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**Environmental Scanning: Untangling Threats, Opportunities and the Influence of
Perceived Environmental Uncertainty**

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Abstract

Our study explores what drives environmental scanning in organisations. Existing literature emphasises perceived environmental uncertainty as the primary driver of scanning behaviour. While other drivers have been examined implicitly in previous research, focus has tended to be on the orientation towards either opportunities or threats. The inductive analysis of seven case studies presented here suggests two things. First, that the relationship between perceived environmental uncertainty and scanning could be more complex than previously thought, and second, that a number of drivers apart from uncertainty may exist in their own right. Based on analysis of qualitative interview and secondary data, we propose that type of perceived uncertainty - state, effect, or response – may be an important determinant of scanning behaviour. We also advance knowledge of organisational motivations for scanning by identifying four drivers – opportunity search, relationship management, environment modelling, influence monitoring – that were replicated across multiple case studies.

1. Introduction

Environmental scanning is the mechanism through which organisations search for and gather information on their external environment (du Toit, 2016). Scanning is a part of a number of organisational processes, not least as an essential contributor to an organisation's dynamic capabilities (Liao et al., 2009, Wu, 2010), which are characterised perhaps most intuitively as the processes of sensing, seizing and reconfiguring in response to internal and external issues (Helfat and Peteraf, 2014). Scanning is part of the process of internal knowledge creation (Tsai and Li, 2007) and is directly related to firm growth rates in manufacturing organisations (Peters and Brush, 1996).

Scanning has been studied extensively in terms of the parts of the environment are scanned (Beal, 2000, Rouibah, 2014) and how they are scanned (Aldehayyat, 2015, Haase and Franco, 2011), with a general acceptance that the information gathered is a necessary input for sound strategic decision making. Systems for scanning the environment have been examined extensively for their effectiveness. While early results on their existence and usefulness were mixed (Jain, 1984, Lenz and Engledow, 1986), there is now general agreement that to be more effective, scanning systems should be integrated into the planning and decision-making process in the organisation (Mayer, 2011).

Despite scanning's importance, research concerned with why organisations scan their environments has tended to focus on the impact of perceived environmental uncertainty (PEU) on scanning behaviour (Daft et al., 1988, Stewart et al., 2008). Other influences investigated include top executive turnover (Cho, 2006), functional background (Hough and White, 2003) and organisation strategy type (Jennings and Lumpkin, 1992).

In this paper, through exploration of why environmental scanning is conducted in practice, we argue first that the impact of PEU on scanning may depend not only on the level of PEU

but also on PEU type and on the size of the organisation in question. Second we argue that motivations for scanning the environment are complex, and that a number of different drivers of scanning exist. Our findings are grounded empirically in a set of seven case studies that involved a qualitative exploration of scanning practices in organisations of differing sizes. The degree of replication of behaviour and relationships across these cases suggest that our findings could be indicative of wider practice.

2. Relevant Literature and Conceptual Framework

We conduct our review of relevant literature in two streams. Prior research on scanning motivations has been predominantly concerned with the impact of PEU on scanning behaviour. This is examined first and research on wider motivations for scanning the environment is dealt with second. The intention is to develop a conceptual framework representing existing knowledge in the field, which can then be compared with our empirical findings.

2.1 Perceived Environmental Uncertainty (PEU) and Environmental Scanning

It is common to break down the environment into a number of sectors and a variety of approaches are apparent in scanning research. Early work typically used four sectors of the environment to examine scanning (e.g. Hambrick, 1982), while highly cited work by Daft, Sormunen and Parks (1988) used a six-sector breakdown. Others have added finer breakdowns of the environment, using seven sectors (Sawyer, 1993, Elenkov, 1997, May et al., 2000, Stewart et al., 2008) or even nine environment sectors (Jogarathnam and Law, 2006). We propose that, given the ambiguity inherent in any organisation's environment, a six sector breakdown is sufficient. This consists of *economic*, *sociocultural* and *political/regulatory* sectors in the general or remote environment and *customer*, *competitive* and *technological* sectors in the task environment (Daft et al., 1988).

The attributes of an organisation's environment are also of some importance, usually identified as dynamism, hostility and heterogeneity (Miller and Friesen, 1983, Sharfman and Dean, 1991). While these factors have been used in an objective sense to examine scanning behaviour (Hough and White, 2003, Nastanski, 2004), a far more popular approach has been to look at managerial perceptions of the environment and its relationship with scanning.

There is plenty of empirical evidence to support the proposition that PEU in a given sector of the environment encourages scanning of that sector (Ebrahimi, 2000, Xu et al., 2003). The relationship is, however, moderated by the perceived level of strategic importance of a given environment sector (Stewart et al., 2008, Boyd and Fulk, 1996).

The way in which the environment itself affects the level of PEU has also been examined. In transition or industrialising economies, for example, the task environment was found to be a more significant source of uncertainty than the general environment, despite the fact that the political/regulatory environment was a particular source of PEU in Nigeria (Sawyer, 1993) Bulgaria (Elenkov, 1997) and Russia (May et al., 2000).

