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**Organising Environmental Scanning: Exploring Information Source, Mode and the
Impact of Firm Size**

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Abstract

Recent research on environmental scanning has shown it to be an important part of many organisational processes related to strategy. A fundamental aspect of scanning behaviour is the mode or channel through which information is gathered. Existing research on mode selection and source use has suggested that managers prefer to use personal sources that are either internal to or external to the organisation depending on context. What is not clear, however, is why one source may be preferred to another and how different scanning modes might complement each other. We explore these issues through the collection and analysis of interview data from seven organisations of widely differing sizes. Using the organisation itself as the unit of analysis, we offer a number of theoretical contributions concerned with mode and source use in environmental scanning activity. We find that quality of information source may be less important in explaining source use than previous studies suggest. We also uncover heavy reliance on internal reporting on the environment, compiled using multiple channels, in larger companies. Furthermore, we present a variety of instances where scanning modes were used to complement one another in different ways, the patterns changing according to organisation size. Our findings, while exploratory and theoretical in nature, also have practical implications for growing organisations that wish to ensure their environment is scanned as effectively as possible.

Introduction

Environmental scanning is the process through which an organisation gathers information about its external environment (Aguilar, 1967). Scanning is a key input into scenario planning (Sharma & Yang, 2015), an antecedent to strategic change (Ben-Menahem et al., 2013) and a driver of innovation (Berghman et al., 2013; Martini et al., 2016). In more general terms scanning has come to be viewed as part of a wider process of organisational learning (Daft & Weick, 1984; Drew, 1999; Sadler-Smith et al., 2001), and an integral component of the ‘sensing’ aspect of an organisation’s dynamic capabilities (Danneels, 2008; Fainshmidt & Frazier, 2016; Teece, 2007; Wilden et al., 2013).

The activity of environmental scanning itself has been examined extensively in preceding literature, and appears to be driven in its focus and intensity by the level of perceived environmental uncertainty in strategically important sectors of the environment (Boyd & Fulk, 1996; Elenkov, 1997; Stewart et al., 2008). Systems for scanning the environment have been studied for their effectiveness and, while early results on their usefulness were mixed (e.g. Fahey & King, 1977; Jain, 1984), there now seems general agreement that more effective systems should be integrated into the planning and decision-making processes of the organisation (e.g. Lenz & Engledow, 1986; Mayer, 2011; Yasai-Ardekani & Nystrom, 1996).

A key characteristic of scanning behaviour that emerges from the literature is the medium or channel through which information is gathered, often referred to as *scanning mode* (Daft et al., 1988; May et al., 2000). Research on mode has found that size of organisation is more important than industry setting in driving channel selection (Haase & Franco, 2011), and more recently that organisations use a variety of both primary and secondary sources to scan their environments even when formal systems do not exist (du Toit, 2016). Yet there is little to explain why some sources are more popular than others and research to date has struggled

to address the way in which different information sources complement each other in the organisation. We seek here to explore both these issues, using detailed qualitative data from seven different organisations.

This paper is organised as follows. We first examine the current state of environmental scanning literature and provide an overview of the methods employed in our research. We then look at the relative importance of different information sources in scanning and offer some possible explanations for the choices made. Following on from this, we propose three tentative models of scanning mode use, dependent on the size of the organisation. These models together capture some of the ways in which different sources are used by organisations to develop a picture of the environment and provide further insight into the way in which different information channels might complement one another.

Theoretical Background

Scanning research has examined a variety of issues and there has been a move towards studying scanning in relation to other organisational variables in recent years. These include scanning's contribution to new product development and innovation (Danneels & Sethi, 2011; So-Jin & Sawyerr, 2014), its role in the development of sustainable supply chains (Fabbe-Costes et al., 2014) and its importance in wider competence development and knowledge management (Bedford & Harrison, 2015; Taipale-Erävala et al., 2015).

A number of country-specific studies have also been conducted, demonstrating that country of origin may impact aspects of scanning behaviour (Barron et al., 2012; Stewart et al., 2008), and that deliberate scanning as an input into planning processes can affect companies' responsiveness to change (Olamade et al., 2011). At the same time, the need for proper internal information systems to support scanning has also been identified (Mayer et al., 2013).

A review of research related to scanning mode reveals a number of key themes and issues, the first of which is concerned with the term mode itself. Very early work by Keegan (1974) used interviews with senior managers to establish the information sources used to scan the environment, finding scanning to be informal and unstructured in nature. These were categorised as either internal or external sources, and as either human or documentary types of information. A similar breakdown was used by Daft *et al.* (1988) but new terminology was used and the expression scanning *mode* introduced. This was in contrast to research published around the same time (Ghoshal, 1988), which examined sources of information used by managers to scan the environment but used the word ‘mode’ to refer to intensity of scanning in four categories, viewing, monitoring, investigation and research.

The approach adopted in later research (e.g. Elenkov, 1997; Jogaratnam & Wong, 2009; May et al., 2000; Sawyerr, 1993; Stewart et al., 2008), and the approach followed in this paper, has been to treat mode and source/channel as synonymous. A breakdown of four scanning modes, *internal personal*, *internal impersonal*, *external personal* and *external impersonal*, is provided in Figure 1, along with source examples. This figure provides a framework for reviewing prior research on scanning mode below. First we examine existing knowledge of personal versus impersonal channels and second we examine the use of internal versus external media. Table 1 provides an overview of papers that directly address scanning mode, with notes on findings about internal and external, and personal versus impersonal sources. The third column provides a summary of the paper’s primary focus. These studies are reviewed next with a view to proposing research questions.

INSERT FIGURE 1 HERE

INSERT TABLE 1 HERE

With regard to the personal or impersonal nature of a data source, findings suggest that managers overwhelmingly prefer information received directly from other people (Aldehayyat, 2015; Choo, 1994; Ghoshal, 1988; Jogaratnam & Law, 2006; Smeltzer et al., 1988). This preference is not absolute, however, and a number of moderating factors exist, including quality and accessibility of information (Culnan, 1983; May et al., 2000). It has been suggested that quality of information is more of a concern for managers than accessibility (Auster & Choo, 1994a).

