



Environmental uncertainty, foresight and strategic decision making: An integrated study

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ABSTRACT

This paper explores how the foresight practices and techniques that might be used for coping with environmental uncertainty are coordinated throughout large corporations and how their results are used for supporting strategic decision making. Based on an in-depth and multiple study of several companies, we analyse the main characteristics of environmental uncertainty - complexity and dynamism - that shape companies' approaches to strategic foresight and uncertainty management. We explore the impact of growing complexity and dynamism on these approaches and the role of prediction and control in their design and implementation. We outline a conceptual framework for strategic foresight activities - and their relationships with decision making under uncertainty - as a planned learning process about the future which enables managers not to know opportunities and threats in advance, but to detect them more promptly and to react more effectively as soon as they start emerging.

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1. Introduction

Uncertainty is a key issue for strategic decision makers in charge of sustaining the advantage of the firm over time [1]. Since the early 1970s the investigation of the likely evolution of the business environment has been regarded as a relevant area of management research. A survey of US companies revealed that in the late 1970s and the early 1980s almost half the US Fortune 1000 industrial companies were using techniques like scenario planning in their decision-making processes; European firms followed a similar pattern [2,3]. The wide interest in future studies seems to be confirmed by their growing number in both the private and the public sectors [4,5]. Today the terms “Foresight” and “Strategic Foresight” have become commonly used to encompass the wide range of approaches and activities which underlie future studies and aim at supporting long range planning [6,7].

Despite the intense interest and debate over uncertainty and foresight, we know little about the formal systems (i.e., the overall methodological and organizational frameworks) through which companies coordinate their foresight efforts and activities [8,9].¹ We can define such systems as “Foresight Systems”. The goal of this paper is twofold: first, to investigate foresight systems in corporate organizations; second, to examine how the results are concretely used in strategic decision making.

Our research is based on a multiple-case study of major companies that operate in different industries and thus have to face different environmental conditions. These firms are Royal Dutch Shell (Shell in the paper) in the oil industry, Nokia in mobile communication, BASF in chemicals, Philips in consumer electronics. These firms provide compelling examples since they have been engaged in foresight activities over many years and thus have progressively designed and refined their foresight systems.

This paper contributes to literature on foresight and strategic management in three ways. First, it provides descriptive data and empirical evidence about the foresight systems that were used by some of the world's largest and most influential companies

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¹ A remarkable exception are contributions on Shell by previous scholars: see Cornelius, Van de Putte and Romani [8], and Davis [9]. We build upon this work by investigating further the case of Shell and by comparing it with other relevant firms. Most of all, we deepen the investigation of how the results of foresight practices and techniques are concretely used in strategic decision making and thus affect the long term performance of the organization.

throughout the 2000s for coping with increasing uncertainty. Second, it sheds light on the role of foresight practices and techniques in strategic decision making. Third, it addresses the long-running debate between the *planning* and *adaptive schools* of strategic management, and the roles of *prediction* and *control* in strategy formulation.

2. Environmental uncertainty and strategic decision making: theory and practice

The concept of ‘uncertainty’ has been central in the literature on strategy and organization. Early conceptualizations go back to fundamental management scholars like Knight, Barnard, and March and Simon, who argued that firms’ business environments are inherently unstable [10–12]. This instability creates uncertainty for rationally bounded managers, since information about external changes is intrinsically difficult to collect, process and comprehend fully. More specifically, uncertainty arises when managers do not feel confident that they understand what the major events or changes in their business are and when they feel unable to predict something accurately [13–15].

Strategic management literature defines the micro environment and the macro environment, by distinguishing sectors with which the firm has direct contacts and which directly affect its business strategy from sectors that affect the firm indirectly [16]. The micro environment is made up of competitors, customers, suppliers, potential incomers, substitute products and providers of complementary products [17]. The macro environment is made up of the political, economic, ecological, societal and technological landscapes (PEEST) which surround the business micro environment.

2.1. Strategic management theories: the roles of prediction and control

Studies in the strategic management of environmental uncertainty have developed around two fundamental theoretical frameworks. On one hand, the *planning school* argues that, as uncertainty increases, organizations that work more diligently to predict changes in their environments accurately will outperform those that do not. Relevant empirical studies support this notion [18,19]. This approach therefore emphasizes the importance of systematic analysis and integrative planning, and discipline in the scanning of trends, the generation of alternatives and forecasts, the rational evaluation of information and its integration into the firm’s existing operations: these are the hallmarks of the planning school [20,21]. According to this approach, scholars recognize that predictions might not be perfect because they are obviously difficult; however, predictions represent the best way of remaining aligned with a changing environment. In contrast, the *adaptive school* prescribes avoiding prediction as much as possible, but focussing rather on responding to change events as they emerge, and so emphasizes continuous experimentation and fast adaptation to changing environments. This strand suggests firms learn what to do next by minimizing the use of predictive rationality, and by experimenting instead so as to be able to move quickly to capture emerging opportunities. It advocates using purely adaptive approaches which avoid trying to define future changes and events, and seek instead to position the firm to make timely responses to *actual* events and changes [22,23].

Both planning and adaptive strategies basically assume that the key elements of the business environment are exogenous to the organization’s own efforts. Under this assumption, positioning resulting either from prediction or from quick adaptation turns out to be the only viable ways for organizations to optimise their performances. However, influential scholars have more recently relaxed the assumption of exogeneity, emphasizing the organizations’ ability to be active in shaping the development of some of their environmental elements (e.g., technological standards, customer preferences). Under this (endogeneity) assumption, the firm may do something other - something more - than simply positioning itself in its environment: it may actually try to push its evolution toward a more favourable structure. Some scholars therefore argue that a new dimension – beyond mere prediction – has to be considered to fully understand an organization’s viable responses to environmental uncertainty: the dimension of *control* [24]. Control measures the level of *influence* an organization can have on the components of its environment, and thus the degree to which they can be endogenous to its own efforts.²

Thus, two further approaches to the strategic management of environmental uncertainty were identified: the *visionary* and the *transformative*. The visionary approach embodies the notion of ‘heroic’ insightful and entrepreneurial actions. This type of approach has strong connections with the planning school, and envisages the organization as building its environment by imagining future possibilities and working proactively to bring them to fruition. The essence of the vision is to set inspiring goals so as to create and to colonize new spaces in the environment [25,26]. Prominent scholars like Hamel and Prahalad (1994) emphasize the ability of the (major) companies to play an active role in influencing the development of their business. In contrast, the transformative approach has strong connections with the adaptive school, suggesting that firms should not focus their efforts into prediction, but rather on co-creating goals with other business ecosystem players in mutually supportive processes where action often precedes clear and predictable outcomes [27,28].

On the basis of the higher or lower levels of these dimensions – prediction and control – it is possible to derive the taxonomy represented in Fig. 1, which summarizes the main strategic management approaches to dealing with uncertainty [24].

2.2. Management practices and techniques

In the vein of the planning school, specific foresight tools and practices have been developed for improving predictions and informing major investments decisions under uncertainty. Overall, these tools and practices encompass two main tasks. The first

² It is worth stressing that the notion of “control” – which emphasizes the capability of the organization to influence, to a certain extent, the evolution of drivers of change – relates only to large companies, but not to public institutions.

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