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Approaching the future: Blueprinting and Wayfinding in corporate foresight enactment☆

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ABSTRACT

Corporate foresight has predominantly been conceptualized as an organizational capability, especially in the context of organizational transformation. Therefore, it is viewed as something that firms either have or do not have rather than as something people do. Consequently, the literature on corporate foresight contains surprisingly little insights about how such corporate foresight is enacted by people within organizations through distinct "future-making" practices. So how do organizations undergoing technology driven transformation enact corporate foresight using distinct "future-making" practices? Our paper addresses this question by undertaking a twenty-month long field study on corporate foresight enactment using scenario planning at ProRail B.V. We find two novel and distinct modes of corporate foresight enactment that we call *blueprinting* and *wayfinding*. *Blueprinting* is a response to 'state' uncertainty. It is characterised by rational planning, belief encoding, forward-looking cognitive-based choice processes and pre-conception that allow participants to *preview* the future. *Wayfinding*, by contrast, is a response to 'effect' and 'response' uncertainty. It involves bounded rational muddling, belief updating, feedback based experiential processes and anticipation that allow participants to *foresee* the future. Blueprinting and Wayfinding are therefore two distinct modes of "future-making" practices for corporate foresight enactment within organizational transformation.

1. Introduction

The maxim, 'managing means looking ahead' (Fayol and Storrs, 1949), is reflective of the importance attached to corporate foresight (henceforth CF) in organizations. CF is essential for firms "to create and maintain a high-quality, coherent and functional forward view" (Slaughter, 1995, p. 1) and to use the resulting insights in organizationally useful ways (Ringland, 2010; Rohrbeck, 2012). CF, defined as, "identifying, observing, and interpreting factors that induce change, determining possible organization-specific, implications, and triggering appropriate organizational responses" (Gordon et al., 2020, pp. 1–2), is therefore viewed as an important strategic capability and is critical for laying the foundation for future competitive advantage (Peter and Jarratt, 2015; Rohrbeck and Kum, 2018; Schwarz et al., 2020; Gordon et al., 2020; Fergnani, 2022).

Yet, current research on CF is riddled with three significant challenges that need addressing. First, CF has predominantly been conceptualized within existing research as a "capability" (Fergnani, 2022, p. 821; Schwarz et al., 2020, p. 1; Rohrbeck et al., 2015, p. 6) or something that firms have (or do not have) rather than as something people do. Therefore, even though existing research "claims to have many practices to contribute to" (Gordon et al., 2020, p. 9) CF by building and refining theoretical models of the antecedents, nature, and consequences of CF, our understanding of how CF is actually enacted in firms and the associated mechanisms used for carrying out this work remain rudimentary and underdeveloped. Thus, there is a need to complement our understanding of CF as an organizational capability with insights from "future-making" practices where practices carried out by managers and strategists are foregrounded as the site for CF capability emergence.

Second, the theoretical shift from CF capabilities to "future-making" practices that "examine the myriad ways in which actors produce and enact" (Wenzel et al., 2020, p. 1442) CF shines the spotlight on the role of 'anticipatory assumptions' (Miller, 2018, p. 24) in CF enactment. Prior research on the Future Literacy Framework (FLF) (Miller, 2018) and anticipatory action (Anderson, 2010; Poli, 2010; Miller et al., 2018) has demonstrated that CF is "not a monolith" (Minkkinen et al., 2019, p.

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1) and that "conscious human anticipation can only occur on the basis of anticipatory assumptions of one kind or another" (Miller, 2018, p. 24). However, such anticipatory assumptions are seldom spelled out explicitly and generally constitute the "assumed shared background" (Minkkinen et al., 2019, p. 1) within CF research. Investigating the role of anticipatory assumptions in CF enactment requires theoretical integration between the research on "future-making" practices and anticipatory action. Doing so will allow us to scrutinize the relationship "between the 'presence of the future' and the dynamics of a 'living present'" (Anderson, 2010, p. 793) which reveals "how foresight work" (Minkkinen et al., 2019, p. 11) actually takes place within CF enactment.

Third, we do not understand much about CF mechanisms that underlie and shape organizational transformation. On one hand, research on organizational transformation offers "mounting evidence that transformational change can and does occur in a more evolutionary way through a process of both continuity and change rather than that of indiscriminate rapid upheaval" (Malhotra and Hinings, 2015, p. 1). On the other hand, scenarios research has demonstrated that when confronted with uncertainty, the time horizons people employ when thinking about the future constructions of perceived continuity and change between the past, present, and future can either facilitate or inhibit foresight (Mackay and Burt, 2015; Augustine et al., 2019; Wack, 1985a,b). Yet, questions about how "temporal" and "cognitive" dynamics shape the formation of fundamentally new beliefs about what might be possible in the future (Vecchiato and Roveda, 2010), how the future may differ from the present, and what different types of future could or should be considered during CF enactment for organizational transformation (Beckert, 2016; Bartunek and Jones, 2017), has received scant attention. A framework to facilitate systematic understanding of how CF enactment drives organizational transformation has yet to be sufficiently developed.

In sum, unpacking how CF enactment shapes organizational transformation requires theoretical integration of three previously unconnected theoretical strands. First, we need to complement our current understanding of CF as something firms have with CF conceptualized as something that people within firms do. Second, this requires integrating theoretical insights from the literatures on future-making practices (Wickert, 2025; Wenzel et al., 2025; Whyte et al., 2022) and anticipatory action (Miller et al., 2018; Poli, 2010; Anderson, 2010). Third, we also need to develop an integrated understanding of how and why "temporal" and "cognitive" dynamics constitute CF mechanisms that underlie and drive organizational transformation. This raises the question: *How do organizations undergoing technology driven transformation enact corporate foresight using distinct "future-making" practices*?

In order to address this question, we undertook a twenty-month long field study on CF generation at ProRail B.V. (henceforth ProRail), a Dutch firm responsible for rail infrastructure management in the Netherlands. By investigating how practitioners enacted CF through multiple future-making cycles, our study has unearthed two distinct modes of "future-making" practices: *blueprinting* and *wayfinding*. In the 'blueprinting mode', actors sought to 'plan for the future' by specifying a priori the possible future states of the business. The aim here was to develop a shared 'vision' or 'future image' for ProRail before embarking on organizational transformation. For the 'blueprinters', all thought, discussion and personal judgment were about what preferences and expectations were to be 'encoded' into beliefs about the future. The encoded beliefs would then allow them to produce a rational 'plan' or 'blueprint' upon which they can act. As such, they wanted to preconceive the 'future' and then use forward-looking cognitive based choice processes for CF enactment. For them, greater fidelity between the 'blueprint' of action-outcome linkages that result from corporate foresight enactment leads to more efficacious choices of action (Gavetti and Levinthal, 2000). Hence corporate foresight involves *pre*-viewing a *preconceived* future prior to its unfolding so that appropriate organizational responses can be planned for prior to its execution.

In the '*wayfinding*' mode by contrast, far from an attempt to blueprint the future, the practitioners directly aimed at improving their ability to "muddle through" by increasing flexibility and adding new alternatives. The *wayfinders* "plan" for muddling (Kahn, 1963, p. 4) by making a distinction between uncertainty and unknowability inherent within organizational transformation. Given their bounded rationality, the irreducible complexity and instability of future competitive situations, wayfinders cannot predict the consequences of distant courses of action (Gavetti and Menon, 2016). Hence, they forego belief encoding and are instead guided by a process of belief updating where individuals can update their beliefs by engaging in internal cognitive processes (e.g., attention, perception, memory, reasoning) that interact with emergent external information (Kapoor and Wilde, 2023, pp. 706–707). They approach the future with a sense of *anticipation* – an awareness of "*waiting on the world and tuning to a world-in-waiting*" (Ingold, 2023, p. 29). Thus, anticipation is underpinned by experiential learning that offers a form of backward-looking wisdom where beliefs about action-outcome linkages itself may change as a result of prior and ongoing experiences (Gavetti and Levinthal, 2000). CF is therefore understood as *foreseeing* the future. To foresee, in this sense, "is to *see into the future*, not to project a future state of affairs in the present; it is to look where you are going, not to fix an end point" (Ingold, 2013, p. 69). *Blueprinting* and *Wayfinding* therefore represent two contrasting modes of "future-making" practices for CF enactment.

Overall, our paper makes three significant contributions to the CF literature. First, by examining how CF enactment unfolds in-situ, within an organization, our research complements prevailing conceptualizations of CF as a "firm-level capability" (Fergnani, 2022; Schwarz et al., 2020). Our empirically derived modes of "future-making" practices demonstrate how CF capabilities are an ongoing accomplishment sustained by something that people within firms do. Therefore, our research shifts the theoretical focus from the antecedents, nature, and consequences of CF to a deeper and more systematic examination of CF enactment — that is, how organizational actors respond to uncertainty inherent within organization transformation by enacting "future-making" practices that produce CF. Second, our process research methodology captures the cognitive and temporal complexities involved in CF-making. Unlike much of the CF literature, where time is typically treated as a linear trajectory that flows independent of organizational activity, using a process research methodology allows us to examine "future-making" practices where "the future is not an objective 'thing' out there, waiting to be measured through supposedly more or less accurate planning techniques" (Wenzel et al., 2020, p. 1444). Instead, we show how the temporal complexities inherent within future making can shift ways of CF enactment within firms. Our process research methodology, therefore, adds to the CF analytic toolkit. Finally, prior research on both organizational transformation and CF has highlighted the need and importance of investigating both these phenomena from the perspective of the organizational actors tasked with its realisation (Rohrbeck and Gemünden, 2011; Bartunek and Jones, 2017). By identifying and developing '*blueprinting*' and '*wayfinding*' as two contrasting modes for CF enactment, our research illuminates two CF mechanisms that underlie and shape organizational transformation. Our process model, therefore, breaks new theoretical and empirical ground by offering a systematic understanding of how CF enactment drives organizational transformation in practice.

