides a structure within which to become intimately familiar with the data (Eisenhardt, 1989) to facilitate a meaningful interpretation of qualitative interview data.

Establishing construct validity is especially problematic in case study research, because of a reliance on subjectivity in data collection (Yin, 1994) which is especially problematic when relying on the ability and willingness of interviewees to recall past events accurately. The onus is on the researcher to establish the extent to which an interviewee's account accurately represents the social phenomena being described (Hammersley, 1990). As such researchers must always treat responses with caution, given the inevitable political context

within most organisations. Use of multiple sources of evidence for triangulation is advocated by many qualitative researchers (e.g. Silverman, 1993).

A longitudinal approach, revisiting a company and undertaking repeat interviews over time offers a way of tracking the pattern of actions that go to make up realised strategy over time (Pettigrew, 1990). The adoption of such an approach improves the richness and reliability of the data, but inevitably lengthens the timescale of the research.

If more than one case study is being undertaken, cross case analysis (Yin, 1994) can be undertaken to compare findings in different organisational contexts. By following this approach in three small manufacturing companies, Barnes (2000) is able to develop a descriptive model of the manufacturing strategy formation process in manufacturing SMEs. However case study research is often criticised as lacking external validity as it can usually only involve a small number of cases (Meredith, 1998).

Interviews can provide the means of collecting high quality research data, of a depth only likely to be exceeded by ethnography. Unlike ethnography, this does not require the researcher to spend extended periods of time on site, but it is nonetheless time consuming both in terms of data collection and data analysis. The transcription of interview tapes, perhaps to facilitate computer analysis, also adds to time and cost.

3. Strategy charting

Strategy charts (Mills *et al.*, 1998a, 1998b) were specifically designed to capture data on past operational decisions and actions, and their causal origins. The method forms part of a structured process for the development of manufacturing strategy (Mills *et al.*, 1996). It is in essence a group interview, led by a facilitator who might be the researcher, involving a cross functional group of managers including those with responsibility for operations. The objective for the group is to recall past strategic events, which are then recorded on the strategy chart. The chart has time as the horizontal axis and the strategy hierarchy on the vertical axis. The group decides how many levels of strategy are appropriate for their use, but this typically includes corporate objectives and strategy at the highest levels, thorough manufacturing objectives, to manufacturing strategy formulation and manufacturing strategy implementation at the lowest levels. Each strategic event is marked at the appropriate level on the chart as determined by the group. It is up to the group to determine what is meant by a strategic event. Similarly they also determine how much history to use, typically four or five years, but they may go back further. If causal linkages between events on the chart can be identified, the researcher also records them on the chart either contemporaneously with the group or during subsequent analysis.

When created in this way a strategy chart becomes a pictorial representation of operations strategy, a record of strategic actions and intentions. It is a conceptual map, a representation of the collective realities of those that construct it. As such it is: . . .

an interconnected set of understandings, formed by frequently implicit views of what one's interests and concerns are, what is important, and what demands action and what does not. It is a cognitive representation of the world. In a managerial group the social process of constructing reality this way involves the interaction of several subjective readings of the surrounding world (McCaskey, 1998, p. 120).

Strategy charting is efficient of time for all concerned, when compared to other methods. A record of past strategy can be constructed relatively quickly. Although in the author's experience (Barnes *et al.*, 1999) it may take longer than the "two sessions of between two and three hours" claimed by Mills *et al.* (1998a, p. 1082) to construct a chart with an adequate level of detail, it is a considerably less time consuming activity than interviewing all those concerned individually.