The existence of uncertainty in a given sector of the environment has been shown to relate to increased reliance on personal information sources (Daft et al., 1988; Elenkov, 1997), perhaps because of the non-availability of hard data, but there is also evidence to suggest that this relationship depends on the sector of the environment in question (Auster & Choo, 1994b; Sawyerr, 1993) or the national setting in which scanning takes place (Barron et al., 2015; Sawyerr et al., 2003a). The age of the organisation in question has also been shown to affect channel selection, where personal channels are used more by 'younger' organisations (McGee & Sawyerr, 2003).

Impersonal sources tend to be used either when personal sources are not available (Sawyerr, 1993) or as a complement to information gathered through personal channels (Jennings & Jones, 1999; Julien et al., 1999).

Findings on preference for external or internal sources have varied over time. Early work tended to emphasise the external source over the internal, in that customers, family, friends were preferred to employees or colleagues (Ghoshal, 1988; Sawyerr, 1993; Smeltzer et al., 1988). It has, however, been proposed that internal sources are perceived to be of better quality than external ones (Choo, 1994). Furthermore, other studies have suggested that

internal sources are preferred regardless of their personal or impersonal nature (Sawyer et al., 2000).

Uncertainty also appears to influence the selection of internal and external channels.

Increased uncertainty in a given environment sector is related to increased reliance on both internal and external sources (Daft et al., 1988), or on external sources only (Elenkov, 1997; Sawyer, 1993). Other studies (e.g. Aldehayyat, 2015; Sawyer et al., 2003b) have found the existence of uncertainty in a given environment sector to result in a preference for external, personal sources.

More recent studies that have addressed scanning mode found that larger organisations scan more often and use a wider array of information sources than smaller ones (Aldehayyat, 2015; Haase & Franco, 2011). In addition it has been found that increased use of personal and external sources is related to the success of new product introductions (So-Jin & Sawyer, 2014) and that both primary and secondary sources are used frequently to scan the environment (du Toit, 2016). None of these studies, however, have examined the reasons behind the choice of one source over another.

Overall, research on scanning mode appears to acknowledge, either tacitly or explicitly, that managers use multiple channels to acquire information on the external environment and there is likely to be a degree of complementarity between different sources. It is this complementarity that we intend to explore in more detail.

It is of interest that the four most recent papers in Table 1 have focused on examining scanning in different national contexts. More generally, recent research has tended to look at environmental scanning in relation to other organisational variables (Fabbe-Costes et al., 2014; Taipale-Eräväla et al., 2015). Our approach, in contrast, is to focus only on mode of scanning. We seek here to explore the reasons behind particular media being chosen and the

way in which they are used to complement one another. This aim precipitates two research questions as follows:

- Why are some information sources more popular than others?
- How do different modes of scanning complement one another in organisations?

Methods

The focus of our research on ‘how’ and ‘why’ issues made a case-based research design appropriate (Yin, 2013). Existing research on mode has been predominantly quantitative in nature, with only four of the papers in Table 1 using any qualitative data (Auster & Choo, 1994b; Ghoshal, 1988; Jennings & Jones, 1999; Keegan, 1974). This may help to explain the relatively limited understanding of how and why different modes complement one another and suggests that a qualitative approach could be useful, in that it could assist in providing a new perspective on existing phenomena (Creswell, 2012). An interpretive, qualitative approach was selected also because of its ability to facilitate detection of nuances and detail that might otherwise have been missed (Bettis et al., 2015).

It is worthy of note that the unit of analysis used in all preceding studies of scanning mode, apart from one (du Toit, 2016), has been the individual. We therefore decided that, in order to explore complementarity of channels properly, an organisational perspective rather than an individual one was required.

Our fieldwork was conducted in two stages. First, in order to gain a wide view of the channels through which organisations scan their environments, data from seven companies of radically different sizes 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.

Sampling

A theoretical sampling approach (Eisenhardt & 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.

Initially the research was restricted to companies in and around the oil and gas industry. Previous studies of scanning mode have often used single industries as an empirical domain (e.g. Daft et al., 1988; Jogaratnam & Law, 2006), the intention being to minimise the likelihood of different scanning behaviours being driven by industry context. Others have used multiple industries (e.g. Aldehayyat, 2015) or multiple countries (e.g. Sawyerr et al., 2003a; Stewart et al., 2008), the intention being to compare scanning behaviour across different industries or geographic areas.

It has in fact been proposed that firm size may be a more important determinant of scanning behaviour than industry setting (Haase & Franco, 2011). Indeed, 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 was not meaningful. Thus the scope of the sample was expanded to also 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. There appeared to be

sufficient replication of activity and approaches, both within the three size groups and 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 2 contains a breakdown of the seven companies studied with details on industry, company type, size based on the number of employees, geographic spread, and positions of those interviewed. Participating organisations are labelled A to G in the order in which they were analysed.

INSERT TABLE 2 ABOUT HERE

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. In the larger companies respondents at corporate level were prioritised.
- 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. To avoid collection of data about individual behaviour, questions were framed around the behaviour of the organisation as a whole rather

than that of the individual respondent, in a similar manner to the approach adopted by du Toit (2016).

The possibility of functional bias in the cases was minimised by using multiple respondents where access allowed and secondary data to support the analysis. 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. One further company was excluded from the research because of insufficient quality and quantity of data. This was in part due to the fact that only one person was interviewed. In the case of companies A and B, however, 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 sufficient data for case study development. It is recognised that the case report for these two companies is based on the personal judgement of the individuals in question.

Semi-structured interviews were chosen, being an appropriate technique to use when it is not possible to repeatedly interview respondents (Bernard, 2012). Interviews were between 45 minutes and 2 hours in length. They were conducted using a set of questions designed to guide the discussion through a number of relevant areas while, at the same time, allowing respondents to talk freely about their experiences and how things were done in the organisation. 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. In most cases no changes were made, but four respondents provided additional data to clarify or enlarge particular issues that had arisen in the conversation.