Recent research examining scanning behaviour in three European countries during the euro crisis (Barron et al., 2015) has shown that volatility in a given environment sector can result in both increased levels of scanning and more formal scanning routines. Indeed, the use of formal scanning systems have been shown to reduce the impact of environmental uncertainty on decision-making (Okura et al., 2009) and to provide reassurance to managers that they have a good understanding of their environments (du Toit, 2016).

Research combining objective and perceptual measures of the environment has shown that PEU tends to be positively related to environmental complexity and variability (Oreja-Rodríguez and Yanes-Estévez, 2010). In addition, the act of scanning itself is likely to lead to a closer link between the perceived and actual environment states (Sutcliffe, 1994). There is a

fundamental difference, however, between environmental variability and unpredictability (Doty et al., 2006). It is this unpredictability with which PEU is concerned.

It has been proposed that there are three types of PEU (Milliken, 1987), each affecting the organisation in different ways. *State PEU* is the inability to predict the behaviour of a particular component of the environment. *Effect PEU* is the inability to predict the impact on the organisation of an environmental event or change. *Response PEU* is a lack of clarity concerning options available to respond to an event and is experienced when there is a perceived need for immediate action. Empirical support exists for these three uncertainty types (Milliken, 1990). and more recent work has found that managers are aware of these different uncertainty types (Ashill and Jobber, 2009).

These three uncertainty types have become a core component of the literature on perceived uncertainty (Huff et al., 2016) and they have been used recently in entrepreneurship studies on the role of national culture (Liu and Almor, 2016) and on external networking activities (Engel et al., 2017). No work to date, however, has attempted to relate these three PEU types to environmental scanning behaviour. The treatment of PEU in existing scanning literature has been entirely concerned with measures of perceived variability, most closely resembling State PEU and neglecting both Effect PEU and Response PEU entirely.

This implicit focus exclusively on State PEU in existing literature gives rise to the first question that we seek to answer here:

How does uncertainty type affect the relationship between PEU and scanning behaviour?

2.2 Wider Motivations for Scanning the Environment

The impact of PEU has been the focus of most research that seeks to explain environmental scanning behaviour but other factors are also apparent in the literature. There has been a

tendency, however, to look at influences on scanning behaviour, rather than explicitly at what motivates it. These influences include functional background (Hough and White, 2003), firm age and size (Lester and Parnell, 2008) and industry life cycle stage (Beal, 2000).

In terms of motivations for scanning, managers scan their environments primarily to look for opportunities and threats (Lang et al., 1997). It appears that the precise orientation towards either threats or opportunities is related to generic strategy. Firms pursuing a differentiation strategy tend to be concerned primarily with opportunities, while those pursuing cost-based strategies tend to be more concerned with threats in the environment (Jennings and Lumpkin, 1992, Hagen and Amin, 1995).

Framing the outcome of scanning exercises as opportunities results in better performance than framing them as threats (Howell and Shea, 2001). The ability to effectively seek out and identify opportunities is a fundamental part of a firm's dynamic capabilities (Danneels, 2008). More recent research has shown that opportunity scanning helps organisations avoid competence gaps (Taipale-Eräväla et al., 2015). Pervasive threats, such as the Euro crisis, can be a powerful motivator for scanning of a given environment sector (Barron et al., 2015). There is also some limited evidence to suggest that scanning may also be, in part, a public relations exercise (Lauzen, 1995).

Overall, work concerned with motivations for scanning has been relatively limited aside from research on PEU reviewed in section 2.1. Therefore the second question to arise is:

Aside from PEU, why do organisations scan their environments?

2.3 Conceptual Framework

The literature reviewed in sections 2.1 and 2.2 provide the basis of the conceptual framework shown in Figure 1, which is focused on motivations for scanning the environment.