The remainder of our paper is structured as follows. First, we undertake a literature review that problematizes current conceptualization of CF and illuminate the blind spots within current research on CF, anticipation and organizational transformation. Next, we present the methodology used for investigating our research question. The following section presents the findings and analysis from our longitudinal field research. In the penultimate section, we discuss the implications of our findings and analysis for the theory and practice of CF. Finally, we conclude by summarising our contributions and suggesting avenues for future research.

2. Theoretical motivation

2.1. Corporate foresight and organizations

CF plays a crucial role in laying the foundations for an organization's future competitive advantage (Fergnani, 2022; Marinković et al., 2022; Gordon et al., 2020; Ahuja et al., 2005). Recent research has predominantly conceptualized CF as an antecedence or microfoundation for dynamic capabilities (Fergnani, 2022; Schwarz et al., 2020; Haarhaus and Liening, 2020; Ramírez et al., 2013) that firms require to adapt and shape strategies for creating and maintaining competitive advantage. Rohrbeck (2012) offers three explanations to unpack how CF leads to future competitive advantage: (i) by triggering responses to existing strategy challenges, (ii) by initiating and facilitating strategic discussions that enable strategic change and (iii) by identifying and supporting the acquisition of necessary strategic resources. Therefore, CF is viewed as a "a dynamic, firm-level capability" (Fergnani, 2022, p. 820) "that cuts across all firm levels" (Marinković et al., 2022, p. 290). As a recent review by Marinković et al. (2022) highlight, conceptualizing CF as an organizational capability has produced valuable insights on meta-capabilities like CF motivations and initial conditions, CF tools orientation and composition, formal, cultural and configurational CF moderators and various strategy, innovation, organizational and performance related outcomes.

Yet, by conceptualizing CF as an organizational capability, these studies also reduce CF to a property of the firm whereby CF is viewed as something that firms either have or do not have rather than as something people within these firms do. This has two unintended consequences. One, CF is simultaneously "used to designate the process as well as those tools used in creating the image" (Coates et al., 2010, p. 1423) of a given future. Not only does this conflate means with ends by reducing CF "to both a mechanism and an output" (Burt and Nair, 2020, p. 3), it also envisions "the futurist's role as a supplier to specific clients of images of given futures delivered without paying attention to the means employed to create those futures" (Coates et al., 2010, p. 1423). Two, such studies overlook the direct relationship with decision-making and preparing for action by failing to acknowledge the role of participants in producing CF. This oversight results in unreasonable presumptions about participants being able to either "be certain that a given strategy will produce a competitive advantage *ex ante*" or the equally unreasonable assumption "that managers operate under conditions of total uncertainty and have no idea whether their strategies will be successful" (Ahuja et al., 2005, p. 793 emphasis in original). Visions that underpin CF development are inherently "characterised by a tension between transformational and motivational qualities, on the one hand, and plausibility on the other hand" (Minkkinen et al., 2019, p. 6). Overcoming these challenges require scholars to re-focus their attention on the manifold activities and practices through which participants *actually, rather than ideally*, engage with the future in CF exercises.

Collectively, research has mostly conceptualized CF as an organizational property with the expectation that CF will enable firms to "spot trends ahead of competitors, gain deeper insight into how such trends will affect their organization and identify the most effective response, and ultimately gain a competitive advantage" (Rohrbeck and Kum, 2018, p. 105). However, such a conceptualization, some scholars argue, overstate firms' abilities to manage the future (Wickert, 2025; Wenzel, 2022). By failing to examine how organizational actors produce and enact CF in practice, the capabilities perspective, they argue, "downplays the future, rather than putting it center stage" (Wenzel, 2022, pp. 845–846). This has led to calls for complementing the organizational capabilities perspective on CF with insights derived by scrutinizing the ways in which managers and strategists anticipate or prepare for an uncertain or unknowable future.

2.2. Corporate foresight, anticipation and future making practices

Growing scepticism about firms' abilities to anticipate, shape, or create the future has highlighted the need for "more anticipatory and future-relevant management inquiry" (Wenzel, 2022, p. 849) within CF. This need finds its expression within two parallel streams of research, the Futures Literacy Framework (Miller et al., 2018) and the emerging "future-making" view (Wickert, 2025; Pettit et al., 2023; Whyte et al., 2022; Wenzel, 2022). We explore each of these research streams in turn.

The Futures Literacy Framework (henceforth FLF) is an analytical framework that "can clarify the nature of different anticipatory systems" and guide both research into Futures Literacy and "its acquisition as a skill" (Miller, 2018, p. 15). A key assumption that underpins the FLF is that "in practical terms the future only exists in the present as some form of anticipation" (Miller, 2018, p. 19). Anticipation, according to this framework, is an umbrella term used to define "the capacity of an organism to incorporate the later-than-now into its functioning in ways that are relevant" (Miller, 2018, p. 20). By focusing on relevance of the later-than-now for 'functioning', the FLF provides an 'actionable dimension' to the definition of anticipation.

The FLF makes three important contributions to our understanding of future-making. First, it points to the distinction between "hidden components" and "latent components" that impact how actions might play out in the future (Poli, 2010). As Poli (2010) explains, "hidden components are there, waiting for triggers to activate them" whereas "latent components do not exist at all in the entity's actual state. Latent components relate to incompletely present conditions and aspects. Their incompleteness may be ascribed either to still maturing conditions or to new conditions that may subsequently arise" (Poli, 2010, pp. 8–9). Second, the framework highlights the role of 'anticipatory assumptions' on "future-making" practices. Anticipatory assumptions explain how "differences in the kinds of future being imagined generate differences in both what humans perceive and the meanings they associate with what they perceive" (Miller, 2018, p. 19). Third, depending on whether the anticipatory assumptions are open or closed, FLF outlines "optimization, contingency, and novelty" (Miller et al., 2018, p. 59) as the three distinct uses of anticipation.

Yet, despite FLF offering a theoretically and analytically grounded approach, "much of our understanding of anticipation remains cursory and fragmentary" (Miller et al., 2018, p. 54) and in need for "some theoretical polishing" (Miller et al., 2018, p. 60). A key reason for this is because 'anticipation' has always been used as an "umbrella" construct to encompass "a combination of capacities that allow human beings to consider and evaluate the present in light of the way they imagine the future" (Miller et al., 2018, p. 53). Such a broad conceptualization of 'anticipation' leads to a lack of construct clarity that is essential for theorizing. This lack of construct clarity is evident in the distinction between anticipation-for-the-future (AfF) and anticipation-for-emergence (AfE) (Miller, 2018, p. 20), where there is a failure to "create precise and parsimonious categorical distinctions" (Suddaby, 2010, p. 347) between concepts. The AfF and AfE distinctions suffer from what Stepp and Turvey (2015) call "*the fallacy of assigning perception to the present and anticipation to the future*" (p. 109 our emphasis). Since both perception and anticipation are temporal phenomena, the separation of perception from anticipation with the former belonging to the present and the latter to the future, respectively, makes a distinction along lines that are not clear. Consequently, we still lack understanding about how and why managers make choices about which anticipatory assumptions to adopt. This has led to calls for research to "delve into 'the coalface' of future making" (Wickert, 2025, p. 2) by studying how anticipatory actions operate.

Since CF entails anticipatory action requiring managers and strategists to envision, process, and engage with the future, this makes the examination of "future-making" practices, that is, "the specific ways in which actors produce and enact the future" (Wenzel, 2022, p. 848) particularly important. Several scholars have raised doubts about the

"assumption that futures can be brought into existence through a phase of blueprint design followed by adaptation" (Pettit et al., 2023, p. 1775; Whyte et al., 2022). Such an approach can result in "managerial hyperopia" (Mackay and Burt, 2015) where managers are too focused on managing distant futures, while failing to attach sufficient attention to what is close at hand. These temporal complexities reinforce the need for more research on "future-making" practices that reflect what actors in organizations "do," rather than what they say they do or wish to do.

The focus on "future-making", as Wenzel (2022) correctly argues, has two advantages. First, "instead of representing an ideal world of managing the future, examination of "future-making" practices draws attention to the often subtle, partly mundane, and perhaps even short-sleeved ways in which organizational actors engage with the future. Second, a focus on "future-making" practices opens up the pluralistic range of envisioning, processing, and producing futures in organizations" (p. 848). By treating CF as an ongoing accomplishment rather than as something firms have or do not have, a "future-making" perspective shifts the theoretical focus from CF as a property of the organization to "the emergence of futures through the situated actions of organizational members using tools at hand" (Pettit et al., 2023, p. 1777).