Use of a group interview means that individual memories can be jogged and past events corroborated. However this benefit must be offset against the risk of groupthink (Janis, 1972) or politically motivated behaviour (Pettigrew, 1973). The charting method seeks to minimise this by concentrating on achieving group consensus on the factual description of past events. This is likely to produce greater accuracy than trying to surface the reasoning behind the actions (Golden, 1992; Schwenk, 1985). The method also tries to ensure that the data collected is as comprehensive as possible by getting the group to systematically consider the full range of manufacturing decision areas (Hayes *et al.*, 1988). However, as operational managers may have an incomplete knowledge of higher level strategic objectives and strategies there is a danger that the recording of manufacturing implementation events may be more comprehensive than that of higher level events. Thus the composition of the group may act as a limiting factor on the chart produced. Similarly the facilitator has an important role to play in this type of research (Rhodes, 1991). A high quality chart can only result from a well run charting session. This in turn relies on the knowledge, skills and attitude of the facilitator.

Use of a number of respondents in this way also raises the practical difficulties of convening them as group. In the author's experience getting all the relevant people in one room at one time, and keeping them there for the duration of charting session can be problematic. This difficulty is of course compounded if it is necessary to subsequently re-convene the group.

Despite its limitations and practical difficulties, the method offers an efficient and potentially effective method of gaining a deeper understanding of the causes and effects of strategic operations actions. Strategy charting relies on the collective goodwill and co-operation of organisational members. As such the sponsorship of a senior manager is normally required to ensure its success.

4. Questionnaires

Notwithstanding Hill *et al.*'s (1999) criticisms of their use in operations management research, questionnaires have been used to investigate aspects of the operations strategy process (e.g. Anderson *et al.*, 1991; Tunalv, 1990). Questionnaires invariably have the benefit of greater efficiency for the

researcher. Key issues in their use centre on what questions to ask, in what form and of whom. It is generally agreed that questionnaires are best suited to asking specific rather than general questions, and for closed rather than open questions (Robson, 1993). As such they are best aimed at collecting data to test theories, hypotheses or propositions.

As discussed above, existing operations strategy process literature is limited. In contrast the corporate strategy literature offers a number of descriptive models which Bailey and Johnson (1992) have synthesised into a single model of the strategy process. They envisage the strategy process as comprising six possible dimensions:

- (1) planning;
- (2) incrementalism;
- (3) political;
- (4) cultural;
- (5) command; and
- (6) enforced choice.

These are not mutually exclusive, and in any organisation, the strategy process may feature all of these to a lesser or greater extent. Bailey and Avery (1998) have developed a questionnaire and scoring method, based on a Likert type scale, aimed at measuring these six dimensions. The questions probe respondents about aspects of strategic behaviour exhibited within their organisations. By adopting the questions to strategy at the operational level rather than the corporate level, Barnes (2000) has developed a method for measuring the manufacturing strategy process on these six dimensions. When completed by appropriate individuals, the questionnaire provides data of individual and collective perceptions of the operations strategic processes at work in the organisation. The questionnaire results can be compiled for both individuals and for groups.

As the questionnaire is intended to be self-administered, it is fronted with a brief explanatory rubric. It also asks respondents to supply some brief personal information. The intention is to minimise the time taken to complete (15-20 minutes) in order to prompt a higher response rate from busy managers than might be the case with longer and more complex questionnaires. Having an adequate number of respondents within a company not only offers triangulation but provides multiple perspectives of the process. Although the questionnaire produces quantitative data, it should be stressed that this may need to be interpreted in subsequent analysis by the researcher, emphasising the essentially qualitative nature of the research. Interpretation can be especially problematic if widely differing perceptions of the operations strategy process are surfaced from different respondents.

The Bailey and Johnson model is limited in that it neglects both the content and the context of strategy, focusing as it does on process. Reliance on it as the

sole means of data collection may restrict the richness of the data collected and hence the level of understanding of the operation strategy process obtained. Additional data might be collected by extending the questionnaire, but this risks reducing response rates. To achieve a response rate necessary to provide an acceptable level of validity, almost certainly requires the researcher to have access to the company through at least one senior manager. This person might be used to distribute questionnaires to relevant staff and facilitate their return. Similarly this person might also act as a source of additional organisational data, and act as discussant to probe verification and clarification for the questionnaire results, but this clearly places additional demands of time on both the researcher and interviewee.