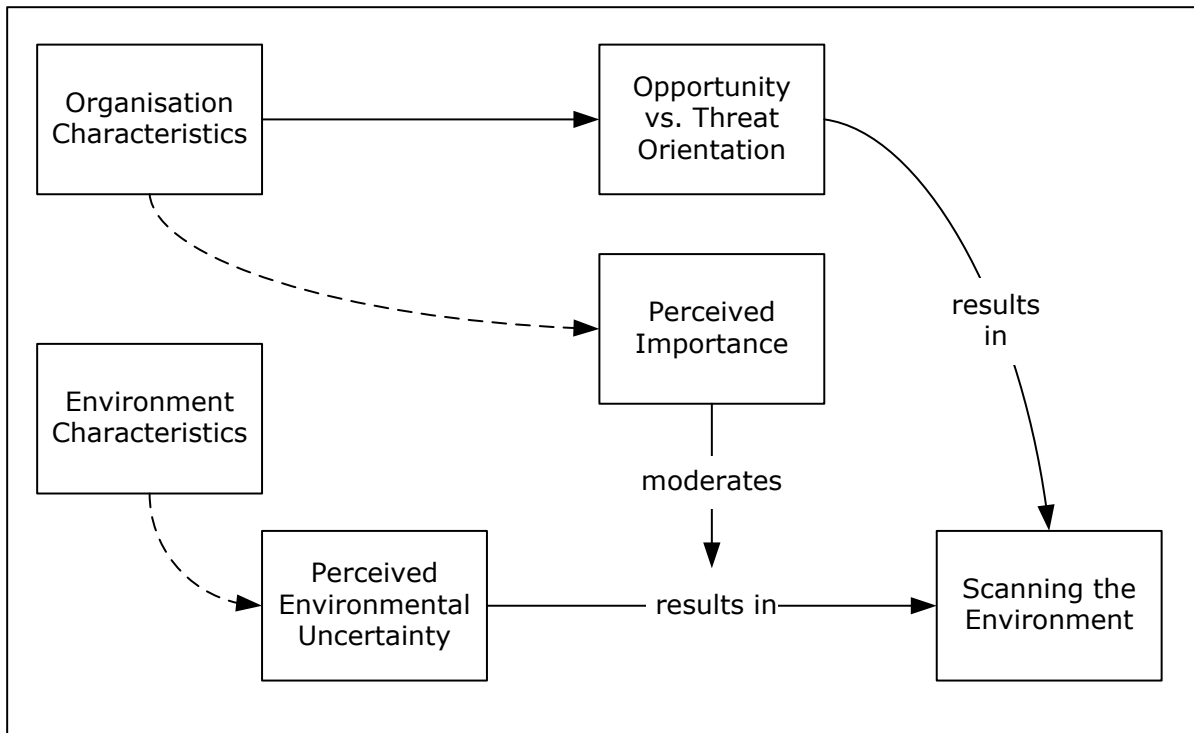


Figure 1: Motivations for Environmental Scanning Conceptual framework

The framework runs left to right, with drivers and influences on environmental scanning shown on the left and scanning of a given sector of the environment as the outcome on the right. *Environment Characteristics*, such as dynamism, heterogeneity, and life cycle stage, drive environmental scanning indirectly. It is the perception of managers that is important. The direct relationship between *Perceived Environmental Uncertainty* and environmental scanning is shown, moderated by the *Perceived Importance* of a given environment sector.

Organisation Characteristics, such as generic strategy, organisation life cycle stage and size, influence the *Opportunity vs. Threat* orientation, which results in scanning of the environment. They may also influence the perceived importance of a given sector. The framework will be revisited and revised in section 5, after the results of the present research have been presented. We acknowledge that there is also a link between organisation and environment characteristics; it is not, however, included here because such links are beyond the scope of our study.

3. Methods

A case-based research design was employed because of its appropriateness for addressing 'how' and 'why' questions (Yin, 2013). Empirical work was conducted in two stages. First, in order to gain a wide view of why organisations scan their environments, data from seven companies of different sizes in the oil and gas and several other industries was collected and analysed. Second, after analysis was complete, respondents in three of the seven organisations were re-engaged to confirm validity of the results of the analysis and discuss the outcomes of the research.

3.1 Sampling

A theoretical sampling approach (Eisenhardt and Graebner, 2007) was used to select companies for the study. This involved choosing an initial sample that would produce as much variability of behaviour as possible and expanding it until theoretical saturation was reached.

At first the research was restricted to companies in and around the oil and gas industry. Previous studies of scanning have often used single industries as an empirical domain (e.g. Jogaratnam and Law, 2006, Sawyerr, 1993), the intention being to minimise the likelihood of different scanning behaviours being driven by industry context. Others have used multiple industries (e.g. Doty et al., 2006, Xu et al., 2003) or multiple countries (e.g. Stewart et al., 2008), the intention being to compare scanning behaviour between different industries or geographic areas. Once the data collection process began, the variation in both behaviour and context of the organisations studied suggested that restricting the sample to a single industry would not be meaningful. Thus the scope was expanded to include a financial services and a defence industry organisation.

It was concluded after the seventh company had been studied, where a significant degree of replication with earlier cases occurred, that a sufficiently heterogeneous and rich set of data had been collected. Theoretical saturation requires that data collected must be adequate for the purposes of addressing the research question (Bowen, 2008). Eisenhardt (1989) noted that data collection should end once improvements become marginal, and there appeared to be sufficient replication of activity and approaches across the seven cases to suggest that theoretical saturation had been reached.

Interviews were conducted between October 2011 and April 2014, either at company headquarters or by telephone. In order to achieve access at the level required, significant negotiation was required over a period of time, making use of personal contacts in the first instance. Written approval (via email) was then sought from a senior manager before interviews were conducted. Table 1 contains a breakdown of the seven companies studied with details on industry, company type, company size based on the number of employees, geographic spread, and positions of those interviewed. A classification of the company's strategic orientation is also included (Miles and Snow, 1978). Participating organisations are labelled A to G in the order in which they were analysed.

Table 1: Sample companies, industry, strategy type and size

Co.	Industry	Company Type	Geographic Spread	Strategy Type	Size*	Respondent Position(s)
A	Oil and gas	Development and production	Europe	Analysers	Medium	CEO
B	Oil and gas	Exploration and development	Europe, Asia, Africa	Prospector	Medium	Senior Executive, Corporate Level 2 Senior Executives, Corporate Strategy
C	Oil and gas	Vertically integrated	Global	Defender	Large	Head of Division
D	Offshore services	Offshore oil services	Europe, S America, Asia	Prospector	Small	Division Operations Manager
E	Financial services	Investments and pensions	Europe, N America, Asia	Defender	Large	Senior Executive, Corporate Strategy Senior Executive, Risk Management Senior Executive, Business Strategy Senior Executive, Market Intelligence
F	Oil and gas	Asset purchase and disposal	Africa	Prospector	Small	Chief Executive Executive Director Senior Manager, Finance Senior Manager, Legal
G	Defence	Products and services	Global	Analysers	Large	Senior Executive, Corporate Strategy Senior Executive, Business Development

*by number of employees. Small <100, Medium 101 – 2,000, Large >2,000

Respondents within cases had to meet the following criteria to be approached for interview.

