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Elements in the construction of future-orientation: A systems view of foresight

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ABSTRACT

Foresight is currently perceived as a critical activity in the development of innovation policies and corporate strategies. While there are many descriptions of the benefits of foresight, there is little research into how these benefits are created. In addition, although the view of innovations has shifted towards a systems understanding, the same has not happened with foresight, which is largely seen as a process. The process view and focus on the outcomes has created a situation where the dynamics between agents involved in foresight is still not well understood. One emerging approach to improve the understanding of the dynamics of foresight, and to embed foresight more closely with innovation management and policy, is the systems view. In this paper, we build on the systems view of foresight, and study what the elements in foresight as a system are and how they contribute to the creation of futures knowledge. Based on the literature, we propose six elements that are useful for understanding a foresight system and the creation of futures knowledge: agents, cognitive schemes, strategic objects, mediating events, memory objects and metaphors. We illustrate the systems view, the elements and their interaction with two case examples: one on creating future-orientation in a research and technology organisation and one on renewing a forest industry through roadmapping. Based on the elements and the case studies, we argue that the strategic objects and mediating events are important leverage points when steering foresight as a system.

1. Introduction

Foresight is conventionally perceived as a process, often even a linear one (see e.g. Martin, 1995; Horton, 1999; Becker, 2002), although systems thinking has been influential in foresight at least since 1970s (Kuosa, 2011a). The systems thinking in foresight, in conjunction with this “process view”, is usually manifested in two ways. First, foresight is defined as a *systematic* practice for exploring futures (Habegger, 2010; Kuosa, 2011b; Miles, Harper, Georghiou, Keenan, & Popper, 2008; Miles, 2010; Yuan, 2010). This means that in a foresight process a set of methods is applied in a planned and rigorous way in order to understand consequences of future developments. Second, foresight processes are commonly perceived to be *about systems*, targeted on a specific system setting (Coates, 2010; Miles, 2010; Rohrbeck & Schwarz, 2013; Yuan, 2010). In a foresight process the topic is often framed as a system, and interdependencies between the sub-systems and system parts

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are scrutinised in order to understand present system behaviour and to shape future behaviours in a system. A foresight process is perceived as an intervention to a system (Treyer, 2009).

In this "process view", foresight is seldom fully integrated into the innovation system or organisational practices, or perceived as a continuous strategic activity (Keller, Markmann, & von der Gracht, 2015; Treyer, 2009; Köhler et al., 2015; Dreyer & Stang, 2013). For example, a survey of Austrian firms found that less than 3% of the firms had integrated strategic foresight systems (König, Sedlatschek, & Wallner, 2014). On the policy side, attention has mostly been on explicit foresight processes, such as national foresight programmes, where foresight is used as an input into policy making. The focus on separate foresight processes might be one reason why there is little understanding of how the long-term accumulation of futures knowledge (Dufva & Ahlqvist, 2015) is being created, although there are many proposals and lists of what the key contributions of separate foresight exercises are (see e.g. Irvine & Martin, 1984; Salo, Könnölä, & Hjelt, 2004; Georghiou & Keenan, 2006; Rohrbeck & Schwarz, 2013).

Recently, some authors have claimed that foresight practice has been shifting towards more systems oriented approaches (Daheim & Uerz, 2008; Rask, 2008; Köhler, 2015). In this "systems view", foresight is seen as dependent on and influenced by other processes taking place simultaneously (Mendonça & Sapio, 2009). There have been attempts to define foresight itself *as a system* or as a part of a system (Amanatidou & Guy, 2008; Andersen & Andersen, 2014; Barre, 2014; Saritas, 2013). A systems view has also been deployed in the evaluation of foresight (Amanatidou & Guy, 2008; Georghiou & Keenan, 2006; Miles, 2012; Piirainen, Gonzalez, & Bragge, 2012). However, these efforts have not yet offered a crisp description of what foresight as a system consists of, and what its key dynamics are. A notable exception is the conceptual model presented by Uotila et al. (2012), which distinguishes acquisition, assimilation, transformation and exploitation of knowledge in an integrated system combining different foresight approaches (explicit, emergent and embedded), knowledge brokerage and absorptive capacity.

In this paper we argue that, in order to understand the foresight system, especially from the perspective of long-term accumulation of futures knowledge, there is a need to identify the core elements of the foresight system and explicate their interactions. This identification facilitates analysis of the dynamics in the foresight system, which again opens a fresh perspective on unravelling how the contributions of foresight are created. We build on existing systems perspectives on foresight and study what the elements of the foresight system are, and how these elements help in explaining the dynamics of futures knowledge creation (see Dufva & Ahlqvist, 2015). Following the categories set by Salmenkaita and Salo (2004), we focus more on emergent or embedded foresight with less emphasis on individual foresight processes and more on the interactions and relations between the stakeholders.

We base our theoretical framework on the literature on complex adaptive systems (e.g. Kaufmann, 1995; Stacey, 1996; Anderson, 1999) and innovation systems (e.g. Lundvall, 1992; Hekkert, Suurs, Negro, Kuhlmann, & Smits, 2007; Alkemade, Kleinschmidt, & Hekkert, 2007), but also draw on other fields such as knowledge management (e.g. Nonaka, 1994; Cacciatori, 2008; Håkanson, 2007), strategy (e.g. Mintzberg, 1987; Whittington, 1996; Heracleous & Jacobs, 2008) and foresight (e.g. Miles et al., 2008; Martin, 1995; Saritas, 2013; Fuller & Loogma, 2009; Uotila et al., 2012). The complex adaptive systems literature builds an overall foundation of what a system is and how it functions. The innovation systems approach opens specific insights into how regulation, industrial interactions, and societal structures affect foresight practice. Thus, the innovation systems approach functions as a context in which the complex adaptive system of foresight operates.

The paper is structured as follows: in the second section of the paper below, we outline the elements of foresight as a system, as well as their key interrelationships. In the third section, we illustrate the systems view and the elements with two case studies: one on creating future-orientation in a Finnish research and technology organisation (RTO) and one on renewing a South Australian forest industry through strategic roadmapping. In the fourth section, we wrap up the key aspects of the case studies and reflect them against the theoretical framework formed in the second section. While our focus in on analysing foresight processes through the systems view, we think that the elements and the frame we describe will be useful in designing and conducting foresight projects and connecting them to a larger context. This is further elaborated in the fifth section, where we also provide general conclusions and outline potential avenues for future research.

2. The theoretical framework: elements in building future-orientation

In our approach, we view foresight as a system embedded in the wider innovation system. By system we mean a functionally indivisible set of interconnected, interdependent agents, which together generate aggregate behaviour that is

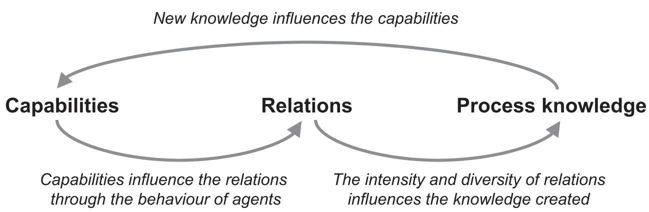

Fig. 1. Interplay between process knowledge, capabilities and relations.