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

Data Analysis

Data were subjected to content analysis (Bryman & Bell, 2011) in three stages, broadly following a process of reduction, display and conclusion (Miles & Huberman, 1994). The first stage was conducted using NVivo software and involved grouping together statements or parts of interview transcripts that mentioned the use of data sources carried out on a case-by-case basis. Initially two broad codes were used, one for personal channels and the other for impersonal channels. The result of this first stage of analysis was a coding report for each case that highlighted data concerned with source selection and scanning mode.

The second stage of analysis was conducted manually rather with the assistance of 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 and further broken down using internal/external dimensions. Various marginal notes were made in an attempt to understand scanning mode choices. Time-ordered statements (x follows y) or more explicit causal statements (x causes y) were highlighted to better understand causal factors in the selection of scanning mode. Common approaches and themes were grouped together. All

coding was conducted by one individual, meaning that inter-coder reliability was not an issue. Internal consistency of coding was checked at both stages through blind re-coding of a single transcript or report.

The third and final stage of analysis involved cross-tabulation of results, the collection of useful vignettes and the development of three mode networks, presented in the results section of this paper. Mode networks were developed by examining the in-case reports and looking for connections between modes used. After developing the network for one of the large organisations (E) the other two large companies (C and G) were then mapped onto the same network. The degree of similarity was striking, and the process was repeated for the medium companies (A and B) and the small companies (D and F).

Findings

Various approaches to scanning the environment emerged across the seven cases. We found a mixture of formal and informal processes being used to look at a variety of issues in the environment. Even formal systems designed to systematically gather and analyse information on the external environment made some use of individuals in other parts of the organisation who, either passively or actively, scanned their immediate environment.

Information sources used were diverse, and evidence emerged from the data of explicit movements from one source of information to another. The most important point that emerged, however, is how sources were used by different groups of individuals across the organisation to build a picture of events in the external environment. The way in which these sources were used varied according to the size of organisation.

The first section below deals with explaining source popularity, while the second is concerned with the interrelationships that emerged between different modes of scanning in the organisations. A number of quotes from the primary data are included to provide context

for the reader. In some cases, words or names have been amended to maintain anonymity. Where words have been removed or changed, this is shown with square brackets.

Explaining Source Popularity

The most popular sources overall were personal, with individuals inside the company and individuals working at a customer or partner organisation being the most commonly used sources of information on the external environment. The next most popular source was impersonal, being industry intelligence reports and databases provided by a third party. Other sources, such as internal reports, individual subject matter experts, public news sources and competitor press releases were also discussed but less frequently.

Personal internal sources tended to be employees whose role involved engagement with some part of the external environment. Their knowledge and understanding of regulators (B and C) or customers and competitors (B, C and E) was seen as a valuable asset that could be used to gather high-quality intelligence.

Personal channels were seen as more valuable than impersonal when looking specifically at customers but their internal or external nature appeared to relate to the size of organisation in question. In larger organisations the network of strategy professionals invested time and effort getting face-to-face time with their own customer-facing employees who were seen as a valuable source of intelligence. By contrast, in smaller organisations face-to-face time with customers was sought directly. Availability of information was more of an issue for smaller organisations than large ones.

In both cases the information gathered from personal sources was seen as more likely to be reliable, or of higher quality, than information from elsewhere. The influence of perceived source quality, however, becomes less clear when looking at impersonal external sources

such as industry intelligence reports. A number of respondents in different organisations made it clear that they did not trust the information provided by or place heavy reliance on these industry intelligence systems, yet they were still used frequently.

'If you go to something like [industry intelligence database], which we do subscribe to, you can then start to have a forward projection where it starts to say, "This oilfield – here is historical information of what has been discovered/produced or whatever; here is our outlook for that oilfield." You would never use that – it is a bit like a home report¹; it is a good start but if you really want to buy that house you would do your own work and get your own survey.' (Company B)

In company A industry reports and intelligence systems were noted to be of some use in decision making, but were used with caution because they were seen as the work and view of a given individual. Companies B, D and E used these reports as the starting point for deeper scanning of particular sectors of the environment. It was noted that the reports brought no competitive advantage on their own because all companies in the industry could access the information they contained.

'Everyone will have these but we think, because everyone gets them, they don't really generate any competitive advantage for you, so it's really flavouring them with the stuff that we gather from across the company [that is important].' (Company E)

Respondents from companies F and G did not use external reports, feeling they were of poor quality and not useful for gathering information on the environment. It is of interest that these two companies are not related in terms of size, industry or strategic approach. It is possible that the personal preference or previous negative experience of managers resulted in such reports and databases being disregarded.

¹ The 'home report' referred to here is a legally required building survey produced by anyone wishing to sell a property in the UK

'The information we were getting [...] was way off what we were actually experiencing on the ground. I mean, it wasn't just that we were or weren't receiving a good price. It was other stuff as well, for example rig rates, drilling rig rates, workover rig rates. It was a whole host of stuff that you just... if you relied upon it, you're really foolish, based on the experience on the ground. So I've, personally, shied away from those sorts of things.'

(Company F)

In general terms the use of external industry intelligence reports might be explained by their widely available nature. The perceived reliability or otherwise of these reports tended to dictate the level of use in the organisation, which itself seemed to depend on the past experience of individual managers.

Internal company intelligence reports prepared for specific initiatives or for periodic strategy meetings with senior managers and board members were the most common impersonal internal source. The separation of responsibility for scanning the environment and decision-making authority in the large organisations (C, E and G) resulted in a distinction between sources used to scan the environment and sources used to make strategic decisions. In these organisations compilation of internal reports on the environment formed a significant amount of the activity of the strategy and/or environment teams. Senior executives would rely heavily on these when making decisions.

