Pergamon

European Management Journal Vol. 23, No. 3, pp. 293–299, 2005

Printed in Great Britain
0263-2373 $30.00
doi:10.1016/j.emj.2005.04.007

Barriers to Information Management

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As the amount of data increases, organizations need to consider how to use their information assets successfully, an organizational capability that we call information intelligence. Starting from a particular area of information management, that of using market research data, and based on our interviews with market research as well as business intelligence executives, in this paper we discuss what are some key barriers to successfully using and extracting value from information. We identify three fundamental types of barriers to information intelligence and discuss specific ones in each type. One implicit message of this work is that when thinking about information management, managers can learn not only from past IT experiences, for example from business intelligence and knowledge management initiatives, but also from market research as well as decision science principles.

Keywords: Business intelligence, Information technology, Market research, Knowledge management

Introduction

The central premise of this work is that every organization needs to become information intelligent. The ability to successfully search, assemble all pieces, analyze, and effectively use all relevant available information for any decision and initiative is what we call *information intelligence*. This is a fundamental capability whether one is searching for the business magic that leads to successful innovations, sequencing the human genome, or sorting through the fragmented signals that might warn of catastrophe. For example, the 9/11 Commission Report, Executive Summary (2004), states (p. 12): ''The intelligence community struggled throughout the 1990s . . . to collect intelligence on and analyze the phenomenon of transnational terrorism. . . Many dedicated officers worked day and night to piece together the growing body of evidence. . . Yet, while there were reports. . . there was no comprehensive review of what the intelligence community knew and what it did not know, and what that meant. . .''

The growing importance of information intelligence for organizations is indicated by the rise of business intelligence (BI) technology as a top priority for many executives (see for example Luftman and McLean, (2004)). This indicates a major shift in managerial thinking about IT from the ''T'' to the ''I'', much like the fundamental distinction in IT management between ''automate'' and ''infomate'' (Zuboff, 1988). However, although the shift in managerial focus to information when it comes to IT management is more recent, companies have for many years now had departments dedicated to information intelligence. Among the first such departments where information is vital are the market research departments searching and communicating to marketing, successfully or not, signals from customers. In this paper we advocate that a lot about information intelligence, therefore also about BI and knowledge management (KM) initiatives for example, can be learned from market research. In particular, starting from market research, we study what are some critical factors that may impede information intelligence in organizations.

Based on our work on market research and business intelligence, and in talking with managers around the business intelligence, marketing, and market research functions in large organizations[1] about why information intelligence succeeds or fails, we found that avoiding a few key pitfalls can have a significant impact on the information intelligence of an organization. These pitfalls fall into three fundamental categories. Some of them are due to behavioral biases, others are due to basic misunderstandings of key characteristics of information intelligence projects, while others are due to organizational factors. We discuss them below and provide recommendations on how to avoid them. We believe that these observations are applicable whether the focus is competitive intelligence, or market intelligence, or any information intelligence for that matter.

The paper is organized as follows. We use market research as our starting point for discussing the more general issue of information intelligence, and we first review in Section 2 past work about factors affecting the success of market research projects. We then present in Section 3 our study, where we discuss the key barriers to information intelligence that emerged from our interviews. Finally we conclude in Section 4.

Past Related Work on Market Research

We briefly discuss past work on why market research, a particular instance of the information intelligence capability we consider in this paper, often fails to meet the expectations of managers. One of the central points of our work is that, in search of best practices and lessons for successful information intelligence, executives and researchers can borrow a lot of ideas from one of the oldest and most well-developed information intelligence departments in organizations, that of market research. We believe that this is also a key point to keep in mind in the shift of the focus of organizations from the ''T'' to the ''I'' of IT.

The estimated value of the total world market research expenditures is estimated to be $16 billion (ESOMAR 2003). Yet executives find market research fails to meet their expectations and be used for actionable insights, although the market research community is indicating a key objective is to provide added-value as the result of delivering actionable knowledge-based research. Various factors that lead to such situations have been proposed in the past.