- Be in a role that required some involvement in corporate or strategic business unit (SBU) strategy.
- Operate at a level sufficiently high to have a view of the organisation as a whole.
- Have some engagement with the external environment, either as a decision maker or in a role that required examination of the external environment.

The respondents included chief executives, directors of corporate strategy, heads of SBUs and members of environment teams. All were in roles requiring involvement in corporate or business unit strategy and were at a senior level. Critically, all had engagement with the environment external to their organisation. The majority of individuals who were asked to participate did so, but three proposed participants did not respond to requests for interview, one each in companies B, E and G.

The number of available respondents in each company was limited by the level of access that it was possible to negotiate. In companies A and B a single senior manager was interviewed. In all other cases at least two senior managers were interviewed. This was deemed sufficient, however, because the focus of the interview questions on the organisation as the unit of analysis, combined with the position of the respondent in each case (the CEO for company A and a senior executive at the corporate level for company B), allowed for collection of enough data for case study development.

Semi-structured interviews were chosen, being an appropriate technique to use when it is not possible to repeatedly interview respondents (Bernard, 2012). Interviews were semi-structured, between 45 minutes and 2 hours in length, and allowed respondents to talk freely about their experiences and how things were done in the organisation, the intention being that the data collected were not restricted by the interviewer's preconceived ideas. All interviews

were recorded and then transcribed. Subsequently all respondents were sent a copy of the transcript and invited to make comments or changes before the transcript was used.

Each case was supplemented with secondary data. In companies B, C, D and F these data consisted of publicly available documents and information collected from the relevant company website. The other companies (A, E and G) provided internal presentations and documents relating to environmental scanning and the strategy process. These various documents and the background understanding they conferred was critical in making the most of available interview time (Eisenhardt, 1989).

3.2 Data Analysis

A template analysis approach was taken (King and Brooks, 2016). The first stage was conducted using NVivo software and involved grouping together statements or parts of interview transcripts that provided explanations for environmental scanning being carried out on a case-by-case basis. A general code for motivations was used, along with three PEU-related codes, one for each uncertainty type, to highlight instances where respondents demonstrated or reported uncertainty around some aspect of the environment. The result of this first stage of analysis was a coding report for each case study that highlighted data concerned with motivations for scanning the environment and instances of State, Effect and Response PEU.

The second stage of analysis was conducted manually rather than using computer software. The reports were read repeatedly to gain a deeper understanding of what was happening in each case. Next the contents of each code were examined. Various marginal notes were made at this point and an attempt was made to understand what motivated scanning of the environment. Time-ordered statements (x follows y) or more explicit causal statements (x

causes y) were highlighted. In each instance this allowed identification of a single driver of a particular aspect of environmental scanning.

Data coded as State PEU, Effect PEU and Response PEU were examined for both impact on scanning and the sector of the environment to which that PEU was related. Evidence of PEU arose both on direct questioning about uncertainty and at other points during the interviews.

The third and final stage of analysis involved cross-tabulation of results by case and a search for instances that either concurred with or differed from existing understanding as represented by the conceptual framework.

3.3 Limitations

The large number of case studies used in the research resulted in a wide frame of reference in which the findings could be grounded. There was, however, some trade-off between the number of cases examined and the number of interviews conducted in each case. The number of cases included means that the depth of exploration in each individual case is, by design, more limited than might have been possible in a different sort of study.

We also acknowledge that the nature of the data collection process means that instances of PEU and the various drivers that emerge are unlikely to be comprehensive in nature.

Furthermore, while the seven case study companies ranged in size, in industry, in purpose, in type and in strategic orientation there can be no sense that taken together they can be considered representative. The degree of replication across cases suggests that findings could be indicative of wider practice, but any generalisation is likely to be theoretical as opposed to empirical in nature (Tsang, 2014).

4. Results

Evidence of PEU and its impact on scanning behaviour in the seven cases is presented in section 4.1. This is followed in section 4.2 by an exposition of other drivers of scanning that emerged in the data analysis. While a variety of drivers were found in each of the sample organisations, a number of common themes emerged. An adapted conceptual framework, based a combination of the framework developed from existing literature in figure 1 and our empirical results is presented in section 4.3.

4.1 The Role of Perceived Environmental Uncertainty (PEU)

Some instance of PEU was observed in all seven cases. These instances give an indication of the types of PEU experienced by organisations in the sample and the impact of PEU on scanning behaviour. As noted in section 3.2, we approach the empirical results by reporting instances that either concur with or go against existing knowledge.

Overall PEU was most apparent in the political/regulatory and economic sectors of the environment, and was observed in every environment sector apart from the sociocultural. State PEU was observed most frequently, followed by Effect PEU. Both uncertainty types were observed across all seven organisations. Response PEU was observed only in company C and thus findings on Response PEU are constrained by lack of replication. Both State PEU and Response PEU tended to encourage deeper and wider scanning of a given sector, but the impact of Effect PEU tended to vary according to the situation.