In the small and medium organisations (D and F, A and B) detailed reports on the environment were not compiled; decision makers were broadly responsible for scanning the environment themselves. In company D, however, junior employees were assigned to gather preliminary information on regulatory, competitive and technological issues to provide a focus for senior executive scanning activity. Thus preference for use of internal, impersonal

channels could be related to organisation size and the consequent availability of resources to produce them.

Table 3 provides a summary of explanations for source use, broken down by the four modes shown in figure 1.

INSERT TABLE 3 HERE

In general, information gathered through personal channels was invariably seen to be of high quality. Their internal or external nature depended upon the size of organisation in question. The ready availability of impersonal external sources such as industry intelligence reports to all organisations in a given sector appeared to drive their use regardless of perceived quality in some instances. The perceived quality of a given source appeared to depend on the individual user perception and past experience. Impersonal internal sources were only used in the large organisations where there were significant resources devoted to their compilation and dissemination.

Channel Use Across the Organisation

The preceding section provides some explanations for sources being used in different situations. The use of certain sources, even when they were seen to be of low quality, suggests that the overall understanding of the environment might be more important than the impression taken from one information channel in isolation. The purpose of this section is to examine the combination of scanning modes used and how they relate to those one another in different organisations.

INSERT FIGURE 2 HERE

Figure 2 depicts the mode network for the small organisations in the study. The nodes down the right-hand side represent external sources of information and the single node on the left-hand side represents the decision-makers within the organisation. The letters on each arrow represent the companies in which each of these relationships was observed. An arrow from one node to another represents use of an information source and the mode type is noted on the arrow. For example, the arrow from 'customers' to 'decision-makers' shows that decision-makers scanned their environment using personal contact with customers. This represents scanning through external personal media and was observed in both companies D and F.

'I do a lot of stuff with the Society of Petroleum Engineers – as much as I can. It's a great way of keeping your hand [in with] what is going on in the industry. [...] They do a lot of small events in each of the regions. [...] They are very valuable indeed. It's a good way of seeing who needs what, why, when [and] what is the technological advance going on at the moment, etc.' (Company D)

'If you're in areas where there isn't a lot of companies operating and all the companies that are around you aren't public companies, they keep their information very close to their chests; it's very difficult [...]. So what we have to do is take a less formal approach. [...] I go to industry seminars and forums, where there is opportunity to speak to people from different countries. If you're lucky you get to speak to somebody and get their card. And [if] you find yourself looking at something in that particular region at some point in the future you can actually call upon that.' (Company F)

The relatively straightforward nature of the network is to be expected from organisations with relatively few employees. The small size of the companies resulted in decision makers carrying out a number of different functions within the organisation that included

environmental scanning and analysis. While company F eschewed the use of industry intelligence systems and databases, company D invested significant effort in using this source of information. Company D's technique of assigning particular geographic areas to graduate trainee engineers was seen as useful in terms of both development of junior staff and provision of a first pass of various sectors of the environment in a specific area.

INSERT FIGURE 3 HERE

Figure 3 shows the mode network for the two medium-sized companies in the study, in which a more compact network of mode relationships was found to exist. In company A the corporate development manager was responsible for some of the functions that a strategy team would perform in the larger organisations. The difference between company A and the large organisations was that the manager in question was part of the management team of the organisation. Hence much of the scanning activity conducted was linked directly to the team responsible for making decisions.

'This is more when we are looking at strategy actually. [...] it is a bit linked to how you have your team. I have my team based around development, production and what I call "subsurface". [...] I also have a function called "finance and commercial", which is just enabling the other three things. [...] All the others come into the financial/commercial side, which is oil price and all the other things we have talked about. [...] All the rest are coming at me from different parts of my organisation. And we merge all of that at the management committee level.' (Company A)

In both companies external-facing employees were seen as valuable sources of information on their individual environments, but there was little in the way of formal processes for compiling and synthesising such information. In company A it was noted that such

information was collated at management team level, with each functional head of department being responsible for their own area of the environment. In company B the managers in specific geographic areas were held responsible for understanding their own environments, but a formal reporting system of external factors did not exist.

'We have company staff in-country. Generally we have a representative office in the countries in which we operate. So that again acts as a bidirectional opportunity for information to flow, and it means that you are not relying on second-hand or indirect feedback.' (Company B)

Both companies A and B made use of intelligence reports and public news sources. Both companies noted that external-facing employees would develop and maintain a network that could be used to scan the environment, but only company A mentioned the use of industry bodies and personal networks for decision makers.

INSERT FIGURE 4 HERE

Figure 4 shows the mode network for the large organisations in the study. Here wider, more elaborate networks of individuals and departments with external-facing and reporting responsibility meant that different scanning modes were apparent in different groups in the organisation.

Employees whose main role was to face certain parts of the external environment used external personal sources of information to understand the external environment relevant to them in their work. This could be in terms of product (company E), in terms of geography (company G) or in terms of a combination of the two (company C). The understanding of the environment at this level was personal and not comprehensive but in each case could be harnessed by those in the strategy teams with a wider view of the organisation.

'The full-time team is about 15 people, and then there is the wider network that is called on. We manage the network in as structured and systematic a way as we can. So we have people who are within the company that are almost co-opted into the team through to where the subject-matter experts are within the company and outside.' (Company C)

'We run what we call ICTs, which are integrated capture teams. They would involve people from the business unit, include business development, and the corporate intelligence team, all sharing information to make sure that the company is best informed around any given prospect in any given country.' (Company G)

The strategy teams, comprising business environment units (company C), competitive intelligence units (company E), or business development and strategy units (company G), built and used an internal network to gather and synthesise the knowledge gathered by external-facing employees. This internal personal mode was used in conjunction with various other modes to develop a synthesised picture of the external environment that was passed up to executives with decision-making authority in the form of an internal report. This process sought to turn various external and internal personal sources and external impersonal sources into a single comprehensive internal impersonal source of information.