Deshpande and Zaltman (1982) explored five factors which they hypothesize will affect the magnitude of use of marketing research results: the purpose of the research, the organizational structure of the firm, the stage of the product life-cycle, the characteristics of the research report, and the extent of interactions between managers and researchers. They found that the most important variables leading to use of research were organizational structure (the degree of formalization and centralization), technical quality of the research reports, researchers-managers interactions, and the surprise and actionability of the research results. Surprise not only played an important role in having a direct effect on the use of research, but also as a moderating variable between the research requested and produced and its use. The authors suggest that those researchers who favor exploratory research should be sensitive to managers' tendencies to want confirmatory research which contains few surprises. Preparing managers for potential surprises prior to the research would help overcome a negative reaction to unexpected results. Finally, their findings also underline the importance of interactions between managers and researchers emphasizing the need for creating trust which affects managers' perceptions of the overall research quality and for providing researchers with more information about the decisions to be made.

Trust and perceived quality of interaction between managers and researchers is also studied by Moorman and Zaltman (1992). The authors show that these two factors contribute most significantly to the use of research, with trust having also indirect effects through other relationship processes. Moreover, a better relationship between the researcher and client through trust and perceived quality of interaction can result in the researcher receiving more information and direction from the client, which in turn will result in a more efficient and relevant research output.

A causal model of research use as perceived by researchers was developed by Deshpande and Zaltman (1984). The four most important variables were found to be the extent of interaction, political acceptability, the purpose of the research, and quality of the report. Their next four most important variables were technical quality of the research, interaction, surprise, and purpose. They also show that managers prefer a more confirmatory purpose, attempting to reduce uncertainty in their decision making process. Drawing on various theories and studies, they hypothesized and empirically showed that research is more likely to be used if it is consistent with prior beliefs, that the research design will be more favorably evaluated if the research is consistent with prior beliefs, that qualitative research is likely to be more highly evaluated and used by the decision maker than quantitative research, and that sample size and process had no effect on evaluation or on usage.

Findings that managers' use of market research is indeed influenced by their expectations is in line with Deshpande and Zaltman (1982) and also further confirmed by the authors' own subsequent discussions with researchers at three Fortune 500 companies and an advertising agency. The authors suggest that such findings uncover the need for client firms to compensate for this manager bias and indicate that some companies are in fact doing so. De-biasing of managers is considered extensively in the decision science literature (Kahneman *et al.*, 1982), where various strategies are proposed (see for example (Fischhoff, 1982)). One company, for example, had asked its managers not only to take part in research design but also to sign a statement agreeing with the research questions and methodology as appropriate for the problem under study. Generally de-biasing strategies to ensure that managers are more open and objective in their use of marketing research are recommended.

Semon (1999) studies the role of expectations, and considers that marketing research firms are not performing as well as in the past due to unrealistic

expectations from the users. Internal researchers may be inhibited from questioning those expectations and the research objectives due to internal politics, and external researchers are likely to lack the information needed to judge whether the problem is a pertinent one or may not even have direct access to the final user. He considers that not only should information needs be clearly discussed beforehand, different options presented and quality and scope of the research defined to ensure the reality of expectations, but measures should also be in place after delivery of the research to ensure that management objectives and expectations have been met.

Krum *et al.*, (1988) focus not on the actual carrying out of market research but rather on the stages which precede and follow it, such as the problem formulation and the action recommendations. The authors conclude that the main areas of conflict arise from the researchers' frustration at managers' resistance to their participating more actively in the decision-making process. Particularly during the problem formulation process, there is a significant difference of opinion in the role marketing research should play, with the majority of managers believing that research should not help management define the problems and researchers seeing the problem definition as a vital part of their role. In terms of analysis and interpretation, only half the managers believed that researchers should make recommendations for action based on the results and their own judgement, while researchers felt that many executives were not open to honest opinions concerning the results. This would explain why researchers are often criticized for lack of creativity, since they may confine their analysis to narrow and objective conclusions in line with what is expected of them, which inhibit the more strategic implications.

Finally, the problem definition process from the manager's perspective is also explored in Butler (1994). To ensure effective collaboration, the author suggests using for the problem definition stage a joint statement including details of action contemplated, origin of the problem, the information required in order to take action, justification of each part of the research and how it will be employed, specification of information and data sources and estimates of various logistics such as cost, resources and so on. Furthermore, to ensure successful problem definition, openness to innovation and creativity are also considered as crucial factors. Finally, in agreement with other work as discussed above, the author also considers that the manager-researcher relationship plays a vital role, with an exchange of different viewpoints and complementary skills serving to enhance the quality at each stage of the process.