The corporate strategy literature can offer other questionnaire-based approaches. For example, Fredrickson and Iaquinto's (1989) investigation of strategic processes uses a questionnaire to capture managers' responses to a major organisational problem presented to them in as a hypothetical scenario.

A questionnaire-based approach can be an extremely efficient method. Data collection and analysis are simpler and speedier than is achievable with interviews. The main disadvantage is in the lack of depth and detail of data. The effectiveness of the method depends entirely on the quality of the questionnaire responses obtained. This in turn relies on the diligence, goodwill and level of understanding of respondents. Foregoing the opportunity of personal contact with respondents is less time-consuming for the researcher. However, it prevents respondents from seeking clarification from the researcher and the researcher from responding to non-verbal communications. Interviewing a key respondent in the organisation might alleviate these dangers, but this reduces efficiency.

5. Documentation

The final method discussed within this paper will, like the first, be described more in terms of its potential than its practice. As with ethnography, this author is unaware of any published empirical studies of the operations strategy process that base their methodology solely on documentation.

Documentary evidence is the basis for most historical research. In theory there is no good reason why this should not be an appropriate methodology for researching the operation strategy process. Clearly the first requirement is the existence of relevant documentation. While some documentation may be in the public domain (company annual reports, government reports, newspaper articles, etc.), the extent of these will depend on the size and importance of the organisation. Also, it seems unlikely that such documentation could provide sufficient data about the operations strategy process. Internal documents such as memoranda, minutes of meetings, proposals, plans, and the like are likely to be required in order to track back events and intentions, both realised and unrealised, over time. Only the most bureaucratic of organisations, and by implication the largest, are likely to have accurate written records. It seems

likely that researchers would encounter less than adequate records in most organisations.

Where such records exist, a researcher would also require unhindered access to them. In the case of internal documents, this implies sponsorship from the highest level within the organisation, as such records may well be politically sensitive, internally if not externally. Like historians, operations strategy researchers need to be aware that documents can not be relied upon merely to report the facts. They may contain one-sided reports or even deliberate distortions intended to gain some kind of advantage for those who control their content. As Carr (1961, p. 5) notes:

... the most effective way to influence opinions is by the selection and arrangement of facts. ... The facts speak only when the (writer) calls upon them; it is he [sic] who decides which facts to give, in what order or context.

Organisations are often intensely political arenas. As such researchers relying on documentary evidence are advised to use triangulation to enhance data reliability and validity (Saunders *et al.*, 1997).

Despite these difficulties, there are some notable examples of the use of predominantly document based methodologies within the corporate strategy literature; Chandler's classic, *Strategy and Structure* (1962) relies almost entirely on documentary evidence to trace the evolution of strategy in large American corporations. Hickson *et al.* (1986) also rely on documentation for retrospective case histories within their study of strategic decisions processes. Such research highlights the ability of the documentary methodology to trace organisational activities over time, which is exactly what is required to study the operations strategy process.

Documentation may be both an efficient and an effective method if suitable adequate data sources exist and the researcher can obtain access to them. However caution needs to be exercised if potential inadequacies and bias in the documents are to be overcome.

Discussion

The paper assesses five possible methodologies that might be used within case study based empirical investigations of the operations strategy process. Each of these methods has its own advantages and disadvantages. Each is favoured by specific circumstances which researchers should take into account in their research design. These are summarised in Table I.

Maxwell (1996) characterises qualitative research design as an interaction between five components, namely:

- (1) the research's purpose;
- (2) conceptual context;
- (3) research questions;
- (4) methods; and
- (5) validity.