Examples of situations where State PEU encouraged scanning of the environment include company E's scanning of the political/regulatory environment:

'Regulation is the thing that can just change overnight. That creates or destroys markets. [...] We spend a lot of time managing our regulators in terms of expectation.' (Company E)

An entire team at the corporate level in company E was dedicated to liaising with regulators and monitoring the political/regulatory environment because of uncertainty surrounding the behaviour of regulators. It was not just in large companies that State PEU encouraged scanning of the environment. In company F, the smallest organisation studied, State PEU was apparent in the competitive environment:

'The good opportunities that are available are very difficult to find [...] from a logistical point of view: just actually finding out about them. Let alone the competitive point of view'
(Company F)

Effect PEU was observed to increase the level of scanning on a number of occasions. A particularly well-articulated example was that surrounding the technological environment in Company A:

'If you think about it, we are making decisions based on a hole in the ground 10,000ft deep, the diameter of a dinner plate. We make investment decisions worth hundreds of millions of pounds based on that and it is easy to get them wrong.' (Company A)

Effect PEU surrounding the outcomes of new projects and the impact they could have on the organisation is apparent here. This led to increased scanning of the technological sector in an attempt to reduce Effect PEU.

Company G exhibited both State PEU and Effect PEU surrounding the political/regulatory environment, which encouraged scanning. The following was said in relation to investigating geopolitical factors for a prospective new client:

'[we look at] procurement policy, foreign versus domestic suppliers, competition versus source, partnering versus fixed price. Every procurement, even with the same customer, is a

little bit different, so it's just understanding as much as you absolutely can [...] and that varies by country by country.' (Company G)

The political/regulatory sector was a source of State PEU in that changes could occur rapidly and were not easy to predict, but also a source of Effect PEU because it was not clear from project to project how regulatory changes would affect the company.

Where Response PEU arose, it was in conjunction with both State and Effect PEU in company C as follows:

'When Tunisia happened – the Arab Spring – and the spark flew to Egypt, that was the time we [produced reports for the whole] region, because obviously that would not be contained to these countries; it would spread through the region. [...] It is making sense of a volatile situation and we do that to make [sure] our decision makers neither underreact nor overreact.' (Company C)

This short vignette contains examples of state, effect and response PEU. Initial State PEU encouraged deeper scanning of the region, designed to reduce Effect PEU and the Response PEU experienced by decision-makers. This suggests there may be a time-based element to the instance of the three uncertainty types.

In all of the examples presented so far, the apparent relationship between PEU and scanning is as expected. There were however, a number of instances where PEU appeared to actually discourage scanning of the environment. This behaviour was restricted to medium and smaller companies and most often observed in relation to Effect PEU. For example, the political/regulatory sector of the environment was a significant source of Effect PEU:

'[Country X is] probably the most tear-your-hair-out place to try and get a contract; there is nothing like it. [... Country Y] is another one that's like it but we don't put political instability as a risk on our analyses because it's everywhere.' (Company D)

Both State and Effect PEU are apparent here. The unpredictability of regulation in two countries, combined with the inability to forecast how this might affect the company meant that this part of the environment was not subjected to scanning and analysis. Another example of PEU discouraging scanning was concerned with the impact of oil prices on costs:

'We have a fairly straightforward approach now where we say the costs will be what they will be and the oil price and the gas price will work with it. Because we are so front-end you can get a little bit too intricate in trying to model costs and prices. Until you have a tangible project and you say, "Now we are going to commit the capital for that project," I think it is right to look at it the way we do.' (Company B)

The fact that it was difficult to effectively model the impact of oil price changes on company costs meant that it was, in effect, ignored in the above case. A similar instance arose in company F as follows:

'You have to remember we're in a higher oil price, but we're also getting into an increasingly higher cost environment too. So costs have really gone up significantly in the last ten years. So at what point do you get to a point when things get too costly? There are several instances now of offshore wells costing more than \$200 million. And that's an expensive shot.' (Company F)

The increased Effect PEU resulted in very little scanning of the economic sector of the environment in company F. In addition, the price of oil was a source of State PEU. The

impact of the oil price on the organisation was not seen to be an issue, despite it being a key driver of exploration activity:

'Developments are still going ahead. Oil, as long as it sits above \$90 a barrel, [...] can be a very lucrative place to do business, [but] if oil was sitting at \$60 a barrel, it would be a very different market-place. [...] I don't think it has a major impact on us at the moment.'
(Company F)

Larger companies appeared to scan sectors where PEU arose, while smaller companies took a mixed approach. In companies B, D, and F for example, Effect PEU always appeared to result in reduced scanning of the relevant environment sector. The negative impact of State PEU was observed only in the small organisations (D and F).

It is possible that the negative impact of State PEU could be explained by company size and available resources. Smaller companies have limited management time available to try to understand the state of objects in the environment. They also have limited resources with which to scan the environment.