In summary, the key factors affecting the successful use of market research data and results as outlined in past work are: a successful problem definition, the bias of managers to seek for confirmatory information versus their openness to surprises, trust among managers/users and researchers, the *a priori* expectations about the value of market research, and the quality of the market research itself. Some of these factors are also found to be crucial for successful information intelligence in our work. However we also consider below other factors. We now turn to our study and analysis of key factors that facilitate or not information intelligence.

Barriers to Information Intelligence

Our study is based on interviews of market research and business intelligence executives. The interviews were carried out from different viewpoints: that of the researchers and analysts of information, and that of the users of the results. For the first part we interviewed executives and researchers at Research International, a global market research company. For the second part we interviewed marketing directors as well as business intelligence managers either from some of the clients of Research International or from other companies.

We consider three types of barriers to information intelligence, as outlined in Figure 1:

A. *Behavioral* barriers: these are barriers mainly due to behavioral characteristics of managers, decision makers, and researchers.
B. *Process* barriers: these are barriers mainly due to the process characteristics of an information analysis project.
C. *Organizational* barriers: these are barriers due to the organizational structure of the groups involved in an information analysis project.

We focus on the key barriers that emerged from our interviews. We now describe each one of them and provide recommendations on how to avoid them. Clearly there are many more issues one has

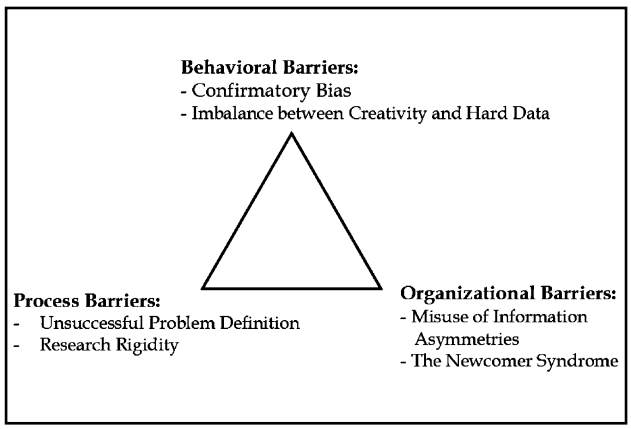

Figure 1 Three Types of Barriers to Information Intelligence

to consider – for example just regarding the behavioral type barriers, there is a very rich literature such as that on judgment under uncertainty (see (Kahneman *et al*. 1982)). A complete study of all these factors is beyond the scope of this work.

Confirmatory Bias

This is mainly a behavioral barrier. As discussed above one of the fundamental behavioral biases of decision makers in market research is to only look for information that simply confirms existing beliefs and often disregard all other information. Unfortunately there is a saying that ''if you torture the data enough they will reveal anything to you''. In other words, having a purely confirmatory mind frame will sooner or later lead to evidence that, almost definitely wrongly so, indeed ''confirms'' the initial beliefs. But then there is effectively *no* use of the information whatsoever. We found from our interviews, in agreement with the past work on market research outlined above, that the confirmatory bias is, among other behavioral biases (Kahneman *et al*., 1982), central to the success of market research initiatives. Moreover, even though managers are aware of this trap, they typically do not control for it.

Recommendation

The first basic rule is to acknowledge this bias, warn all stakeholders about it, and enter intelligence projects with an open mindset and ready to challenge prior beliefs. After all one can always ''lie with statistics'' to confirm prior beliefs – but this is not the goal. However this is easier said than done. It is therefore important to consider various de-biasing strategies, much like the ones suggested in the market research and behavioral decision science literature. For example, corrective procedures for prediction and de-biasing, such as references to similar situations, using committees instead of individuals, or even replacing strongly biased individuals have been proposed in the past (Fischhoff, 1982; Kahneman, Slovic and Tversky, 1982).

Difficulty to Balance Creativity and Hard Data

This is also mainly a behavioral barrier. It is a very delicate balance that needs to be achieved between intuition and prior beliefs, and what the data reveal. Lean too much towards hard data, hence ''successfully'' analyzing the information available, and creativity may be lost.

For example, marketing managers are often giving back the decision to the consumer instead of living their entrepreneurial spirit. And consumers, just like hard data, by nature tend to be very conservative. A lot of research has shown, however, that following the customers (''the information'') successfully can often be, surprisingly, fatal (see for example (Bower and Christensen, 1995)). On the other hand, ignoring the data can itself be destructive. As a manager said, one of the most typical reasons why market research is ignored in organizations is that, although the majority of the people are aware of the direct implications of the research, often the person in charge says, ''well, no I think totally differently about it and I want this product to be introduced now in 3 months''. Sometimes, this may be due to the manager acting in the best interest of the organisation, but it may also be because the market research outcome (''the information'') may be threatening to the manager. However a creative entrepreneur does not live in an isolated space and cannot decide purely on intuition what is going to happen. People who are great entrepreneurs also have the ability to listen to information from the consumer and work through this information.