Method	Advantages	Disadvantages	Most favourable circumstances
Ethnography	Extremely effective for collecting large quantities of in-depth data The researcher gains an understanding of the research subjects and their context	Highly inefficient of researcher time as it requires researcher to spend long periods on site Objectivity of researcher can be compromised	The researcher can spend long periods of time within the organisation, perhaps in the capacity of a practitioner-researcher or a participant-observer
Interviews	Effective for collecting large quantities of in-depth data Researcher is not required to spend long periods on site	Interviewing is time consuming High quality analysis of interview data is especially time consuming Requires the researcher to be able to gain full access to the knowledge and meaning of informants	The researcher can gain access to a range of suitable informants The researcher is limited to at most a few days on site
Strategy charting	Time efficient for researcher and respondents Group interviews can stimulate memory recall and improve data validity A pictorial representation of strategy created as a permanent record Emphasises realised operations strategy	Difficult to arrange and convene group interviews Risks political behaviour from participants Risks not capturing data on intended strategies Running a charting session requires a high level of facilitation skills from the researcher	The researcher can access and convene all the key informants in one place for a period of two to three hours, perhaps on two or more occasions Informants are prepared to engage in open discussion about past events
Questionnaires	Very time efficient for researcher and respondents Responses can be quantified for ease of analysis Less chance of political responses	Data collection depends on respondents' goodwill Quantity of data collected is limited No opportunity for clarification and deeper questioning Additional data may be needed in order to interpret the questionnaire results meaningfully	The researcher has limited time for on site work The researcher can not gain access to the site The researcher has an on site champion to encourage a high response rate
Documentation	Strategy can be traced back over time Plans as well as actions may be recorded Multiple sources can facilitate data triangulation	Documents may be limited, unavailable, biased or unsuitable for their purpose	Records exist that can be accessed by the researcher

Table I.
Methods for the empirical investigation of the formation of operations strategy

Although focusing on possible methods, this paper does not ignore the other components. It assumes that the purpose of the study is to achieve an increased understanding of the operations strategy process in practice in some way. Its assessment of research methods is based on the existing theory and research that comprise the conceptual context of the operations strategy process. It assumes that the research questions are of the “how” or “why” type, as the case study is the preferred approach in such instances (Yin, 1994). There are particular threats to validity (Saunders *et al.*, 1997) for each of the five methods reviewed in this paper. For example, ethnography risks observer bias, interviews (including the group interviews used in charting) risks subject bias, documentation risks author bias and the validity of data from a questionnaire depends to a large extent on its design. Researchers will naturally want to achieve the highest possible level of quality in their research. However, in case studies the usual tests of research quality (construct validity, internal validity, external validity and reliability; Kidder and Judd, 1986) require a somewhat different interpretation than that otherwise afforded to them, especially that within the positivist research paradigm. (For a detailed discussion of this issue, see Yin, 1994.) Any research design needs to consider all five of these components simultaneously. Researchers need to choose the method that will best realise their purpose and address their research questions, giving maximum validity within the conceptual context of their specific research topic.

However, in their consideration of design, researchers also need to take account of Robson’s (1993, p. 24) caution that: “Any real world study must obviously take serious note of real world constraints”. The most significant resource issue is likely to be that of time, for both the researcher and the researched. Ethnography demands total real-time commitment from the researcher, whilst requiring only tolerance of the researcher’s presence from the researched organisation. Interviews place considerable time-demands on both the researcher and interviewees. Charting reduces the time demanded of the researcher, by, in effect, conducting a series of interviews concurrently in a group. However this is unlikely to reduce the total time devoted to the research by organisational members collectively. In fact, it may increase it. Use of questionnaires certainly reduces the time-demand on research subjects. Despite the time spent in preparing a questionnaire, the greater efficiency it affords in analysis should considerably reduce the time-demands on researchers. Documentation may well remove the need for any organisational member to have any direct involvement in the research, but, depending upon the suitability of available records, may increase the time-demands on the researcher.