'We've over 100 people, effectively, who are facing off to the market here [with reference to diagram detailing internal network]. They all individually will hear things that are useful. Some of them will be very low level, some will be very high-level-type stuff, and it really gives you an insight to where our competitors are going in the market. That's the bit that effectively makes a difference when you understand what the competitors' plans are.' (Company E)

In summary, three different networks emerged from the data (as shown in figures 2, 3 and 4), related to the size of the organisation in question.

The small organisations (D and F) exhibited a direct link between decision makers and the environment, resulting in external sources, both impersonal and personal, being used. This is perhaps unsurprising, given that small organisations are limited in terms of the number of people available, firstly to scan their own environment and secondly to act as internal personal sources of information.

The two medium organisations (A and B) tended towards a more direct relationship between the external-facing employees and decision makers, resulting in use of internal personal, rather than impersonal, sources to make the link between external-facing employees and decision makers.

The large organisations (C, E and G), given their complex structures and multiple groups scanning the environment, tended to engage in scanning through all four modes, with strategy teams gathering personal and impersonal information from external sources, along with some element of internal personal information from employees whose role happened to involve facing some aspect of the external environment. These data were then collated into reports for decision makers, who relied on these internal impersonal sources for their information on the environment.

Discussion

Scanning mode has, in the past, been treated as an individual phenomenon. Here we have attempted to acknowledge that it is not solely the information sources used by one individual manager that are important; rather it is the way in which the organisation as a whole gathers information that is of interest. Consequently, findings have been both supportive of and divergent from existing knowledge in this area.

A general preference for personal as opposed to impersonal channels is unsurprising and has been broadly supported in existing literature (Daft et al., 1988; Elenkov, 1997; Jogaratnam &

Law, 2006). While early research (Keegan, 1974) proposed that personal source preference is due to the unstructured nature of scanning, others have argued that preference for personal sources was a result of the inaccessibility of hard data on specific issues in uncertain environments (May et al., 2000; Sawyerr, 1993). It is the second proposition here to which the present findings lend more weight. In company F the technological and economic environments were examined using personal contacts, sometimes gathered through industry events or networks. Indeed it was explicitly noted by one of the respondents from company F that, when secondary written data was not available, personal channels had to be developed. In company D professional bodies were noted as a source of opportunities for gathering information in an uncertain environment. This is in contrast to the findings of Sawyerr et al. (2003b), who noted an increase in internal rather than external networking activities under conditions of uncertainty. This divergence could be explained by differences in methodological approach or field setting, but is nevertheless worthy of highlight.

Previously it has been suggested that source quality is of more concern than accessibility when scanning the environment (Auster & Choo, 1994a). Our findings, while tentative, are not consistent with this proposition. A source of perceived lower quality was not necessarily dismissed by users. Despite reservations being expressed about quality of information provided by various market intelligence systems, they were used frequently in five of the seven organisations. In fact, easily accessible information was often gathered first from impersonal sources and then examined with a critical eye, which would then provide prompts for searching out further pieces of information that may be more difficult to access. While previous research has suggested that impersonal sources complement personal (Jennings & Jones, 1999; Julien et al., 1999), our exploration suggests that it could be personal sources that augment impersonal ones.

The use of internal reports to scan the environment has often been overlooked in prior studies (e.g. du Toit, 2016; Haase & Franco, 2011), which have tended to focus on external impersonal channels. Therefore a key point from our work is the way in which external reports were augmented with internally sourced information, as found in company E. A system was uncovered whereby impersonal external sources were supplemented with personal internal sources by the manager responsible for competitive intelligence activities. The information was then synthesised into an internal report that combined insights from the market intelligence companies and from those working in the firm. This type of behaviour is consistent with the findings of other studies that suggested internal channels were preferred over external (Aldehayyat, 2015; Sawyerr et al., 2000) but provides a different view to studies that have overlooked internal reports as a source of information (du Toit, 2016; Haase & Franco, 2011). Our findings here may add some weight to the proposition that internal sources are often viewed as more reliable than external ones (Auster & Choo, 1994a). Perhaps most importantly, our findings may afford some preliminary insight into how different scanning modes are used across organisations, resulting in the mode networks presented above. While recent research has also noted that scanning behaviour is affected by firm size (Aldehayyat, 2015), the level of detail presented here deepens understanding of the nature of how this change might work.

While the differences are of note, the similarities between the three networks presented above are also worthy of consideration. In larger organisations, dedicated teams gathered both personal and impersonal sources of information from inside and outside the organisation. These were then compiled into reports for decision makers. Small and medium companies exhibited less complicated networks, but similar activities were taking place. Medium companies in the sample did not have dedicated scanning or strategy teams, yet used many of the same sources in similar ways. Small organisations again used similar approaches in a

more concentrated manner. Such similarities may cast raise questions about earlier findings showing that channel use widens as firm size increases (Haase & Franco, 2011). These similarities could, however, be explained by the fact that all the organisations were successful in their own right, given the suggestion that mode selection is related to success (So-Jin & Sawyerr, 2014) and performance (Sawyerr et al., 2003a).

The mode networks lend a perspective to scanning mode that is richer and deeper than existing studies might suggest. The organisation, it appears, gathers information through a variety of channels and compiles it into useful media for decision makers. This was found to be the case, to a greater or lesser extent, in all of the organisations studied. These findings are complementary to those concerned with scanning and knowledge management (Bedford & Harrison, 2015; Taipale-Eräväla et al., 2015). We agree with du Toit (2016) that gathering of information on the external environment from a wide variety of sources may occur even if a formal system is not in place.

Overall, the similarities between different organisations within the three size groups are striking. Indeed the degree of replication over a number of cases may suggest a consistent pattern of mode use between companies that changes according to the size of the company in question. That said, the exploratory nature of our research means that these findings are tentative.

Conclusion

Our contribution to theory in this paper is to provide potential deeper insight into the way in which different scanning modes are used in organisations to develop an understanding of the external environment. Existing studies have suggested that different channels complement one another. Our findings, while tentative, suggest that scanning modes may need to be examined across the organisation in order to fully comprehend their use. The explanations for

different sources being more popular than others presented here suggest that source quality may not be such a fundamental issue as existing research suggests and that internal reports on the environment are increasingly important for senior management in large companies. In addition, the mode networks presented provide some initial understanding as to how different parts of the organisation may collect and compile information from different channels for decision-making purposes.