Together, the research on FLF and "future-making" demonstrates how a person's attempt to understand the future "depends on what kind of future they are trying to understand" (Miller, 2018, p. 19). This is particularly significant in the context of organizational transformation where it is impossible to specify apriori the possible future states of the organization and its environment. However, relatively little attention has been devoted to what and how individuals -such as managers and strategists – 'do' while "enacting the yet-to-come by making sense of and giving form to imaginings of the future" (Wickert, 2025, p. 1) required to produce CF for organizational transformation.

2.3. Corporate foresight and organizational transformation

How a focal firm needs to evolve is a key organization transformation challenge facing managers as they seek to bring an awareness of long-term challenges and opportunities to inform their more immediate strategy making. However, developing corporate foresight to guide organizational transformation in the face of significant change with limited and often contradictory information, can be especially challenging for managers (Kapoor and Wilde, 2023). There are at least three reasons why this challenge persists.

One, organizational transformation encompasses three specific kinds of uncertainty concerning drivers of change - "state" uncertainty, "effect" uncertainty and "response" uncertainty (Milliken, 1987). Managers experience "state" uncertainty when they perceive the organizational environment to be unpredictable and do not "understand how components of the environment might be changing" (p. 136). Effect uncertainty, refers to the managerial "inability to predict what the nature of the impact of a future state of the environment or environmental change will be on the organization" (p. 137). Response uncertainty is defined as a manager's "a lack of knowledge of response options and/or an inability to predict the likely consequences of a response choice" (p. 137). Yet, research on CF as largely focused on "state uncertainty" with the "basic aim of helping managers to find out timely new drivers of change and anticipate their likely evolution" (Vecchiato and Roveda, 2010, p. 1538). As a result, there is a paucity of research on how managers and strategists deal with "effect" uncertainty and "response" uncertainty related to organizational transformation (Vecchiato and Roveda, 2010).

Two, organizational transformation often involves a "radical shift from one state of being to another, so significant that it requires a shift of culture, behaviour, and mindset to implement successfully and sustain over time." (Bartunek and Jones, 2017, p. 148). This calls for explicit attention on how individuals produce CF to drive organizational transformation (Malhotra and Hinings, 2015). Yet, as Bartunek and Jones (2017) explain, paying attention to organizational transformation "at single levels of analysis such as the group or 'whole system' in isolation limits the reach of theorizing, empirical research, and importantly, practice, because it means that adequate attention is not explicitly paid to the experiences of individuals being exposed to and participating in particular change processes" (p. 161). Stated differently, we do not yet fully understand how individuals use "future-making" practices to drive organizational transformation.

Third, the links between organizational transformation and anticipatory action remain poorly theorized. Successful organizational transformation requires a combination of preemption, preparedness and precaution, three different kinds of anticipatory action (Anderson, 2010, pp. 777–778). However, in the context of organizational transformation, preemption, preparedness and precaution are all united by "a seemingly paradoxical process whereby a future becomes cause and justification for some form of action in the here and now" (Anderson, 2010, p. 778). Linking anticipatory actions to organizational transformation requires a deeper understanding of how managers involved in organizational transformation relate to 'the future' and how are such futures 'known' and rendered actionable to thereafter be acted upon?

In sum, by integrating prior research on CF, anticipatory action and organizational transformation, we highlight how CF must deal with "state", "effect" and "response" uncertainties inherent within organizational transformation. This, calls into question, the experience of 'individuals' driving organizational transformation and the anticipatory actions (preemption, preparedness and precaution) they use to drive organizational transformation. Missing from this puzzle are the practices that give content to specific futures and the processes through which action in the present is enacted.

2.4. Summary

Overall, our review establishes the need for three theoretical shifts. One, a shift from conceptualizing CF as something organizations *have* to an ongoing accomplishment derived from something people *do*. Two, a shift from anticipation as "body of knowledge" (Miller et al., 2018, p. 54) to a skilful "future-making" practice. Three, a shift from an "organizational level" of analysis to analysis of individual practices and mechanisms that underlie and shape CF enactment for organizational transformation. These shifts support the "need for critical sensemaking of complex phenomena, including currently prevailing ideas of the future" (Minkkinen et al., 2019, p. 11). There is, however, little empirical evidence outlining how CF, in circumstances of technology driven organizational transformation, is enacted using "future-making" practices. So *how do organizations undergoing technology driven transformation enact corporate foresight using distinct "future-making" practices*?

3. Methodology

3.1. Context and company background

Given the paucity of theoretical knowledge linking CF, future-making and organizational transformation, we opted for a theory-building process research methodology. Such a methodology allows us to theorize the dynamics of CF enactment from the emerging data (Berends and Deken, 2021; Cloutier and Langley, 2020; Langley et al., 2013; Pettigrew, 1997). In order to empirically unravel the underlying dynamics of CF enactment that plays out over time, we undertook a 20 month long longitudinal field study with ProRail B.V. (henceforth ProRail). ProRail is a Dutch organization solely responsible for the management of rail infrastructure, railway capacity allocation, and rail traffic control in the Netherlands. ProRail was formed in January 2003 by merging NS Railinfrabeheer Ltd., Railverkeersleiding Ltd. and Railned Ltd. The merger aimed to simplify railway operations, drive efficiency and improve rail safety within Netherlands.

Our CF project was part of an organization-wide change management programme, initiated by ProRail, called "ProRail – Right on

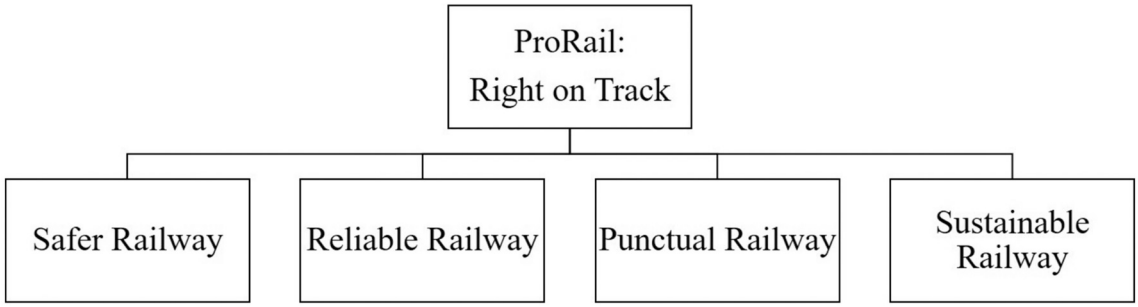

Fig. 1. Four strategic ambitions of the ProRail-Right on Track programme.

Track". This change management programme had four strategic ambitions which are summarised in Fig. 1 (below).

The four strategic ambitions listed in Fig. 1 were further distilled into seven work packages which included: (i) 'Increasing safety'; (ii) 'Lean – customizable and improving continuously'; (iii) 'Robust and punctual rail network'; (iv) 'More train capacity'; (v) 'More innovative and sustainable'; (vi) 'Results-driven and cost conscious' (as government subsidies were being reduced over time) and (vii) 'Adequate scenarios for the future'. Of these work packages, the first six packages were internally driven within ProRail whereas the seventh work package was designed as a CF project to support the first six work packages. '*Adequate scenarios for the future*' aimed to make ProRail more externally focused by becoming proactive in recognising and responding to factors driving change in their contextual environment [Source: Internal ProRail document]. This project was ProRail's first brush with corporate foresight development. It was intended to help ProRail's management team go beyond their traditional 1-to-2-year planning horizon and imagine the impact of information communication technology (henceforth ICT) driven transformation on rail transportation, ten years into the future.

3.2. Corporate foresight activities and scenario planning workshops

ProRail invited a world-renowned scenario planning expert to assist and facilitate the "*Adequate scenarios for the future*" project. The aim of this project was to bring "the outside in" and organize "a strategic conversation, understanding future scenarios shared and lived through with our surroundings" (source: internal ProRail document). Since this was ProRail's first engagement with scenario planning, one of the authors was invited to join the scenario planning expert and study this CF project as an in vivo researcher. This separation in roles between the facilitator and researcher allowed us to simultaneously maintain both 'field proximity' - a key "tenet of qualitative inquiry" and 'professional distance' – "required to avoid 'contamination' of findings" (Langley and Klag, 2019, p. 515). The timeline listing the various corporate foresight project activities are chronologically summarised in Fig. 2 (below). As the timeline suggests, we used a process research methodology capable of capturing both *actions* and *reflections* of the participants within the CF process.

At the outset of the research project there were several meetings with representatives of the senior management project board to discuss the nature and possibility of using the scenario process to help them explore the future of railways and transportation, and future modes of travel and work – 'Adequate scenarios for the future'. The attendees then engaged in a short exploratory hands-on experience of the scenario process, to help them develop an understanding of how scenarios work in practice. This exercise unearthed seven major concerns including: "Ability to utilise data to manage operations", "Degree of automation and control in the future", "Involvement of the Dutch Government", "Availability of Computing Power", "Development of population and modalities", and "Ability to respond to calamities".