Investigating the operations strategy process almost certainly requires access to the organisation being researched. As such, access is another major consideration in research design. Ethnography requires unfettered organisational access over an extended period of time. Interviews depend on the researcher being able to access a number of key employees individually for

periods of perhaps one to two hours. Charting requires access to the same people collectively for at least two hours, probably on more than one occasion. Questionnaires may alleviate the need for direct organisational access, if a suitable employee can act as a surrogate for the researcher to administer the questionnaire and provide additional contextual data. Documentation, is likely to require access to the organisation's records, but is likely to reduce to a minimum the need for the researcher to disrupt organisational life.

It would be perfectly possible to use more than one of these approaches in combination within any one case study. Indeed, Harrigan (1983) advocates the use of hybrid methodologies for corporate strategy research, including that of the strategy process. However, the benefits of using such multiple methods need to be weighed against the extra resources required. Despite the potential benefit from the reduction of inappropriate certainty (Robson, 1993) which might accrue from methodological triangulation, the inaccuracies of one approach can not be expected to overcome the inaccuracies in another (Fielding and Fielding, 1986).

Conclusion

The selection of an appropriate methodology is fundamental to the success of any research project. This paper argues that the most appropriate methodology for those who seek to answer the call for more empirical research on the operations strategy process is that of the case study. In choosing a methodology for conducting their case study, researchers must balance theoretical ambition with the practical constraints that are unavoidable when undertaking empirical research in real organisations. There is no one best way of conducting such a case study, rather the method needs to be chosen to suit the specific circumstances of the research. In assessing a range of methodological possibilities, this paper seeks to help researchers make a more informed methodological choice. In so doing it also hopes to encourage researchers to progress beyond the often-limited methodological perspective of much operations management research.

References

- Adam, E.E. and Swamidass, P.M. (1989), "Assessing operations management from a strategic perspective", *Journal of Management*, Vol. 15 No. 2, pp. 181-203.
- Anderson, J.C., Cleveland, G. and Schroeder, R.G. (1989), "Operations strategy: a literature review", *Journal of Operations Management*, Vol. 8 No. 2, pp. 133-58.
- Anderson, J.C., Schroeder, R.G. and Cleveland, G. (1991), "The process of manufacturing strategy: some empirical observations and conclusions", *International Journal of Operations & Production Management*, Vol. 11 No. 3, pp. 86-110.
- Ansoff, I. (1994), "Comment on Henry Mintzberg's rethinking strategic planning", *Long Range Planning*, Vol. 27 No. 3, pp. 31-2.
- Bailey, A. and Avery, C. (1998), "Discovering and defining the process of strategy development" in Ambrosini, V. with Johnson, G. and Scholes, K. (Eds), *Exploring Techniques of Analysis and Evaluation in Strategic Management*, Prentice-Hall, London.

