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A holistic approach to strategic foresight: A foresight support system for the German Federal Armed Forces

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ABSTRACT

Companies increasingly face a dynamic environment, where unexpected change is the norm rather than the exception. Strategic foresight uses a variety of methods to assess possible future events. Combining different foresight methods and integrating expert opinions transform the strategic foresight process into a powerful but major undertaking. IT systems can assist with the growing complexity of strategic foresight methods. Currently, specialized IT systems can support various strategic foresight methods and foresight activities, but these are generally focused on isolated applications rather than providing a holistic solution.

This article contributes to the field of foresight support systems by documenting and demonstrating the development and implementation of a foresight support system tailored for the German Federal Armed Forces. We draw on a literature-based design for foresight support systems and demonstrate how our system addresses issues raised in the literature. Our system provides a holistic approach to strategic foresight incorporating the rules of order in foresight processes, foresight method combinations, mechanisms for the reuse of foresight activity results, and collaborative decision-making.

1. Introduction

Effective strategic management relies on the capacity of a company to explore the existence of trends, risks, crises and other possible expected and unexpected change, assess and prioritize, and respond by mobilizing company resources [1,2]. Strategic foresight makes it possible to analyze potential future developments in a business, market or technology environment, in order to determine their implications for management [3]. In this article strategic foresight is defined as a means to scientifically deal with possible, desirable and probable future developments and also the possibility of shaping these future developments [1,4]. It is clearly impossible to predict the future accurately, but future uncertainties and complexities can be reduced or at least anticipated by identifying and analyzing various current and past parameters [5–7].

Strategic foresight provides a variety of methods to tap into the know-how of individuals with different areas of expertise [3,8]. Combining different methods and integrating a variety of expert opinions can transform strategic foresight processes into a valuable business tool, albeit this also means the process may become a complex undertaking [9]. Information and Communication Technology (ICT) is currently being frequently used in support of strategic foresight, for example in offering features such as integrated project management or for the allocation of individual experts to specific foresight methods [10,11]. ICT is also used extensively for data collection, data analysis or to integrate the inputs from geographically dispersed experts

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(e.g., [12–15]). Providing data storage and data warehousing to enable the (re)use of foresight activity results [16–18] and the support of collaborative decision-making, analytical modeling, multicriteria methods and simulation are all examples of the use of ICT in support of the strategic foresight processes [19–21].

Despite all these examples, currently there is no comprehensive set of ICT tools to holistically support various activities in strategic foresight [9,22,23]. For example, the development of future options is usually left to workshops or other extremely time-consuming methods.

The German Federal Armed Forces ("Bundeswehr") has a dedicated Future Analysis Section [24] tasked with keeping track of the evolution of security policy implications. The Section is staffed by uniformed officers and civilian researchers with different backgrounds (biology, political sciences, engineering, economics, etc.), who rotate on a regular basis to ensure a constant flow of fresh thinking. The Section also collaborates with external partners in order to address any perceived gap in the expertise of its own staff.

In a recent study of the future of the Middle East and North Africa (MENA) area, experts from different institutions were brought in to provide input about the different MENA spheres. This study, while successful, highlighted four main shortcomings in the foresight approach of the German Federal Armed Forces:

(1) There was no comprehensive foresight process with an appropriate set of methods in place, and therefore the results could not be reproduced and thus were not reliable.
(2) Many foresight methods require substantial data input. Processing these data was time-consuming and error-prone.
(3) Knowledge acquired in the course of other foresight projects had not been documented in a structured fashion, making it difficult to reuse the knowledge gained from previous projects.
(4) Geographical dispersion of the experts made collaborative decision-making very difficult.

As a consequence, the German Federal Armed Forces requested that a new foresight support system be designed, providing a flexible foresight process, allowing the combination and seamless integration of different methods, and supporting data processing, collaboration and documentation.

After reviewing existing foresight support system, e.g. *EIT Innovation Radar* [18], *Foresight Toolbox* [25] *and Competitiveness Monitor* [26], the German Federal Armed Forces found that none of the IT systems, prototypes and concepts identified support a holistic, collaborative, multiple-method, strategic foresight process. This can be partly explained by the fact that strategic foresight projects, like research and development projects, use unique, individual processes and are predominantly conducted by organizations to solve specific problems or to discuss complex strategic questions connected with a dedicated field of interest [27]. The *Foresight Toolbox* is a proof-of-concept platform that merely provides information on foresight methods applicable at different phases of the foresight process; but it does not offer any further feature for communication, decision-modeling or rules of order. The *EIT Innovation Radar* offers an online platform that enables the involvement of different stakeholders in the foresight process, but lacks the formalization of decision procedures and the *Competitive Monitor* is still in the prototype phase.

The shortcomings listed above and the lack of existing solutions are the reasons that the German Federal Armed Forces developed, implemented and tested its own foresight support system, which is presented in this article.

The next section of this article provides an overview of the essential components and design issues of foresight support systems. Section 3 demonstrates the development of the foresight support system called RAHS ("Risk Assessment and Horizon Scanning"). This section also includes a critical review of how well the foresight system supported the solution of a sample problem. We will then examine the extent to which the RAHS system addressed the suggested design issues and how it helped in documenting the lessons learnt. We conclude with a summary of the implications of implementing the proposed system in cross-company settings.

2. Components and design issues of foresight support systems

Amanatidou and Guy [28] developed a framework to conceptualize the dynamics of foresight systems. According to their study foresight has to be seen as a system of processes, actors, objectives, inputs and outputs. The main goal of a foresight support system is to support this complex system with tools that enable collaboration among the actors, ensure transparency and consistency of foresight results and support the efficient handling of very large volumes of data without limiting the flexibility of the foresight process [9,29,30]. There has been little previous work examining components of and design guidelines for foresight support systems. Banuls and Salmeron [9] investigated components and design issues of foresight support systems. According to their definition, a foresight support system should aim to support

- the rules of order in foresight processes,
- the combination and integration of different foresight methods,
- the reuse of results of foresight activities, and
- the collaborative decision-making.

The following four subsections examine these components of foresight support systems in detail, followed by a summary of the resulting design issues.

2.1. Rules of order in foresight processes

The process and procedures are at the heart of every foresight project. Depending on the project scope and the specific field of interest, process and procedures shape the structure of foresight activities, inform the methods used, and help nominating the required expertise [9–11,27].

Fig. 1 shows the foresight process based on Horton [31], Sutherland and Woodroof [32] and Voros [33].

As shown in Fig. 1, the overall process is roughly divided into three phases: input, foresight and output. The input phase starts with the formulation of a strategic question and determines the scope of the foresight project. Step 2 of the input phase is information-gathering. Data from different sources, e.g. the Internet, interviews with experts and publications [32] are elicited, collected, and appropriately stored.