The participants then selected "Degree of automation and control in the future" and "Ability to utilise data to manage operations" to structure the set of scenarios. A key insight for the participants was the level of complexity and uncertainty involved in adopting a data-driven approach for transportation planning. This insight is captured in the interaction below where the participants noted:

> Director Asset Management: "People are reluctant to use the information that the system is generating."
>
> Director of Strategy: "ICT is moving to high-speed using less networks."
>
> Director ICT: "I now realise that there are many potential unintended consequences of using data for prediction."

To get a 'grip' on the complexity and uncertainty involved in organizational transformation, top executives from ProRail (see Table 1) participated in a two-day CF workshop. Their two most pressing business concerns were: "*Ability to utilise data to manage operations*" and

Fig. 2. Timeline for the 'Adequate scenarios for the Future' project.

Table 1
Data sources and research methods.

Serial no	Format	Agenda	Participants	Duration	Data source
1	Meeting: CF work package requirements	To gather background information about the ProRail change management programme and outline "*Adequate scenarios for the future*" project.	• Director of Strategy • Programme Manager • Project Liaison Officer	Two Hours	• Participant Observation • In-situ notes of conversation
2	Meeting: CF Programme Board	Outline activities involved in the CF process including a short hands-on practical exercise in developing scenarios	• Director of ICT • Director of Strategy • Programme manager • Director Asset Management • Innovation and Sustainability Manager • Capacity Manager • Change Management Manager • Information Policy Manager • Project Liaison Officer	Half a Day	• Participant Observation • In-situ notes of conversation
3	Interviews: Individual one-on-one interviews with participating managers	To understand the individual's key concerns, expectations and possibilities	• Chief Executive Officer • Financial Director • Human Resources Director • Operations Director • Projects Director • Traffic Control Director • Asset Management Director • Director of Strategy • Programme Manager ICT • Programme Manager Lean • Programme Manager for CF project • Manager Capacity Management • Managing Director of project development and realisation • Managing Director Stations • Account Director Passenger Carriers • Account Director Freight Carriers • Managing Director ICT • Manager Innovation and Sustainability • Representative from 'Young ProRail' • Interim Director of Communications • Manager Procurement • Head of Workers Union • Programme Manager for Capacity Management	Each of the 23 one-on-one interviews lasted between 90 min and 120 min.	• Interview Transcripts
4	Meeting: CF Workshop preparation with Programme Board	Exploring concerns about the CF project prior to the scenario workshop	• Director of Strategy • Programme Manager • Project Liaison Officer	One Day	• Participant Observation • In-situ notes of conversation
5	Workshop: Interview Feedback	Thematic Presentation of the integrated interview data	• Chief Executive Officer • Financial Director • Human Resources Director • Operations Director • Projects Director • Traffic Control Director • Asset Management Director • Director of Strategy • Programme Manager ICT • Programme Manager Lean • Programme Manager for CF project • Manager Capacity Management • Managing Director of project development and realisation • Managing Director Stations • Account Director Passenger Carriers	One Day	• Participant Observation • In-situ notes of conversation • Record of critical incidents

(*continued on next page*)

Table 1 (*continued*)

Serial no	Format	Agenda	Participants	Duration	Data source
			• Account Director Freight Carriers • Managing Director ICT • Manager Innovation and Sustainability • Representative from 'Young ProRail' • Interim Director of Communications • Manager Procurement • Head of Workers Union • Programme Manager for Capacity Management		
6	Workshop: CF Scenarios	Develop a set of scenarios for CF based on the inputs from the Interview Feedback Workshop	• Chief Executive Officer • Financial Director • Human Resources Director • Operations Director • Projects Director • Traffic Control Director • Asset Management Director • Director of Strategy • Programme Manager ICT • Programme Manager Lean • Programme Manager for CF project • Manager Capacity Management • Managing Director of project development and realisation • Managing Director Stations • Account Director Passenger Carriers • Account Director Freight Carriers • Managing Director ICT • Manager Innovation and Sustainability • Representative from 'Young ProRail' • Interim Director of Communications • Manager Procurement • Head of Workers Union • Programme Manager for Capacity Management	Two Days	• Participant Observation • In-situ notes of conversation • Record of critical incidents
7	Meeting: Scenarios Implication and Feedback	To explore and confirm insights from the scenario building workshop	• Director of ICT • Director of Strategy • Director Asset Management • Innovation and Sustainability Manager • Capacity Manager • Change Management Manager • Information Policy Manager • Project Liaison Officer	One Day	• Participant Observation • In-situ notes of conversation • Record of critical incidents
8	Meeting: CF Report discussion with ProRail Board of Directors	Finalise the Report findings and key message	• Director of Strategy • Managing Director ICT • Human Resources Director • Director Asset Management • Capacity Manager • Programme Manager • Project Liaison Officer	One Day	• Participant Observation • In-situ notes of conversation • Record of critical incidents

"*Degree of automation and control in the future*". A scenarios approach was used to stimulate their CF development process. This resulted in a set of four scenarios that are captured in Fig. 3 (below).

As Fig. 3 indicates, the executives were generally aware of the challenges posed by rapidly advancing information communication technologies (ICT) on their ability to use data within ProRail's current operations. However, they were unsure about what their response to this challenge should be? Should they be developing and deploying ICT to lead change and transformation within ProRail? Or should they merely be integrating ICT into the business on a need-to-need basis? Put differently, should the organizational transformation be ICT driven? Or should ICT still be regarded as a mere support function within organizational transformation?

Trust in data was key as participants began to understand the complexity of an ICT enabled data driven approach to organizational transformation. This dilemma is represented on the Y-axis in Fig. 3. The

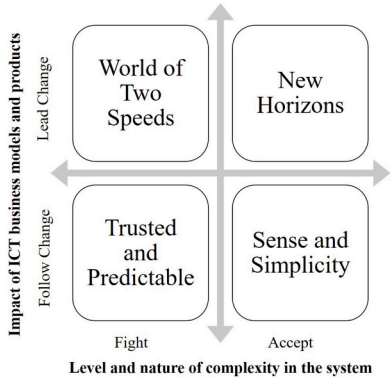

Fig. 3. Scenarios for corporate foresight.

challenges posed by automation and control systems are reflected on the X-axis in Fig. 3. Here, the executives were unsure about what to do about the emerging complexity posed by such technologies. Should they accept this complexity and work with it? Or should they fight and tame this complexity? These dilemmas resulted in the four scenarios presented in Fig. 3.

Scenario 1 was headlined "New Horizons". In this scenario, executives would accept and embrace the emerging complexity that results from advances in automation and control. They would then use ICT to lead change and transformation within ProRail. In Scenario 2, headlined "World of Two Speeds", executives would fight and suppress the automation and control driven complexity while still using ICT to lead change and transformation. Scenario 3 was titled "Trusted and Predictable". The aim here was to continue with ProRail's business as usual outlook. Here the business would continue to exploit its existing ICT and automation and control infrastructure which, some executives felt, was working just fine. In Scenario 4 titled "Sense and Simplicity", ProRail would need to invest in new automation and control capabilities to modernise their rail infrastructure. However, they would take a more conservative approach towards ICT. ICT was primarily viewed as a business support technology for sustaining existing operations rather than transforming them. It was the conversations among ProRail executives as they debated these four scenarios that enabled us to unearth two distinct modes of "future-making" practices: *blueprinting* and *wayfinding*.

3.3. Data sources and research methods

The data for this study was collected from three formats: meetings, one-on-one interviews and workshops. In total, we were able to gather information from five meetings, twenty-three one-on-one interviews and two workshops. The details of these data sources and corresponding research methods are summarised in Table 1 (below).

As Table 1 reveals, in-situ participant observations, interviews and recording of critical incidents were the key data gathering research methods. Critical incidents were noted, captured, tracked and discussed with key informants (Hartley, 1994; Pettigrew, 1985; Flanagan, 1954; Chell, 1998; Burgess, 1991; Webb, 1991). Participant observation, here, refers not to *seeing what is 'out there'* but rather to "*watch what is going on*" (Ingold, 2011, p. 233 our emphasis). In other words, this was a study *with* participants rather than a study *of* participants (MacKay et al., 2021). Our participant observation was therefore 'in situ' and over time as we aimed to understand how the ProRail participants engaged with the scenario process to enact CF. 'In situ' refers to the situatedness of the researcher within the empirical flux of the complex social phenomena under investigation.

This situatedness is of paramount importance within process research because researchers are required to develop an intellectual sympathy while following the 'actions' and 'reflections' of the participants as they unfold in real time. In other words, we did not merely capture retrospective data on CF generation by attending episodic meetings or solely relying on interviews of participants. This real time note taking and recording allowed us to maintain the "temporal connectedness" of data (Berends and Deken, 2021; Pettigrew,

Table 2
List of 'critical' incidents at ProRail.