- Bailey, A. and Johnson, G. (1992), "How strategies develop in organisations", in Faulkner, D. and Johnson, G. (Eds), *The Challenge of Strategic Management*, Kogan Page, London.
- Barnes, D.L. (2000), "An investigation into the process of formation of operations strategy in small manufacturing companies", PhD thesis, Staffordshire University.
- Barnes, D., Gill, R., Mills, J., O'Brien, T. and Rowbotham, F. (1999), "The origins of manufacturing strategy in SMEs", in Childe, S.J. (Ed.), *Proceedings of the Second Stimulating Manufacturing Excellence in Small and Medium Enterprises*, University of Plymouth, pp. 135-42.
- Berger, P. and Luckman, T. (1966), *The Social Construction of Reality*, Doubleday, Garden City, NY.
- Bowman, C. and Ambrosini, V. (1997), "Using single respondents in strategy research", *British Journal of Management*, Vol. 8, pp. 119-31.
- Burgess, R.G. (1982), *Field Research: A Sourcebook and Field Manual*, Allen and Unwin, London.
- Carr, E.H. (1961), *What is History?*, Macmillan, London.
- Chandler, A.D. (1962), *Strategy and Structure*, MIT Press, Cambridge, MA.
- Davenport, T.H. and Prusak, L. (1997), *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, Harvard, MA.
- Dey, I. (1993), *Qualitative Data Analysis: A User Friendly Guide for Social Scientists*, Routledge, London.
- Easterby-Smith, M., Thorpe, R. and Lowe, A. (1991), *Management Research: An Introduction*, Sage, London.
- Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-50.
- Fielding, N.G. and Fielding, G.L. (1986), *Linking Data*, Qualitative Research Methods Series No. 4, Sage.
- Fine, C.H. and Hax, A.C. (1985), "Manufacturing strategy: a methodology and an illustration", *Interfaces*, Vol. 15 No. 6, pp. 28-46.
- Flynn, B.B., Schroeder, R.G., Flynn, E.J., Sakakibara, S. and Bates, K.A. (1997), "World-class manufacturing project: overview and selected results", *International Journal of Operations & Production Management*, Vol. 17 No. 7, pp. 671-85.
- Fredrickson, J.W. and Iaquinto, A.L. (1989), "Inertia and creeping rationality in strategic decision processes", *Academy of Management Review*, Vol. 32 No. 3, pp. 516-42.
- Gianesi, I.G.N. (1998), "Implementing manufacturing strategy through strategic production planning", *International Journal of Operations & Production Management*, Vol. 18 No. 3, pp. 286-99.
- Gill, J. and Johnson, P. (1997), *Research Methods for Managers*, 2nd ed., Paul Chapman Publishing, London.
- Golden, B.R. (1992), "The past is the past – or is it? The use of retrospective accounts as indicators of past strategy", *Academy of Management Journal*, Vol. 35 No. 4, pp. 848-60.
- Gummesson, E. (1988), *Qualitative Research in Management*, Chartwell-Bratt, Bromley.
- Hammersley, M. (1990), *Reading Ethnographic Research: A Critical Guide*, Longmans, London.
- Hammersley, M. and Atkinson, P. (1983), *Ethnography: Principles in Practice*, Tavistock, London.
- Harrigan, K.R. (1983), "Research methodologies for contingency approaches to business strategy", *Academy of Management Review*, Vol. 8 No. 3, pp. 398-405.
- Hayes, R.H. and Pisano, G.P. (1994), "Beyond world-class: the new manufacturing strategy", *Harvard Business Review*, January-February, pp. 77-86.