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. It is important therefore to acknowledge that the research design employed means that the findings presented here are tentative.

We also acknowledge that the limited access and nature of the data collection process means that instances of mode use and source preference that emerge are unlikely to be comprehensive in nature. Furthermore, while the seven case study companies ranged in size, in industry, in purpose and in type 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).

Our findings are also limited by our decision to focus on scanning mode. Our analysis did not examine the level of uncertainty in the environment, a popular approach in preceding studies (e.g. Stewart et al., 2008), nor did we examine organisational and environmental factors such

as the age of the organisation (McGee & Sawyerr, 2003) or the national setting in which scanning took place (Barron et al., 2015). These aspects are worthy of further study in future.

With both contributions and limitations in mind, a number of areas for further research emerge. First, the ideas developed here could be studied in a single organisation in further depth than was possible here and would provide further explanation for source use in different contexts. This would also facilitate deeper investigation of the organisational variables and contingencies that affect scanning in organisations. In addition, an important endeavour would be to approach the issues of source popularity and complementarity from a more quantitative stance, using a survey instrument to gather data from multiple individuals in a variety of organisations. This would provide more generalisable findings than those presented here, which can be considered at best indicative.

A practical lesson for managers also emerges from our work. All of the organisations involved in the study were successful in their own right. Given the accepted importance of scanning in numerous organisational processes, it is not unreasonable to propose that the activities uncovered here contribute towards the success of the organisation. It is therefore important for all companies, from the smallest to the largest, to be aware of how and why they scan the environments in which they operate. A crucial part of this is to ensure that the arrangements in place to gather and analyse such information are appropriate for their size and complexity. It is not hard to imagine a rapidly growing organisation that struggles to adjust its scanning capabilities as its size and complexity grows. This may have grave consequences for both strategy and survival.

Another practical question that emerges is concerned with the distance between decision-makers and the activity of scanning the environment. It is of note that, in medium and small organisations, decision makers appear to be much closer to the external environment and the

scanning thereof than in the large organisations. Does this illustrate that, in large organisations, key decision makers risk becoming insulated from the environment? If so, how might this affect the quality of scanning and the quality of strategic decisions in such an organisation? Conversely in small organisations scanning and decision-making are all concentrated in a very small number of people or even a single individual. A risk here, particularly if the organisation is in a rapid growth phase, is that threats and opportunities in the environment are missed in a plethora of data that it is impossible for one person to digest.

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Tables

Table 1: Summary of Key Studies of Scanning Mode

Author(s)	Year	Personal or Impersonal	External or Internal	Focus
Keegan	1974	Personal preferred	Int. abroad, Ext. in domestic	Setting (Multinationals)
Culnan	1983	-	-	Quality and Accessibility
Daft et al.	1988	Personal increases with uncertainty	Both increase with uncertainty	Uncertainty
Ghoshal	1988	Personal preferred	Ext. preferred	Setting (Korea vs. USA)
Smeltzer et al.	1988	Personal preferred	-	Setting (Small Business)
Sawyerr	1993	Personal increases with uncertainty	Ext. increases with uncertainty	Uncertainty
Auster & Choo	1994a	Personal preferred	Both	Quality and Accessibility
Auster & Choo	1994b	Personal preferred	Both	Quality and Accessibility
Choo	1994	Personal preferred	Int. better quality	Quality and Accessibility
Elenkov	1997	Personal preferred	Ext. increases with uncertainty	Uncertainty
Jennings & Jones	1999	Impersonal complements personal	Int. more important	Setting (emerging industries)
Julien et al.	1999	Personal preferred	-	Setting (technological in SMEs)
May et al.	2000	Both increase with uncertainty	Ext. often harder to access	Uncertainty
Sawyerr et al.	2000	No preference	Int. preferred	Setting (Nigeria)
McGee & Sawyerr	2003	Personal used more by new firms	Ext. used more by new firms	Uncertainty
Sawyerr et al.	2003a	Depends on country context	Int. increases with uncertainty	Uncertainty
Sawyerr et al.	2003b	Focused on Personal	Int. increases with uncertainty	Uncertainty
Jogaratnam & Law	2006	Personal preferred	Int. more utilised than ext.	Setting (Hong Kong)
Haase & Franco	2011	Personal and Impersonal	Focused on ext.	Setting (Industry Comparison)
Barron et al.	2012	Varies according to setting	-	Setting (3 EU countries)
So-Jin & Sawyerr	2014	Personal increases chances of success	Internal increases chances of success	Setting (New Product Dev)
Aldehayyat	2015	Personal preferred	Int. preferred	Setting (Middle East)
Barron et al.	2015	Varies according to setting	-	Setting (3 EU countries)
du Toit	2016	Used primary/secondary distinction	Focused on external	Setting (South Africa)

Table 2: Sample companies, industry and size

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

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

Table 3: Explaining Source Use by Mode

Mode	Why Chosen?
Personal External	Seen to provide high quality information, usually from individuals working at customer or competitor organisations. More heavily relied upon in smaller organisations, perhaps because the pool of internal individuals was small.
Personal Internal	Also seen to provide high quality information. Mostly used in the medium and larger companies with sufficient numbers of employees in external-facing roles. In general, organisation size appeared to drive whether personal sources were internal or external in nature.
Impersonal External	General availability to all companies in a given sector drove the use of these sources, usually industry intelligence reports or databases. Frequently seen to have limited value and not to be sufficiently focussed to guide decision making. Therefore general availability was a more important consideration than information quality in this case.
Impersonal Internal	Use limited to large companies due to sufficient internal resources being available for formal report generation. These reports were produced by using some form of personal source to augment information from impersonal external sources.