Critical Incident (CI) number	Incident
CI 1	Tensions between participants about the time horizon of the planned transformation
CI 2	Dilemma balancing short versus long term priorities within the transformation
CI 3	Tensions between desire for continuity and desire for change within transformation
CI 4	Challenges balancing internal versus external concerns within the transformation
CI 5	Lack of consensus on the 'mindsets' required to drive transformation
CI 6	Debates on the relevance of the 'present' on the 'future' of ProRail
CI 7	Breakdown in what 'transformation' means for ProRail
CI 8	Recognition of 'inward' organizational focus and lack of 'external' awareness
CI 9	Awareness of a lack of focus on 'drivers of change'
CI 10	Emergence of technology related "effect" uncertainty on transformation
CI 11	Awareness about technology related "response" uncertainty on transformation
CI 12	Recognition of individual skill gaps required to drive transformation
CI 13	Uncertainty over the role of the government in organizational transformation
CI 14	Divergent participant views on the role of railways in Netherlands
CI 15	Surfacing of "state" uncertainty within transformation
CI 16	Evaluation of the ProRail "asset base" for building new capabilities
CI 17	Surfacing of challenges in managerial receptivity to new ideas
CI 18	Defensiveness and push back among several participants to new ideas
CI 19	Tension between need for control and need for adaptability during transformation
CI 20	Focus on the role of technology in current task constraints within ProRail
CI 21	Awareness of the impact of technology evolution on task constraints within ProRail
CI 22	Tension between enumerating trends to 'optimize' the future and imagining future 'contingencies'
CI 23	Dilemma between the pursuit of a 'preemptive' versus 'preparedness' strategy for transformation
CI 24	Awareness of challenges to a 'preemptive' strategy during transformation
CI 25	Awareness building on alternative approaches to 'preemption'
CI 26	Debate on how this organizational transformation relates to the 'past' and 'present'
CI 27	Reengagement with 'drivers of change'
CI 28	Cultivation of precaution for managing organizational transformation
CI 29	Surfacing of the need for preparedness to deal with organizational change
CI 30	Mutual exploration of 'future' uncertainties among participants
CI 31	Awareness of the limits of 'control' over transformation
CI 32	Tension between improving prespecified dimensions of performance or redefining what performance might mean in the context of organizational transformation
CI 33	Emergence of self-reflection among participants
CI 34	Tension between accountability and flexibility while driving transformation
CI 35	Need to balance continuity and change while transforming
CI 36	Recognising the need to synthesize 'preemption', 'precaution' and 'preparedness' for transformation.

1990) while capturing the possibilities, dilemmas, incoherence and contradictions discussed (for later analysis) and decisions taken throughout the data gathering period.

We complemented our participant observation with twenty-three one on one interviews with top executives at ProRail (see Table 1). The aim was to capture the unique richness of their lived experience with the potential to generate information on CF that is novel and insightful (Whittle and Reissner, 2025; Ma et al., 2021; Langley and Meziani, 2020). We captured interview data that is both rich "in terms of its breadth and depth in capturing interviewees' experiences, perspectives, and related contexts" and authentic, that is, the information is reliable and genuine (Ma et al., 2021, p. 83). Each individual was invited to disclose a future where their concerns and uncertainties developed into favourable and unfavourable outcomes for ProRail. These interviews provided an opportunity to "understand individual managers' concerns, issues and foci of attention when contemplating the future of the organisation" (Burt et al., 2017, p. 19).

The "critical incident technique" (Flanagan, 1954, p. 327) which relies on direct observations of human behaviour was also used to gather data. We asked participants to focus on certain specific incidents within the scenarios and CF process with a view to "capturing practitioners' behaviours in concrete situations" (Langley and Meziani, 2020, p. 376). In total, we identified thirty-six critical incidents which are summarised in Table 2 (below).

At each stage of this project, the key issues were summarised and presented back to the participants for feedback. This process allowed us to validate the accuracy of the data that we captured. It also offered our participants and key informants, an opportunity for 'reflection'. Wherever applicable, they provided us with further clarification and a refined understanding on some issues. Overall, capturing data using participant observation, interviews and critical incidents allowed us to develop a deeper and fuller conceptualizations of CF activities at ProRail. All the gathered data was recorded verbatim and fully transcribed prior to data analysis.

3.4. Data analysis

Analysis from the one-on-one interviews revealed eight major themes: Geo-politics (1 page); Demographics (1 page); Socio-cultural factors (2 page); Mobility in the Netherlands (5 pages); ProRail Offering (14 pages); Operations (8 pages); Vision in ProRail (34 pages). These themes were then presented to the top executives at ProRail for validation and to obtain their feedback before the scenario workshop. This step allowed us to capture the reflections of the participants prior to the CF workshop. After the completion of all the activities listed on the Timeline (see Fig. 2), we then developed an event chronology to 'descriptively' integrate data from our participant observations, interviews and critical incidents.

In order to transition from description to data analysis, we used "abductive reasoning" (Sætre and Van de Ven, 2021, p. 684) involving the following steps. First, we used a narrative strategy to develop "a detailed story from the raw data" (Langley, 1999, p. 625). Developing the narrative allowed us to observe anomalies within CF enactment at ProRail where participants appeared to confront each other and debate contradictory perspectives. Second, in order to confirm these anomalies, we analysed the narrative more substantially to "captures temporal sequences and connections within the narrative" (Lerman et al., 2022, p. 288). This step allowed us to identify thirty-six critical incidents (summarised in Table 2) within the CF process. Third, to generate and evaluate hunches that may explain our observed anomalies, we undertook *temporal bracketing* of our data. Temporal bracketing allowed us to compress and transform "a mass of process data" into "a series of more discrete but connected blocks" (Langley, 1999, p. 703). The term *bracketing* reflects the nonlinear and recursive relationship between actions and structure over time where these brackets act as units of analysis for replicating the emerging theoretical hunch (Lerman et al., 2022). Four, we than began coding the 'empirical threads' within each bracket to identify patterns within the temporal brackets. During data analysis, we first moved from the raw temporally bracketed empirical data to theoretically informed first order codes (see Fig. 4). Five, we then

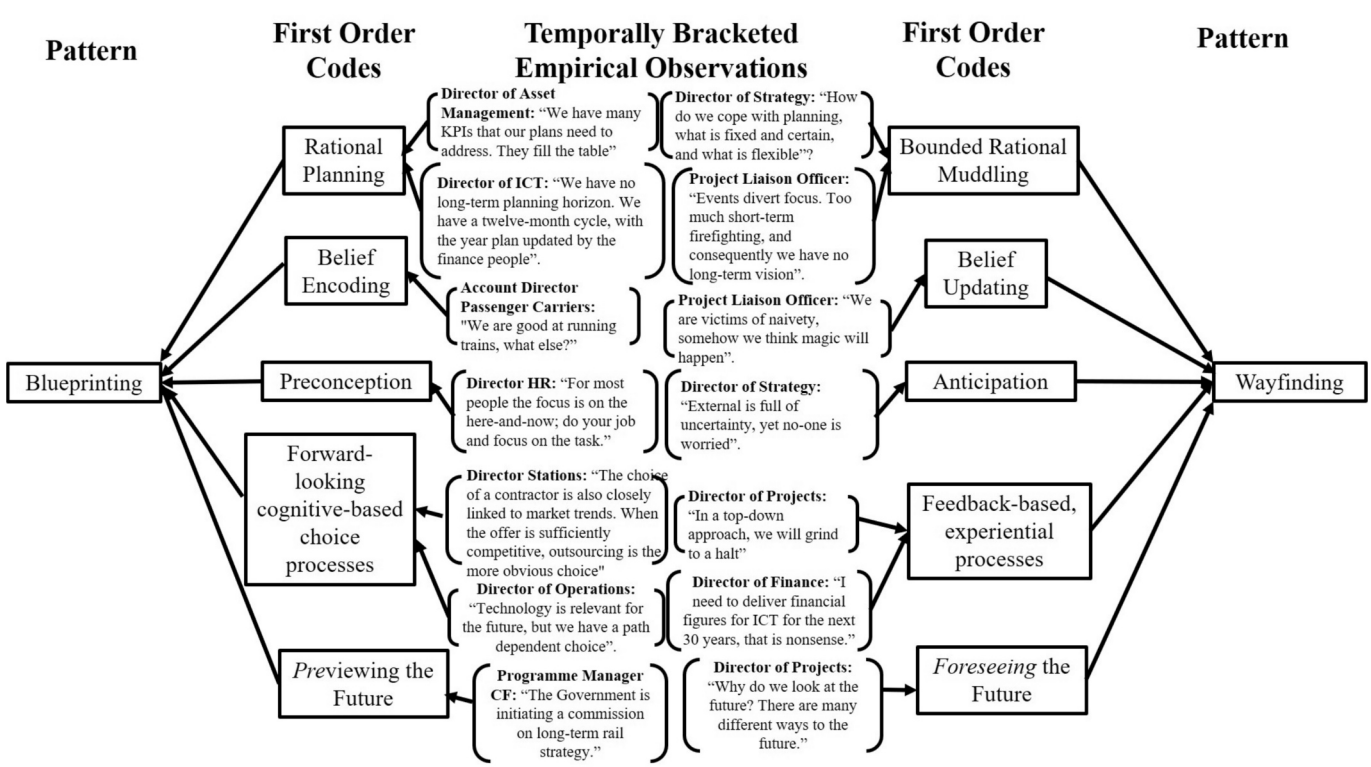

Fig. 4. Data structure diagram.

Table 3
Data structure table for blueprinting.