The negative impact of Effect PEU may be a more complex phenomenon. It is of interest that the three organisations in which negative Effect PEU was observed were all categorised as prospectors. It is possible that the strategic orientation of a prospector, given the drive to search for new and evaluate new opportunities noted above lends itself less towards determining in detail the effects of specific events in the environment. It may be sufficient to gather an understanding of the behaviour of different environmental variables in such organisations.

Indeed, it may be the case that managers in the organisations where Effect PEU was seen to have a negative effect on scanning may convince themselves that the potential impact of

environmental issues is smaller than an objective observer might think. This was most marked with regard to the oil price and its effect on costs. The two oil and gas exploration companies (B and F) both noted that they did not spend large amounts of time worrying about what would happen to cost levels if the oil price increased. It is of interest, given the subsequent substantial fall in oil prices, that none of the managers in relevant companies identified this as a possibility at the time of questioning.

4.2 The Emergence of Four Drivers

Aside from looking at PEU, our intention was to see what other motivations for environmental scanning would emerge. A detailed review of content coded as ‘motivations’ resulted in common themes emerging across cases, the outcome of which was four frequently observed drivers of scanning. While other drivers of scanning did emerge from the analysis, only drivers replicated across at least two organisations are included here, as follows:

Opportunity search is scanning to find potential opportunities in terms of new products, markets, services, acquisitions or joint ventures. Examples of opportunity search driving scanning behaviour include company A’s scanning of the competitive environment to look for companies to acquire, company G’s use of cross-disciplinary teams to scan political/regulatory, competitive and customer environments, or companies D and F’s examinations of the political/regulatory environments in areas that were being considered for market entry:

‘We look at this, perhaps wrongly, as acquisition opportunities. We are looking to see what people are doing and how vulnerable they are. Unashamedly we are looking at the ones who pursue the exploration model but do not have the finance to develop their assets.’ (Company A)

‘The skills we have in-house have been selected and focused on selecting the right transaction, doing the right transaction, and then watching the operator.’ (Company F)

Influence monitoring involves scanning the external environment to monitor something that is understood or expected to influence the activities and in some case the performance of the organisation. An example of this is company A’s and company F’s monitoring of the political/regulatory environment in which their operations were based in order to understand and better anticipate forthcoming changes in regulation and tax structures. Another example is the monitoring of the technological environment by companies A and G for changes in technology that might affect their business, or company E’s ongoing monitoring of the competitive environment:

‘What happens on an ongoing basis is we have competitor intelligence, market people, “insight” people broadly, whose job it is to monitor things that are going on. They tend to be business unit specific.’ (Company E)

Relationship management is scanning to monitor and in some cases to sustain a relationship with an external stakeholder. Such scanning is distinct from influence monitoring because it involves scanning some aspect of the environment over which the company might be able to exert some change or control. One example of relationship management driving scanning is company G’s need to maintain open communication and dialogue with governments with whom they were working. Company E’s regular meetings with regulators also fall into the relationship management category. Company B also spent a lot of time scanning political/regulatory and customer sectors of the environment to manage relationships:

‘The way that we try to behave – indeed we talk about respect, relationship and responsibility – [is that] we have a responsibility to, in this case, the government in a political sense, and

we respect them, earn their respect, and you do that through establishing very straightforward and transparent relationships' (Company B)

Environment modelling involves scanning the external environment to gather information to be used to make strategic choices, likely to involve a degree of internal modelling and reporting. Examples of this include company G's scanning of the economic environment to provide environmental analysis reports, company C's development of detailed environment reports for executive meetings and company E's scanning to produce periodic reports for senior management about competition that were tailored to their requests:

'If you can [...] gather that stuff from these 100 people that don't speak to each other all the time because they are scattered about, but if we can collate that, then it means that the outputs that we produce, which effectively will go to the decision-making forums, [...] that generates a competitive advantage for us, because in theory we understand the market better than anyone else.' (Company E)

All drivers were replicated across multiple cases with opportunity search, relationship management and influence monitoring being observed in five organisations each. The fourth driver, environment modelling, was observed in six of the seven companies. The sample contained three prospectors (B, D, F), two analysers (A, G) and two defenders (C, E). This categorisation of strategic orientation was derived from an examination of the secondary data sources, which contained items such as Chief Executive statements, annual reports and investor presentations.

Prospectors in the sample seemed to scan the environment most for opportunities.

Opportunity search appeared to drive all three organisations to scan the technological and political/regulatory environments in particular. Two of the prospectors noted that they wanted

to enter new markets via acquisition, which meant that they were also driven to scan the competitive environment when searching for opportunities.

The most common driver of scanning in the two analyser companies was environment modelling, followed by influence monitoring. The technological environment was scanned to monitor influences rather than to find opportunities, in contrast to the prospectors.

Information from the economic environment was used to model the environment to support decision-making processes.

The two defender companies were not driven to scan the environment for opportunities at all. Rather, scanning of the political/regulatory and customer sectors was driven by the need to manage relationships in both cases. Environment modelling needs drove scanning of the competitive, customer and technological sectors, and the need to prepare budgets and forecasts drove scanning of the economic and technological sectors.

5. Discussion and Framework Development

While our research is of an exploratory nature, the degree of replication in a number of instances suggest that the relationships presented in the conceptual framework in Figure 1, may be more complex than originally thought. We therefore present an adapted framework in light of the results of our study, shown in Figure 2.