- Hayes, R.H. and Upton, D.M. (1998), "Operations-based strategy", *California Management Review*, Vol. 40 No. 4, pp. 8-25.
- Hayes, R.H. and Wheelwright, S.C. (1984), *Restoring our Competitive Edge: Competing through Manufacturing*, Wiley, New York, NY.
- Hayes, R.H., Wheelwright, S.C. and Clark, K. (1988), *Dynamic Manufacturing*, Free Press, New York, NY.
- Hendry, J. and Johnson, G. with Newton, J. (1993), *Strategic Thinking*, John Wiley, Chichester.
- Hickson, D.J., Butler, R.J., Cray, D., Mallory, G.R. and Wilson, D.C. (1986), *Top Decision: Strategic Decision-Making in Organizations*, Blackwell, Oxford.
- Hill, T., Nicholson, A. and Westbrook, R. (1999), "Closing the gap: a polemic on plant-based research in operations management", *International Journal of Operations & Production Management*, Vol. 19 No. 2, pp. 139-56.
- Hill, T.J. (1985), *Manufacturing Strategy*, Macmillan, Oxford.
- Janis, I.L. (1972), *Victims of Groupthink*, Houghton Mifflin, Boston, MA.
- Kidder, L. and Judd, C.M. (1986), *Research Methods in Social Relations*, 5th ed., Holt, Rinehart and Winston, New York, NY.
- Kinnie, N.J. and Staughton, R.V.W. (1991), "Implementing manufacturing strategy: the human resource management contribution", *International Journal of Operations & Production Management*, Vol. 11 No. 9, pp. 24-40.
- Leong, G.K., Snyder, D.L. and Ward, P.T. (1990), "Research in the process and content of manufacturing strategy", *Omega*, Vol. 18 No. 2, pp. 109-122.
- Maruchek, A., Pannesi, R. and Anderson, C. (1990), "An exploratory study of the manufacturing strategy process in practice", *Journal of Operations Management*, Vol. 9 No. 1, pp. 108-23.
- Maxwell, J.A. (1996), *Qualitative Research Design: An Interactive Approach*, Sage, London.
- McCaskey, M. (1998), "Conceptual mapping", in De Witt, B. and Meyer, R. (Eds), *Strategy: Process Content and Context*, 2nd ed., International Thomson Business Press, London.
- McCutcheon, D.M. and Meredith, J.R. (1993), "Conducting case study research in operations management", *Journal of Operations Management*, Vol. 11, pp. 239-56.
- Meredith, J. (1998), "Building operations management theory through case and field research", *Journal of Operations Management*, Vol. 16, pp. 441-54.
- Meredith, J.R., Raturi, A., Amoako-Gympah, K. and Kaplan, B. (1989), "Alternative research paradigms in operation", *Journal of Operations Management*, Vol. 8 No. 4, pp. 297-326.
- Miles, M.B. (1979), "Qualitative data as an attractive nuisance: the problem of analysis", *Administrative Science Quarterly*, Vol. 24, pp. 590-601.
- Miles, M.B. and Huberman, A.M. (1994), *Qualitative Data Analysis*, 2nd ed., Sage, London.
- Mills, J., Platts, K. and Gregory, M. (1995), "A framework for the design of manufacturing strategy process: a contingency approach", *International Journal of Operations & Production Management*, Vol. 15 No. 4, pp. 17-49.
- Mills, J., Neely, A., Platts, K. and Gregory, M. (1998a), "Manufacturing strategy: a pictorial representation", *International Journal of Operations & Production Management*, Vol. 18 No. 11, pp. 1067-85.
- Mills, J., Neely, A., Platts, K., Richards, H.G. and Gregory, M. (1998b), "The manufacturing strategy process: incorporating a learning perspective", *Integrated Manufacturing Systems*, Vol. 9 No. 3, pp. 148-55.
- Mills, J., Platts, K., Neely, A., Richards, H., Gregory, M. and Bourne, M. (1996), *Creating a Winning Business Formula*, Findlay Publications, Dartford.