Illustrative quotes from empirical data	First order codes	Patterns/modes of practice
Director Asset Management: "*We have many KPIs (Key Performance Indicators) that our plans need to address. They fill the table*".	Rational Planning	Blueprinting
Director Stations: "*We think demographics and migration and build stations here and there*".		
Interim Director of Communications: "*That's striking, but that's the way it is. Image experts' analyses confirm this. Utility companies inherently have a poorer image than companies that have direct customer contact. Whatever happens, ProRail has always done so. Even though the truth is often much more nuanced.*"	Belief Encoding	
Account Director Passenger Carriers: "*We are good at running trains; what else?*"		
Director Human Resources: "*For most people the focus is on the here-and-now; do your job and focus on the task*".	Preconception	
Director Information and Communication Technology (ICT): "*Technically, I do not see much trouble. There is not much to be developed. We need to go slow into the future. In the timing of projects, I see a risk of a lack of investment*".		
Director of Operations: "*Availability [of our operating system] must be high and at the same time it must be possible to change. It is not an issue of choice between change and the same as our system needs to handle both. We are not really doing that now*".	Forward-looking cognitive-based choice processes	
Programme Manager Corporate Foresight: "*We need to consider splitting ICT into two activities. First, database activities and data management. Second, understanding users and how they engage with apps. This will allow us to clarify our project choices*".		
Programme Manager Corporate Foresight: "The Government is initiating a commission to outline a long-term rail strategy."	*Pre*viewing the Future	
Director of Operations: "If we follow the internal ICT project scale and scope, then we can create a blueprint for our future".		

Table 4
Data structure table for wayfinding.

Illustrative quotes from empirical data	First order codes	Patterns/modes of practice
Project Liaison Officer: "*Events divert focus. Too much short-term firefighting, and consequently we have no long-term vision*".	Bounded Rational Muddling	Wayfinding
Managing Director Project Development and Realisation: "*A planning discussion does not interest me at all. It just does not matter! In all cases, a logistic puzzle needs solving: a red coat, blue coat, yellow box and a green pit all need to be present at the same time. Just do your job. This is the best guarantee that nothing happens to you*".		
Project Liaison Officer: "*We are victims of naivety. Somehow we think magic will happen*".	Belief Updating	
Director of Strategy: "*We need different filters on our glasses. We need to think system change rather than spend money and build more*".		
Director Traffic Control: "*The plan restricts us in the end. It is a phase in which we are heading towards, driving and managing more punctually. The next step is daring to let the plan go*".	Anticipation	
Director of Finance: "*We need to think about economic value and not apologise for investment request. Our systems would need to be based on real-time information flows, rather than electric power information*".		
Director of Projects: "*In a top-down approach, we will grind to a halt*".	Feedback-based, experiential processes	
Director of Finance: "*I need to deliver financial figures for Information Communication Technology (ICT) for the next 30 years; that is nonsense!*".		
Director of Projects: "*Why do we look at the future? There are many different ways to the future*".	*Foreseeing* the future	
Chief Executive Officer: "*It looks as though we sense that things are developing faster and faster and that if we want to keep up, we have to organize things differently and approach ICT differently*"		

explored the temporal connectedness between these first order codes. This allowed us to deliberate further and make the "conceptual leap" (Klag and Langley, 2013) towards identifying the overarching patterns within CF enactment. Since the actions and reflections captured in our data were *observed rather than assumed*, we can empirically establish the modes of CF enactment from scenarios. Our abductive, iterative data coding and data analysis process is summarised as a data structure diagram in Fig. 4 (below).

4. Findings and analysis

In this section, we present and explore our findings, including our CF enactment patterns in more detail. Specifically, we find that the prevalence of 'state', 'effect' and 'response' uncertainty within organizational transformation leads to two modes of CF enactment that we call '*blueprinting*' and '*wayfinding*'. Blueprinting is a response to 'state' uncertainty and is defined as enactment of state descriptions that characterise a future world, as sensed by the participants, from CF exercises (Simon, 1962). Blueprints provide participants with the criteria for working out, in broad outline, the things that need to be done to realise a desired future state. The blueprinting mode of CF enactment involves rational planning, belief encoding (Kapoor and Wilde, 2023), pre-conception and forward-looking cognitive-based choice processes (Gavetti and Levinthal, 2000) that allow participants to *pre*view the future. Further evidence for '*blueprinting*' can be found in Table 3 (below).

Wayfinding, by contrast, is a response to 'effect' and 'response' uncertainty and can be defined as bringing the future into being by following a path of life where participants negotiate or improvise a passage as they go along (Ingold, 2010). In their movement, as in life, their "concern is to seek a way through: not to reach a specific destination or terminus but to keep on going" (Ingold, 2010, p. S126). Wayfinders, as they move along into the future, have to continually *attend* to their path, adjusting or 'fine-tuning' their actions as their journey unfolds. The wayfinding mode of CF enactment involves bounded rational muddling, belief updating (Kapoor and Wilde, 2023), anticipation and feedback based experiential processes (Gavetti and

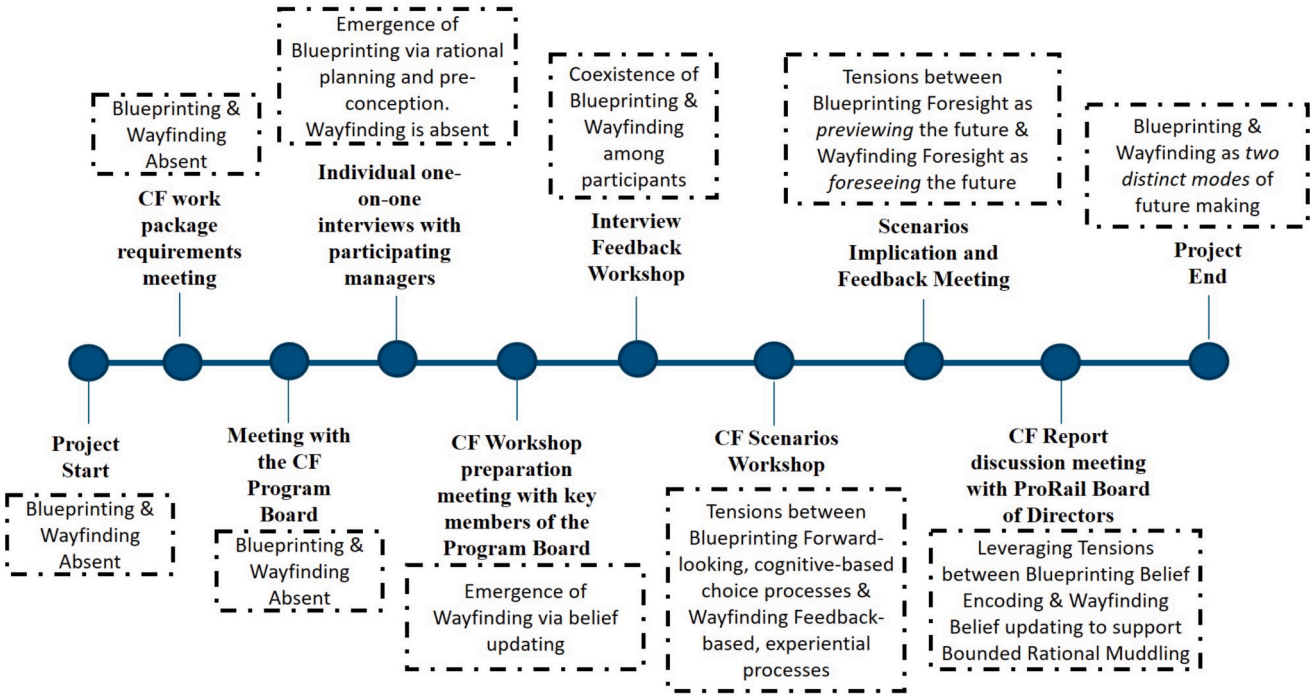

Fig. 5. Emergence and evolution of 'Blueprinting' and 'Wayfinding' in corporate foresight development.

Table 5
Approaching the 'future': blueprinting, wayfinding and corporate foresight.

Blueprinting practices	Wayfinding practices
Rational planning	Bounded Rational Muddling
Belief Encoding	Belief Updating
Pre-conception	Anticipation
Forward-looking cognitive-based choice processes	Feedback-based, experiential processes
Foresight as *previewing* the future	Foresight as *foreseeing* the future

Levinthal, 2000) that allow participants to *foresee* the future. Further evidence for '*wayfinding*' can be found in Table 4 (below).

The emergence and evolution of 'blueprinting' and 'wayfinding' as two distinct modes of future making are visually summarised in Fig. 5 (below). It is important to note that these two modes of future making were participant specific and independent of different hierarchical levels at ProRail. Simply put, 'blueprinters' and 'wayfinders' could co-exist at any hierarchical level and the "future-making" practices associated with these modes manifest '*alongly*' (MacKay et al., 2021, p. 1350) *in* corporate foresight exercises. The differences between these two modes of "future-making" practices are summarised in Table 5 (below).

Following this preamble, we now demonstrate the blueprinting and wayfinding modes of CF enactment. We have developed a process model to visually summarise the blueprinting and wayfinding modes of CF enactment. This process model can be found in Fig. 6 (below).

The sections that follow explore, in turn, each component of our process-model. By displaying our model up-front, we intend to guide the readers through each of the future-making practices that we observed within *blueprinting* and *wayfinding*.