	Internal	External
Personal	Colleague or Subordinate	Contact in another company
Impersonal	Internal reports	News report Industry intelligence report

Figure 1: Four scanning modes with source examples (based on Daft et al., 1998, Elenkov, 1997 and others)

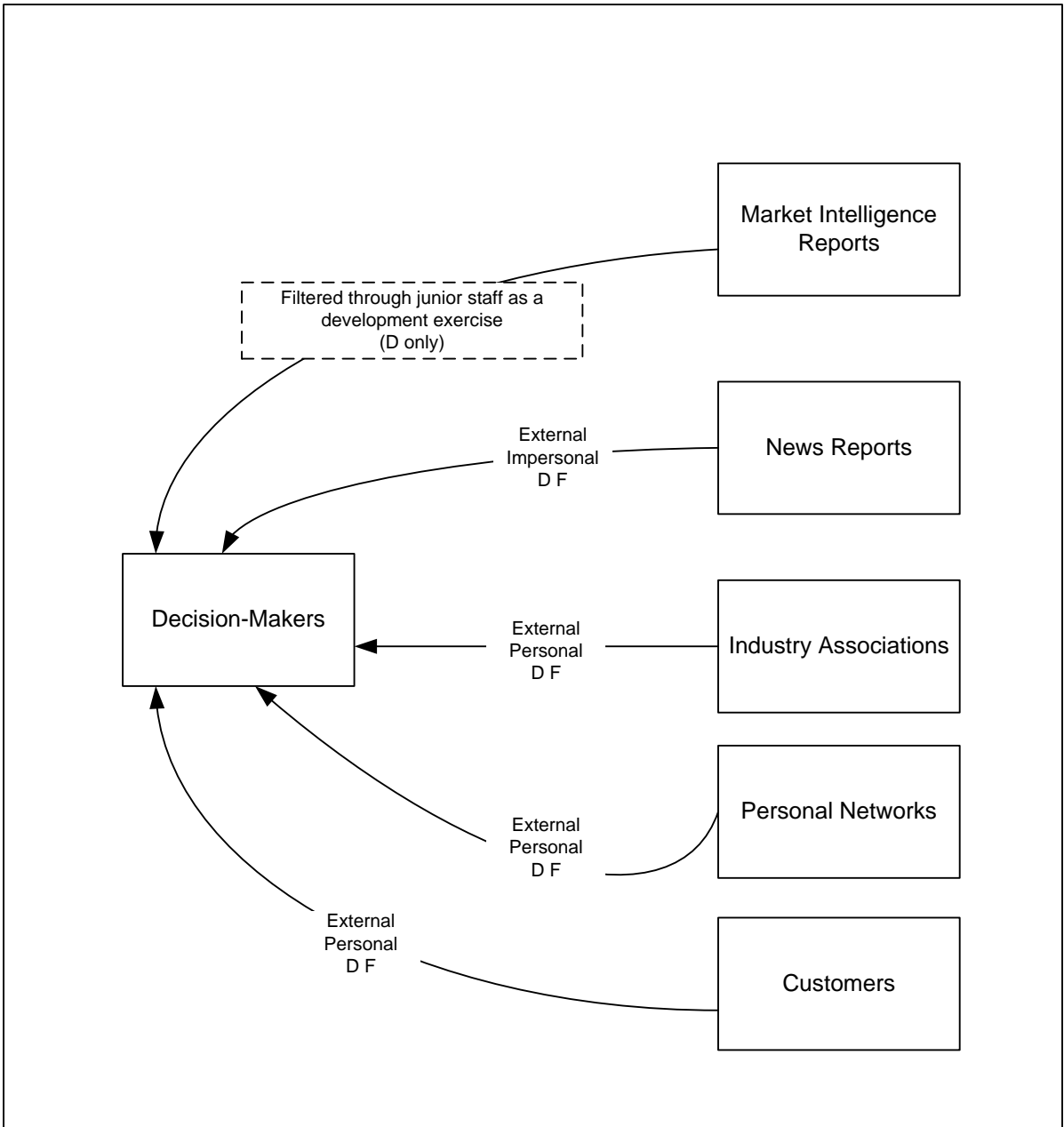


Figure 2: Mode network for small organisations (D and F)