Notice that this barrier is different from the confirmatory bias analyzed above. In the confirmatory bias case, after hard work prior beliefs, wrongly so, ''agree'' with the data as the latter may be ''cooked up'' for this purpose. One may even feel that the prior beliefs were indeed right according to the information available even if that is not necessarily the case. In this case however the decision makers are aware that their prior beliefs and intuition do *not* agree with the information available but still choose to ignore the latter. It is finding the balance between the two that is the challenge here, while in the case of the confirmatory bias the challenge is to avoid fitting the data to the prior beliefs and focusing only on evidence that supports the existing intuition and beliefs.

Recommendation

Creativity is undeniably important, but information must be always used to understand the landscape and validate any intuition carefully. For example a senior marketing executive has said that he begins projects by going into the marketplace himself and understanding the problem from a creative point-of-view as a consumer. He then turns to marketing research for factual evidence. Moreover, any intuition that disagrees with the information must be carefully scrutinized: it may for example be due to fear of the implications of the information available.

Unsuccessful Problem Definition

This is due to a very basic characteristic of intelligence projects very often ignored: if you get the wrong questions upfront, you will get the right answer for the wrong problem. As an example, the CEO of a big group asked the CEO of a marketing research supplier to work on a strategic question for

the group. But the person who subsequently briefed the project team of the supplier with the objectives was somebody who was not specialized in marketing or research. After receiving the objectives and carrying out some initial research, the group CEO was given a verbal debrief. Although he was quite happy, he also asked for more strategic answers, whereas the brief had been defined only as a tactical problem. The fundamental problem was that the contact person did not correctly lay out the objectives of the project.

Recommendation

This is a simple yet powerful rule: allocate management resources at the very early stages of defining the problem and the key questions to be answered. The key stage in any information analysis process is the problem definition one. Managers should not wait to allocate decision makers' time only at the end of the project, a practice we often observed that lead to failures as the one described above.

Research Rigidity

This is another fundamental characteristic of intelligence projects: even when they lead to the correct answers for the correct questions, these answers may quickly become outdated. Reality changes fast and one must recognize that information intelligence search is a dynamic, iterative process, not done in one rigid shot. Information intelligence projects are iterative, sometimes to such an extent that they are not really projects but ongoing processes. As some business intelligence managers said, business intelligence is not a project with a beginning and an end, but a process continuing indefinitely.

> *"Intelligence search is an endless process, and as such, it is iterative and dynamic"*

A large FMCG manufacturer asked a marketing research firm to define strategic options toward the competition. A competitive analysis was conducted and strategic options recommended. However at the final presentation the manufacturer introduced new information concerning strategic alliances with companies previously thought to be competitors. Hence, the information used to drive the intelligence and develop the strategic recommendations up to that point had to be significantly revised.

Recommendation

Information intelligence initiatives should not be seen as one shot projects. Instead they need to be iterative, with the initial questions and goals challenged after each iteration. Moreover, they need to continue as long as the issues considered are of interest: if one stops early, one may be ''stuck'' with intelligence from the past much like the FMCG manufacturer above. Intelligence search is an endless process, and as such, it is iterative and dynamic.

Misuse of Information Asymmetries

This is mainly an organizational barrier. It is probably the hardest barrier to overcome and has been extensively considered for example for knowledge management initiatives. Information asymmetries arise when one or more parties have relevant information that is not shared with another party or parties involved.

For example, a study for a manufacturer on the advertising effectiveness of billboards based on a random sample showed that ''the advertising had no effect''. However sales tracking data purchased later by the manufacturer from another agency showed contradictory results: an exceptional jump at about the same time that the billboards were put in place. Had the two sources of information been combined the manufacturer would not have concluded the ''no advertising effect'' at first.

Lack of information sharing is the most common manifestation of this barrier. But it is trickier than it looks. Information asymmetries may be very costly but they can also be very beneficial. For example, it is sometimes the case that a company will pose a data challenge whereby data addressing the same questions are purchased from two agencies using different methodologies. The purpose of such a data acquisition might be to test the coverage and relative accuracy of data given benchmarks. In this case, the data from competing parties are intentionally withheld so as to not bias the outcome.