4.1. Uncertainty, scenarios and corporate foresight

One of the first anomalies that we observed during the CF exercise was the tension among participants with one group desiring continuity and the other desiring change as the basis for organizational transformation. For instance, consider the following remark by the CEO who was a wayfinder.

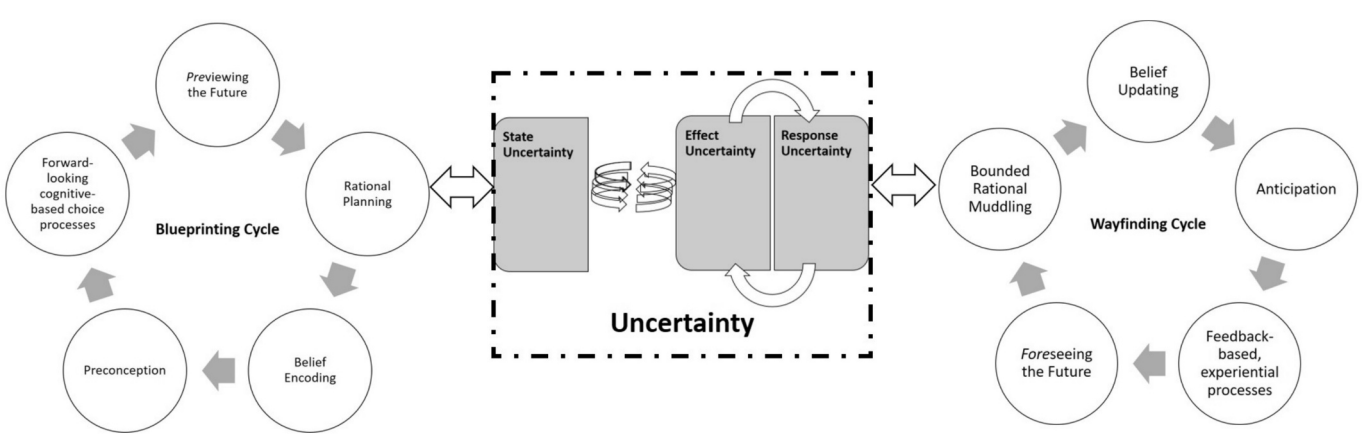

Fig. 6. Process model - corporate foresight and "future making" practices.

Chief Executive Officer: "I do not want to go back in time with terms such as, everything was better in the past; sticking too long to structure discussions without bringing our problems to life."

Her statement suggests that she believes transformation at ProRail will be shaped by discontinuous drivers of change. Therefore, she is no longer interested in "state uncertainty" because she has realised that "sticking too long" with state uncertainty will inevitably lead to ProRail's failure when it matters the most, i.e. when the rules of competition are going to shift sharply in the future. Her desire to bring "problems" to life discloses her inclination towards exploring "effect" and "response" uncertainty. In contrast, consider the following quote from the Director of Operations who was a blueprinter:

Director of Operations: "No lack of questioning the fundamentals of ProRail, yet the dream scenarios differ."

His remark suggests that he is ambivalent about the change drivers. Therefore, he is more concerned about "state uncertainty" because for him organizational transformation is linked to a destination – a dream scenario that needs to be defined prior to action. By "questioning the fundamentals", he is attempting to perceive the likely evolution of change drivers and its continuity within the transformation process. This tension between "state" uncertainty on one hand and "effect" and "response" uncertainty on the other is well articulated by the Director of Strategy when he observes:

Director of Strategy: "It is very interesting to hear the stories from the top management team. They talk, once in a while, specific topics, but not a full story of their vision of the future".

The "full story", at the very least, requires awareness building on the impact of state, effect and response uncertainties on organizational transformation at ProRail. In the absence of such awareness building, the blueprinters and wayfinders used contrasting practices to produce and enact CF.

4.2. Rational planning versus bounded rational muddling

When confronted with the uncertainties presented by the four scenarios, a sub-group of ProRail executives reacted by focusing on "state" uncertainty and resorted to *rational planning*, while the other sub-group focussed on "effect" and "response" uncertainty by embracing a *bounded rational muddling* approach. The blueprinters within the group expressed their uneasiness about the 'lack of clarity' about the transformation and resorted to rational planning. For example, consider the following quote from the Programme Manager for Corporate Foresight who was a blueprinter:

Programme Manager for Corporate Foresight: "One of the most important milestones for the project was the use of the BOB-Model. In particular, establishing the first two phases [picture formation and judgement formation] for understanding transformation required a lot of effort from the whole team".

His remark points to the valuable role that a structured decision-making process, like the Dutch BOB Model, plays within ProRail. The BOB model which involves 'picture formation', 'judgment formation' and 'decision making' was applied to provide participants with a common view of the situation. As the manager's comment suggests, the picture formation and judgment formation phases helped the sub-group to handle the "state uncertainty" impacting transformation. This is also evident in the remarks made by the Account Director for Passenger Carriers who also turned out to be a blueprinter:

Account Director Passenger Carriers: "ProRail, often in collaboration with carriers, is developing new plans to further optimize the utilization of the rail network and further improve reliability and punctuality. The essence of safety, reliability, energy sustainability, punctuality, that is the execution of the plan."

As the above conversation reveals, this sub-group of '*Blueprinter*' executives wanted a long-term plan for the future before they could commit to action. The 'plan' here refers to a document outlining the conscious intention of where ProRail intended to go completed with an articulated and integrated set of decisions, or intended actions that specify in advance what to do, how to do it, when to do it, and who is to do it. The 'future' for them is a destination; a future state of affairs. Rational planning allows them to impose 'form' on this future for "the sake of both coordination internally and surveillance by those around it" (Mintzberg, 1981, pp. 322–323).

In contrast to rational planning, the '*Wayfinding*' executives seemed less perturbed by the lack of clarity about the 'future'. In fact, consider the following candid remark by the CEO, who was a wayfinder, on the futility of rational planning:

Chief Executive Officer: "I have a clear timetable for what I want to do and where I want to go: my own schedule. That timetable sometimes gets completely disrupted. No two days are the same, and no two days are predictable. That demands a lot of flexibility not only from my own side, but also from my team".

The CEO statement points to the inherent contradictions of 'planned' transformation. She perceives change as continuous rather than episodic requiring ongoing improvisation. Therefore, even when structures like 'a clear time table' are imposed on her job, she recognises that such structures are prone to disruption during organizational transformation. This wayfinding mode of CF future making also resonates with the Director of Strategy. According to him:

Director of Strategy: "We are responsible for the upkeep of the rail network system. We receive a three-year licence. How do we cope with planning, what is fixed and certain, and what is flexible? Our DNA is to improve the system".

The Director of Strategy's comments reflect the wider caution expressed by '*wayfinders*' who view their future making roles as an ongoing 'journey' rather than as a 'destination'. Hence, his reference to 'DNA' and 'improving the system' because, as a wayfinder, for him organizational transformation "never starts because it never stops" (Weick and Quinn, 1999, p. 381).

Rather than being short-term and reactive, these *bounded-rational muddlers* see themselves as adaptive information-manipulators who prefer the live, concrete situation in contrast to speculating about the future of ProRail. They recognise that accurate long-term forecasting and rigid timetables over multiple years, a requirement for rationally planning the 'dream scenario', is an increasingly challenging, if not impossible task. Hence, their preference to enact the 'future' on the go by manoeuvring informally and flexibly.

In sum, *rational planning* and *bounded-rational muddling* represent two contrasting practices that executives use while facing future situations that they can only dimly perceive. Rational planners attempt to blueprint the future by making the planning process the inexorable output of a methodology where all actions are specified in advance. Bounded rational muddlers, by contrast, trying to cope imaginatively with the future. Since they can neither plan to the fullest possible extent, nor think of everything, they try to look at a relevant range of possibilities, remembering the importance of examining possibilities which maybe relatively unlikely, but which would be especially catastrophic or desirable if they occurred. It is in this sense that they "*"plan" for muddling*" (Kahn, 1963, p. 4 our emphasis).

4.3. Belief encoding versus belief updating

We observed belief encoding and belief updating as characteristics distinct to the '*blueprinters*' and '*wayfinders*' respectively. For example, consider the following remark made by the Director of Asset Management, a blueprinter, who was tasked with improving rail maintenance at ProRail. According to him:

Director of Asset Management: "I believe that efficiency and effectiveness can be improved by giving contractors more scope for professional development and encouraging them to innovate. We can use the Performance-Based Maintenance (PBM) contract model for this purpose".

The above remark reveals how the '*blueprinters*', attempt to encode their existing beliefs into their future '*blueprints*'. The use of PBM contracts allows the Director of Asset Management to encode his desired performance beliefs about efficiency and effectiveness, such as fewer disruptions, increased punctuality, or a more sustainable track, while the contractor decides which expertise and methods to employ to achieve the set goals. This would allow ProRail to transition from their current maintenance operations where the maintenance work to be performed was specified.

Another instance of belief encoding was observed during a discussion on increasing capacity at ProRail. As demand for capacity on the Dutch railway network continues to grow, ProRail wanted to increase capacity partly by making smarter use of existing tracks to allow more passenger and freight trains to run, and partly in infrastructure adjustments. Here, further evidence of belief encoding was observed in remarks made by the Director of ICT who aligned himself to the 'blueprinting' camp.