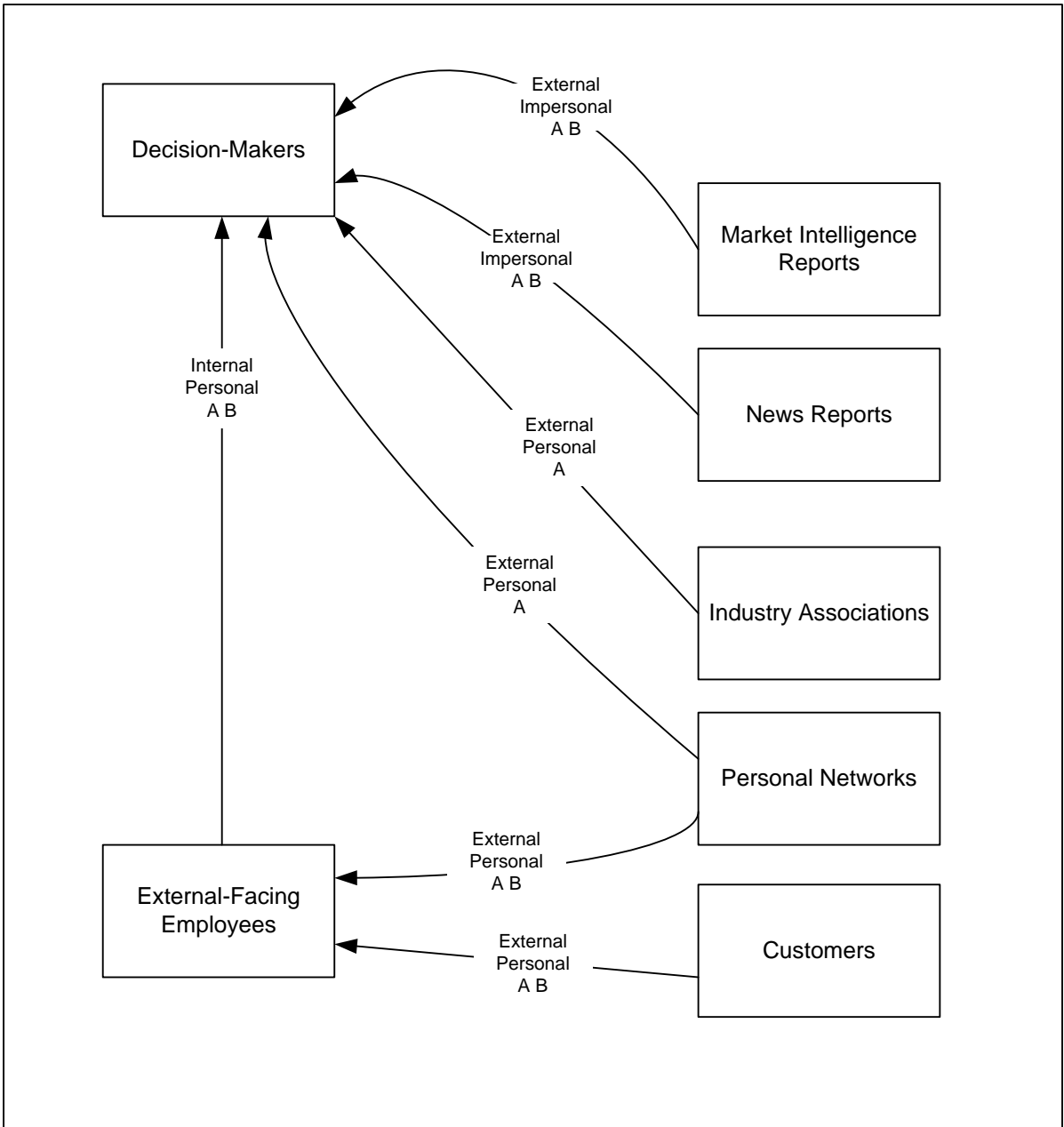


Figure 3: Mode network for medium organisations (A and B)

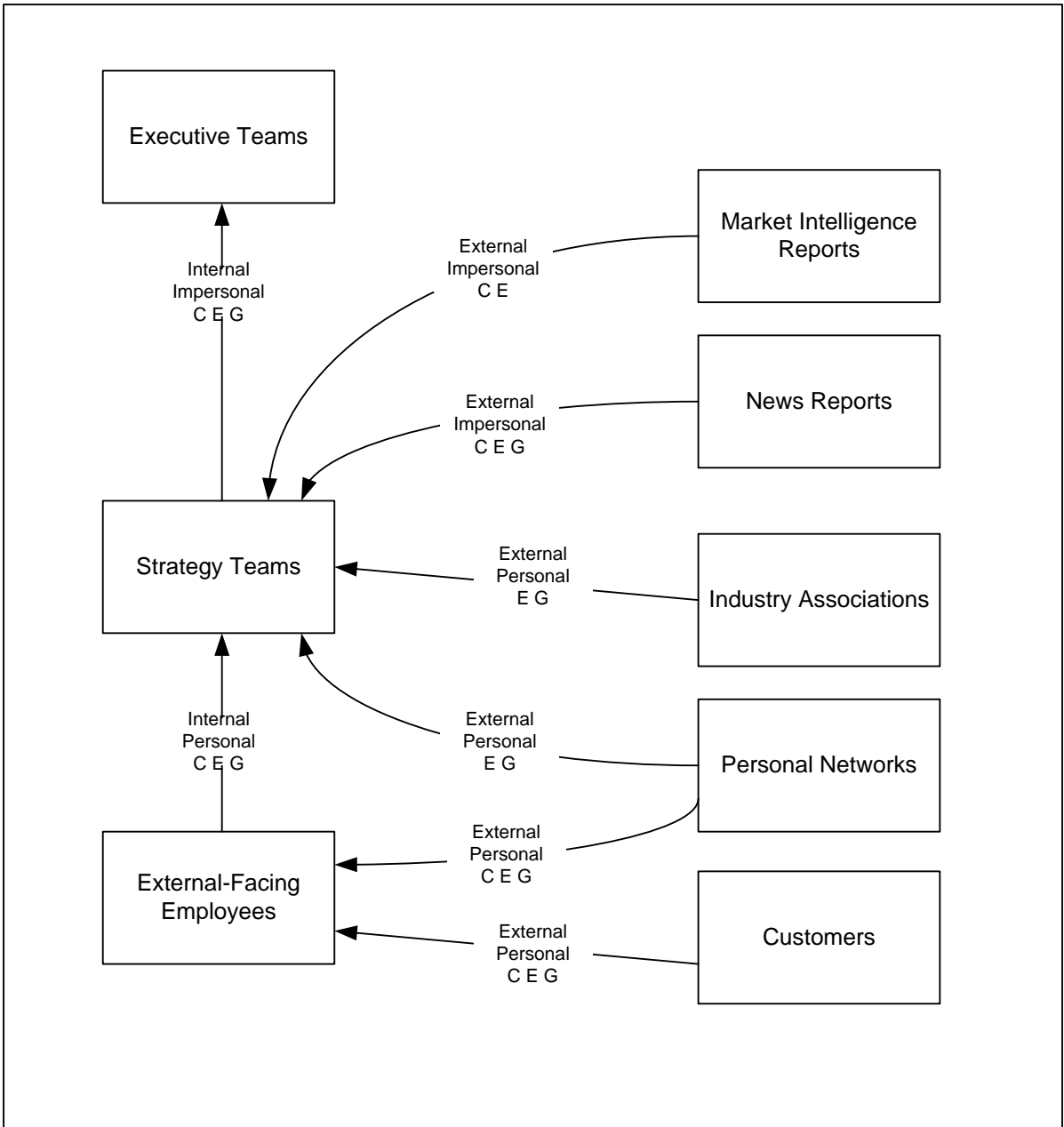


Figure 4: Mode network for large organisations (C, E and G)