- Minor, E.D., Hensley, R.L. and Wood, D.R. (1994), "A review of empirical manufacturing strategy studies", *International Journal of Operations & Production Management*, Vol. 14 No. 1, pp. 5-25.
- Mintzberg, H. (1978), "Patterns in strategy formation", *Management Science*, Vol. 24 No. 9, pp. 934-48.
- Mintzberg, H. (1994), "Rethinking strategic planning", *Long Range Planning*, Vol. 27 No. 3, pp. 12-30.
- Mintzberg, H. and Lampel, J. (1999), "Reflecting on the strategy process", *Sloan Management Review*, Spring, pp. 21-30.
- Mintzberg, H. and Quinn, J.B. (1991), *The Strategy Process*, 2nd ed., Prentice-Hall, London.
- Mintzberg, H. and Waters, J.A. (1985), "Of strategies, deliberate and emergent", *Strategic Management Journal*, Vol. 6, pp. 257-72.
- Misterek, S.D.A., Schroeder, R.G. and Bates, K.A. (1992), "The nature of the link between manufacturing strategy and organisational culture", in Voss, C.A. (Ed.), *Manufacturing Strategy - Process and Content*, Chapman & Hall, London.
- Pettigrew, A.M. (1973), *The Politics of Organizational Decision-making*, Pitman, London.
- Pettigrew, A.M. (1990), "Longitudinal field research on change: theory and practice", *Organizational Science*, Vol. 1 No. 3, pp. 267-92.
- Pettigrew, A.M., Whipp, R. and Rosenfeld, R. (1989), "Competitiveness and the management of strategic change process: a research agenda", in Francis, A. and Tharakan, M. (Eds), *The Competitiveness of European Industry: Country, Policies and Company Strategies*, Routledge, London, pp. 110-36.
- Pilkington, A. (1998), "Manufacturing strategy regained: evidence for the demise of best practice", *California Management Review*, Vol. 41 No. 1, pp. 31-42.
- Platts, K.W. (1993), "A process approach to researching manufacturing strategy", *International Journal of Operations & Production Management*, Vol. 13 No. 8, pp. 8-17.
- Platts, K.W. and Gregory, M.J. (1990), "Manufacturing audit in the process of strategy formulation", *International Journal of Operations & Production Management*, Vol. 10 No. 9 pp. 5-26.
- Platts, K.W., Mills, J.F., Bourne, M.C., Neeley, A.D., Richards, A.H. and Gregory, M.J. (1998), "Testing manufacturing strategy formulation processes", *International Journal of Production Economics*, Vol. 56-57, pp. 517-23.
- Pralahad, C.K. and Hamel, G. (1990), "The core competence of the corporation", *Harvard Business Review*, May-June, pp. 79-91.
- Rhodes, D.J. (1991), "The facilitator - an organizational necessity for the successful implementation of IT and operations strategies", *Computer Integrated Manufacturing Systems*, Vol. 4 No. 2, May, pp. 109-13.
- Robson, C. (1993), *Real World Research*, Blackwell, Oxford.
- Saunders, M., Lewis, P. and Thornhill, A. (1997), *Research Methods for Business Students*, Pitman, London.
- Schwenk, C.R. (1985), "The use of participant recollection in the modeling of organizational decision processes", *Academy of Management Review*, Vol. 10, pp. 496-503.
- Scudder, G.D. and Hill, C.A. (1998), "A review and classification of empirical research in operations management", *Journal of Operations Management*, Vol. 16, pp. 91-101.
- Senge, P.M. (1990), *The Fifth Discipline: The Art and Practice of the Learning Organisation*, Doubleday, New York, NY.
- Silverman, D. (1993), *Interpreting Qualitative Data*, Sage, London.

- Skinner, W. (1969), "Manufacturing: the missing link in corporate strategy", *Harvard Business Review*, May-June.
- Stalk, G., Evans, P. and Schulman, L. (1992), "Competing on capabilities", *Harvard Business Review*, March-April.
- Strauss, A. and Corbin, J. (1990), *Basics of Qualitative Research*, Sage, London.
- Susman, G.I. and Evered, R.D. (1978), "An assessment of the merits of action research", *Administrative Science Quarterly*, Vol. 23, pp. 582-603.
- Swink, M. and Way, M.H. (1995), "Manufacturing strategy: proposition, current research, renewed directions", *International Journal of Operations & Production Management*, Vol. 15 No. 7, pp. 4-26.
- Tranfield, D. and Smith, S. (1998), "The strategic regeneration of manufacturing by changing routines", *International Journal of Operations & Production Management*, Vol. 18 No. 2, pp. 114-29.
- Tunalv, C. (1990), "Manufacturing strategies and decentralisation", *International Journal of Operations & Production Management*, Vol. 10 No. 2, pp. 107-19.
- Voss, C. (1995), "Operations management – from Taylor to Toyota – and beyond?", *British Journal of Management*, Vol. 6, Special Issue, pp. S17-S29.
- Weber, M. (1946), "Science as a vocation", in Gerth, H. and Mills, C.W. (Eds), *From Max Weber*, Oxford University Press, New York, NY.
- Yin, R.K. (1994), *Case Study Research*, 2nd ed., Sage, London.