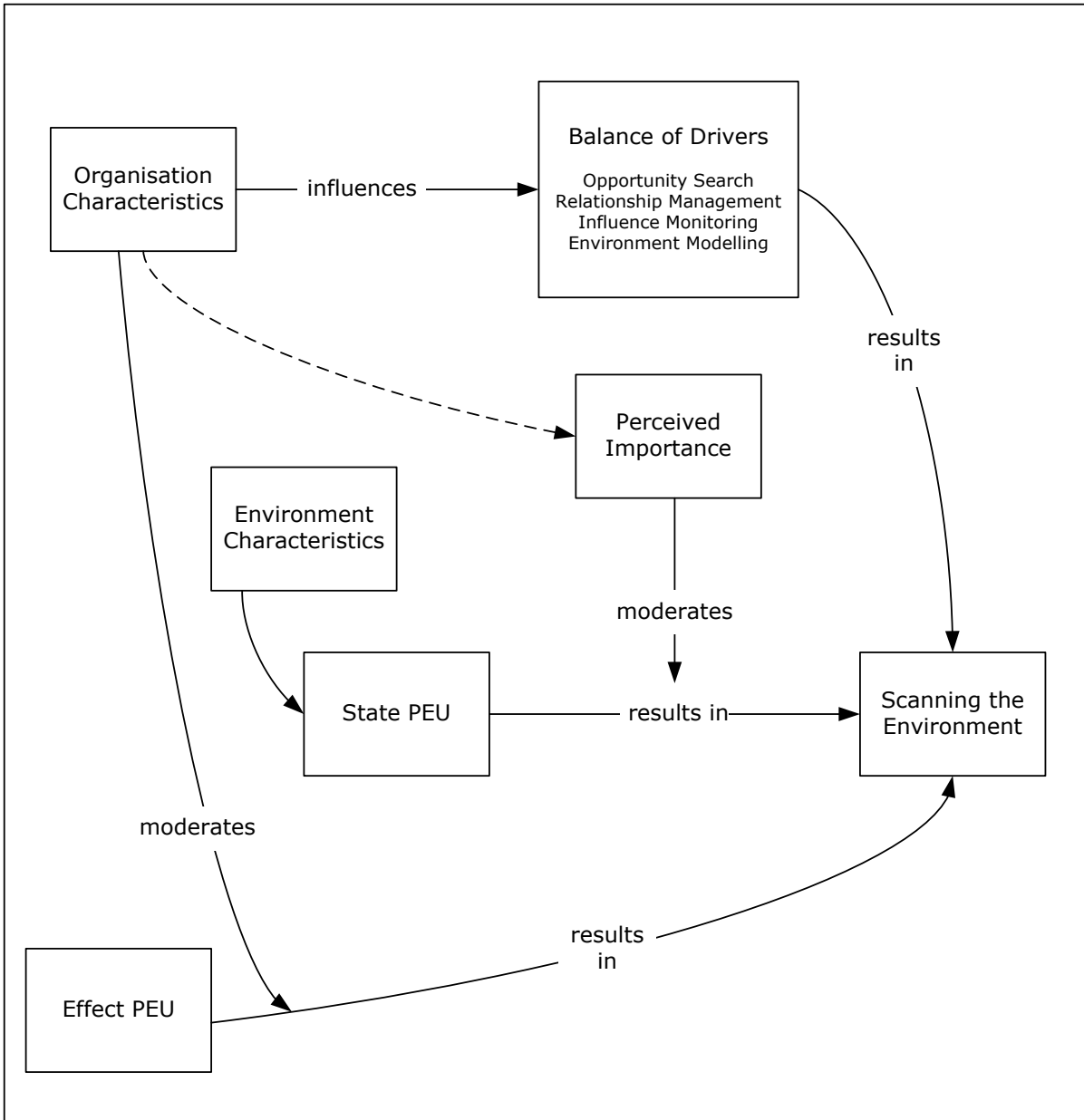


Figure 2: Adapted Conceptual framework

First, the empirical results suggest that the relationship between PEU and environmental scanning may be more complex than presented in section 2. The relationship between State PEU and scanning remains the same as the general relationship between PEU and scanning shown in Figure 1. This is perhaps unsurprising given that most research on PEU has implicitly examined only State PEU (Milliken, 1987). One instance of State PEU discouraging scanning was apparent in company F, but this has not been included here due to the lack of replication in other cases.

The more complex relationship between Effect PEU and scanning is included in the adapted framework, with organisation characteristics, in this case size, moderating the relationship between Effect PEU and scanning. In the smaller and medium sample organisations Effect PEU seemed to discourage scanning in a number of instances.

A significant number of previous works have identified the perceived strategic importance of a particular sector, along with the level of perceived uncertainty, as having a significant relationship with the level of scanning directed at that sector (Daft et al., 1988, Elenkov, 1997, May et al., 2000, Stewart et al., 2008). We did not specifically ask managers to rate the importance or otherwise of aspects of their environments, but it can be inferred, given the framing of the semi-structured interviews, that each instance of PEU observed was related to some item of perceived strategic importance to the organisation. Thus our findings are, in general, consistent with the proposition that increased perceived strategic uncertainty results in increased levels of scanning (Ebrahimi, 2000).