Recommendation

The key lessons come for the knowledge management experiences: there are many lessons to be drawn from the literature (see for example (Davenport and Prusak, 2000)). As a simple rule, before any project starts, it is important to carefully understand its organizational scope: who is affected and where relevant information lies. A top-down coordination of the relevant parties is then one way to proceed, and resistance to sharing needs to be managed. However, it is important not to underestimate the power of bottom-up knowledge management initiatives (Seely Brown and Duguid ,2000). On the other hand, keeping the benefits of information

asymmetries as the data challenge example above indicates can be a reason against information sharing, something very often neglected by organizations rushing to knowledge and information sharing initiatives.

Newcomer Syndrome

It's always good to have new people with fresh ideas joining an information intelligence project, but sometimes newcomers may be dangerous simply because they are expected to come up with new findings. Here is an example that a manager described. When a new product manager comes into the job, he has to improve his P&L. There is not much he can do except for example change some things to reduce the costs. Take the example of shower gel. What costs a lot in the shower gel is the fragrance. The manager may decide it is possible to reduce the level of fragrance in the shower gel a little bit. Parallel tests show no difference to the customer as the two perfumes are indeed close to each other according to the data. When the next product manager comes in, he needs to improve his P&L as well, and he does the same. In the tests, there is almost no difference between the second fragrance and the new one. But after a few years, one begins to see the market share declining because the latest gel is by then very different from the first one. Arguably, product quality suffered significantly just because every new manager had to make a difference, and the data indeed supported all the decisions made. Every newcomer was, with good intentions, creative. But they all lacked the big picture. Information was abused, possibly unintentionally, without any overall vision.

Recommendation

Maintaining continuity with the past is a key success factor of information intelligence in organizations. This is not to say departures from the past should not be taken when appropriate, but there should always be an awareness of the historical context. This can be achieved for example organizationally, with the long overlap of people involved, information transparency regarding past decisions, or also the use of long term external partners for example for market research, as some executives we interviewed suggested.

Conclusions

In this work we discussed what we believe is a key organizational capability: that of information intelligence, namely the ability to successfully search, assemble all pieces, analyze, and effectively use all relevant available information. This is a capability which, as the amount of information in organizations increases, will become increasingly important. One of the key points of this work is that in search of lessons for information intelligence, managers need to seek into the well-developed market research departments of their organizations – or of their market research providers. We then reviewed past work on the factors that affect the successful use of market research data.

Starting from market research and based on interviews with executives, we developed a framework for thinking about information intelligence that consists of three types of barriers: behavioral, process, and organizational ones. Specific examples in each category were discussed and based on the interviews and the literature recommendations to overcome them were suggested. This is by no means a complete framework capturing all complex issues affecting information intelligence. It is only one more step for our understanding of this complex organizational capability. Moreover, a key implicit point of this work is that in search of understanding and building the information intelligence capabilities of an organization, managers need to consider lessons not only from IT and knowledge management experiences, but also from older fields such as market research and decision sciences. A key realization is that market research has been about information intelligence much before the dramatic increase in volume and value of the information assets in organization driven by the IT breakthroughs of the 90s.

In our fast moving, information rich, complex environment, becoming an information intelligent organization is becoming more and more an imperative for all organizations. It is a tall order, but we believe that a lot can be already achieved through a few educated moves. The work in this paper aims at making some fundamental steps for this purpose.

Note

1. We interviewed senior executives involved with many projects in large organizations such as Henkel KgaA, Shell Oil, Tropicana and Research International. For their support and participation, the authors are grateful to Dr. Hans-Willi Schroiff, Vice-President Market Research/Business Intelligence, Henkel KgaA; Mr. Raymond Stiles, VP Market Insights, Global Consumer Lubricants, Shell Oil; and Mr. Michael Aidan, Tropicana Pure Premium Marketing Director, Central Europe Business Unit, PepsiCo International; Mr. Bruno Botton, Global Director Branding and Communication, Research International; Mme. Claudine Coupé, Directeur du Département Etudes Quantitatives Grande Consommation, Research International France, and Mme. Geneviève Reynaud, Directrice Research International Qualitatif. The authors are also especially thankful to Pejay Belond, research associate at INSEAD, for her help with this work.

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