Boyd and Fulk (1996) noted that items in the environment seen as too complex or too difficult to analyse were not scanned. Our findings support this to some degree, with the qualification that the reluctance to scan uncertain aspects of the environment was limited to medium and small organisations. Large organisations, whose resources available for scanning were significantly greater than those of the small organisations, did not appear to see difficulty of analysis as an issue. Indeed, in the case of company C, a significant amount of effort was devoted to developing proprietary models of complex variables in the environment.

Findings concerned with Response PEU are limited, being observed in only one case out of the seven. For that reason Response PEU is not included in the adapted framework. Indeed, the findings presented here concerned with PEU are in general limited, given that only certain

individuals in the organisations were interviewed as part of the data collection process.

Observations of PEU are therefore unlikely to be comprehensive from the organisational perspective.

Nevertheless, the two PEU types observed across multiple cases seem to have had a relatively consistent impact, suggesting that the impact of PEU on scanning may depend on PEU type and be related to organisational characteristics, in this case size. Indeed it is logical to conclude that the impact of Effect PEU is related to organisational characteristics as it involves a deficit in understanding of how an external variable might impact some internal factor. A similar relationship may exist for Response PEU, it being partly dependent on decision-maker characteristics, but we do not have the evidence to propose that here. These relationships are worthy of further research in future.

The results presented here also suggest that size and strategy type might influence more than just the orientation towards opportunities and threats. It appears that a number of different drivers of scanning exist and the balance between these is influenced by organisational characteristics. The drivers themselves are left in a 'black box' in Figure 2 because the exploratory data do not allow relationships between them to be developed. The drivers do, however, provide depth and consolidation to understanding of what drives scanning apart from the existence of PEU.

In previous research, a focus on opportunities has emerged as being related to strategies based on differentiation, while a focus on competitor monitoring was related to cost leadership strategies (Jennings and Lumpkin, 1992, Hagen and Amin, 1995). In more general terms, opportunities and threats were found to be the main motivation for gathering information about the environment in resource-constrained small businesses (Lang et al.,

1997, Beal, 2000). This means that, implicitly at least, *opportunity search* and *influence monitoring* have been acknowledged as drivers of scanning in some existing studies.

In contrast, it appears that existing research has broadly failed to recognise the role of *relationship management* in driving environmental scanning. While it has been acknowledged in general that scanning is good for public relations and external relationships (Lauzen, 1995), our findings here are significant because management of external relationships was the most frequently observed driver of scanning, appearing across five of the seven cases.

In addition, the driver *environment modelling* has not emerged from existing literature. This could perhaps be explained by the quantitative nature of previous research, which has not allowed open-ended exploration of the motivations behind scanning and has instead focused on relationships between scanning and a number of internal and external variables.

An alternative explanation for the emergence of this driver could be that the organisational perspective has afforded insight that predominantly individual-focused existing work has not permitted. Scanning of this nature by its nature involves multiple individuals. In addition its emergence could be explained by engagement in the field with individuals other than senior management decision makers, who have tended to be the focus of prior research.

6. Conclusion

The case study data upon which the findings presented here are based represent broad snapshots of why seven diverse organisations scan their environments. Access to this many companies, ranging from the very small to the very large, serving different purposes has allowed a wide perspective to be taken of scanning as a phenomenon. Findings have emerged that would not have been possible in a study limited to a single company or to a group of two or three. At the same time the number of cases included means that the depth of exploration

in each individual case is, by design, more limited than might have been possible in a different sort of study. Furthermore, while the seven case study companies ranged in size, in industry, in purpose, in type and in strategic orientation there can be no sense that taken together they can be considered representative in a way that might allow confident generalisation. Indeed the fact that five of the seven organisations had some connection to the oil and gas industry may limit the findings further.

It should be noted also that the nature of the research design meant that respondents were being asked to recall how something was done or to comment in a general way about how and why data is collected by their organisation. There may have been elements of post hoc rationalisation in these interviews. The qualitative approach adopted, while allowing insight into environmental scanning by the organisations concerned, is quite different to a quantitative study that might allow rigorous testing of underlying relationships. Nevertheless, the extent of replication of activity and relationships across the seven cases does permit us to speculate that the outcomes of the research described here may be indicative of how things might work in a wider population of organisations.

The role of PEU, emphasised heavily in earlier studies as a determinant of scanning behaviour, may have a different influence on scanning depending on PEU type, strategy type and organisation size, suggestive of a more nuanced relationship than existing research proposes. The adapted conceptual framework presented here could form the basis of further statistical research in this area in the future. Further, Response PEU requires further study in its own right to see how its impact might differ from that of State PEU and Effect PEU.

The emergence of four drivers of environmental scanning represents a step forward in understanding the link between strategy and scanning. While previous research has implicitly identified one or two drivers of scanning, the exploratory approach has resulted in a deeper

picture of what might drive an organisation to scan its environment. The effect that strategic approach seems to have on the pattern of specific drivers of scanning provides further insight into the nature of the relationship between type of strategy and the nature of scanning. Again this relationship is worthy of further investigation in future studies, which might use our adapted conceptual framework as a starting point.

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