Director ICT: "We need to stay in control of information communication technology (ICT). One of ProRail's core tasks is allocating capacity on the railways. The goal is to use ICT to achieve a conflict-free timetable, where as many requests as possible are honored".

Here the ICT Director is attempting to encode the belief that control over ICT is vital for making the rail-network smarter. Doing so will allow ProRail to optimize time-tabling and squeeze in more passenger and freight trains. Control over ICT is key to realising this goal. Both examples demonstrate how belief-encoding incorporates new information about emerging 'future concerns' to support the rational planning initiated by the 'blueprinters'.

For the wayfinders, by contrast, there was a realisation that 'current' concerns will not be 'future' concerns. This is reflected in the observation made by the Managing Director of Project Development and Realisation who was aligned with the wayfinders:

Managing Director of Project Development and Realisation: "Rethinking how we plan rail maintenance and construction work is critical to sustaining future freight and passenger services. It really was a good thing to bring these insights (from scenario planning) on board. They bring fresh thinking and clear analysis to complex problems. When we combine our sector knowledge and skills with these insights, we get great results".

The above statement offers evidence for 'belief updating' where 'rethinking', 'fresh thinking' and 'clear analysis' are all challenging prevailing assumptions within ProRail on how the future will unfold. Another instance of 'belief updating' can be found in the remarks made by the Director of Traffic Control:

Director of Traffic Control: "The 1.9% outage rate on the main rail network exceeds the 1.5% target. The decision to minimize customer disruption, such as with adjusted timetables, is leading to more outages".

The above statement suggests that the Director of Traffic Control has discovered an anomaly in ProRail's belief in the use of ICT to minimize customer disruption actually having the opposite effect. This discovery has forced him to re-examine and update his beliefs about ICT driven optimization and outage rates.

Overall, these examples reveal how the '*wayfinders*' were constantly updating their beliefs based on evolving effect and response uncertainty at ProRail. As the Director of Strategy remarked, "*We talk about different 'ProRails' but we do not talk about different worlds that ProRail might live in*". By taking into consideration the '*different worlds that ProRail might live in*', wayfinders acknowledge that over time, new information on technology improvement, regulation or competition will become available that might change what customers want or redefine what 'performance' means. They voluntarily draw upon this new information "as a basis for updating their beliefs about the industry's evolutionary trajectory" (Kapoor and Wilde, 2023, pp. 706–707) that gets reflected in the updated enactments of 'futures'. Belief updating, therefore, allows them to synchronise their cognition with foresight as they approach the 'future'.

To summarise, belief encoding and belief updating represent two contrasting CF enactment practices that we encountered at ProRail. Belief encoding refers to the reinforcement and extrapolation of existing beliefs into the future. Belief updating, on the other hand, entails several cognitively demanding mental activities that alert participants to new information over time while enabling them to assess its relevance to their specific industry context (Kapoor and Wilde, 2023).

4.4. Pre-conception versus anticipation

Given their faith in rational planning and belief encoding, the blueprinters we observed liked to pre-conceive alternate possible futures prior to developing their blueprints. Pre-conception here can be understood as "prospection of the future through the development of imaginaries of future states of the world" (Beckert, 2021, p. 1). Wayfinders, on the other hand, relied on anticipation, which is part and parcel of keeping attuned to the movement of the unfolding situations within the scenarios process to which an individual contributes (Van Dijk and Rietveld, 2021, p. 349). An example for how blueprinters use pre-conception in future making can be found the following statement made by ProRail's Programme Manager for ICT when talking about a new traffic control system to allow ProRail's traffic controllers to effectively and promptly adjust train traffic when disruptions and emergencies occur.

Programme Manager for ICT: "The functionality (of the system) has largely remained the same, but much has changed under the hood: the system is based on modern, state-of-the-art ICT technology that can be quickly and cost-effectively adapted to changing future needs".

Here, the "drivers of change" was assessed to be the ever-increasing demands for reliability and punctuality. This would render the current system at ProRail which was rolled out in 1993 obsolete. The response to this "state uncertainty" was to maintain existing functionality using updated technology. We can see how belief encoding of change drivers leads to pre-conception of the solution where technology transformation aims to sustain existing functionality. The example also suggests how '*blueprinters*', struggle with genuine novelty simply because of their tendency to pre-conceiving the future.

Yet, when the future is pre-conceived, the occurrence of an event or transformation that had been imagined and rejected as not possible but in fact occurs will cause surprise. So too will events or transformations which has never been conceived or considered nor ever entered into the participant's imagination. This is why the blueprinters focus on the 'here-and-now' jobs. They struggle with novelty and innovation because novelty and innovation produce effect and response uncertainties that will surprise the blueprinters.

Since wayfinding shuns pre-conception in favour of anticipation, this mode is more receptive to novelty and innovation. Consider the following statement on organizational transformation made by the Director of Projects, who was a wayfinder:

Director of Projects: "We struggle so hard with the outside-in approach. The new principles co-developed here will bring radical change to the way we plan maintenance and construction works across the network. Ultimately, this will enable us to develop the network to meet growing demand into the future. Innovation will

allow us to ensure both passengers and freight customers have access to safe, efficient and reliable services that will become an increasingly important part of sustainable transport solutions".

The statement reveals how wayfinders use belief updating to anticipate future changes, not by projecting a future state in the present, but rather by seeing into the future. Thus, they are able to recognise the significance of 'new principles' and sense 'radical change'. By drawing on their continuing history of practices (e.g. maintenance, construction, network management) into a current situational activity, the new principles invite skilled participants to act further. "Via these invitations one situation develops into the other; an unfolding process that sets up the conditions for its own continuation" (Van Dijk and Rietveld, 2021, p. 349). It is in this sense that anticipation allows *wayfinders* to open a path and improvises a passage. Put differently, anticipation allows them to look where they are going, not to fix an end point (Ingold, 2013).

To summarise, pre-conception that we associate with *blueprinting* and anticipation that was seen in *wayfinding* represent two contrasting practices for CF enactment. While pre-conception is concerned with predetermining the final forms of things, or fixing their ultimate destinations, to anticipate is 'to take the initiative, to be out in front, to take (*capere*) in advance (*ante*)' (Derrida, 1993, pp. 4 quoted in (Ingold, 2022, p. 12)).

4.5. Forward-looking cognitive-based choice processes versus Feedback-based, experiential processes

Yet another distinction that we observed between the *blueprinters* and *wayfinders* was that the *blueprinters* used a forward-looking cognitive-based choice process that was based on the 'logic of consequences' (Gavetti and Levinthal, 2000; March, 1994) while the *wayfinders* used a feedback based experiential process to generate foresight. The former is premised on simplified representations of the executive's future world whereas the latter is premised on a "backward-looking", reflexive logic underpinned by experiential wisdom (Gavetti and Levinthal, 2000). For example, consider the following observation by the Director of Operations who represents the *blueprinters*:

Director of Operations: "Operations research (OR) provides us with detailed insight on the relationship between several key factors, such as cost and service. With it, we are able to make better decisions, and that is why we encourage further use of OR within our company. In my opinion, we no longer run without it".

As this remark reveals, The Director of Operations wants to explicitly consider the possible consequences of the choices that ProRail make prior to its execution. Since the futures are pre-conceived, it is possible to use a forward-looking, cognitive based choice process to conduct an "off-line" (Gavetti and Levinthal, 2000, p. 114) assessment of alternatives. Hence his emphasis on the need for operational research techniques to be embedded within ProRail.

For *wayfinders*, by contrast, it is not possible to envision the full set of alternatives available nor can they completely specify, apriori, "the causal linkages between possible alternative actions and possible outcomes" (Gavetti and Levinthal, 2000, p. 117). Consider the following observation made by a wayfinding ProRail executive:

Managing Director of Project Development and Realisation: "Through structured and continuous attention to safety, our focus has shifted from "what can we do to increase safety?" to "how can we prevent unsafe situations?""

The position of this Managing Director contradicts the operations research driven choice-based view of the Director of Operations. As his remark suggests, by continuously attending to safety related issues experienced at ProRail, he has realised the limitations of a cognitive based choice process. Consequently, he favours a feedback based experiential process that prevents situations perceived to be unsafe from developing in the first place. As 'expectations for safety' evolve in the context of changing cognitive representations of the organization-environment relationship, the *wayfinding* ProRail executives have realised the weakness of the prior, static representation upon which the forward-looking cognitive choice-based processes were based.

While the cognitive based choice process might be able to address issues pertaining to 'state' uncertainty, effect and response uncertainty can render previously adequate representation less effective. By focusing on urgency, feedback and attention to ground based realities, these wayfinding executives were able to channel their experiential learning and environmental feedback into their CF enactment.

In summary, we see the contrasting use of forward-looking cognitive based choice process and feedback based experiential wisdom being leveraged for blueprinting and wayfinding respectively. While the former is constraint by the accuracy of the underpinning mental models of the 'future' the latter is constrained by the limited number of experiences that ProRail executives can draw from during CF enactment. This suggests that forward-looking cognitive based choice process are better suited to handle state uncertainty whereas feedback based experiential wisdom will be more effective while dealing with effect and response uncertainty.

4.6. Foresight: previewing versus foreseeing the future

The final distinction that we observed among the *blueprinters* and *wayfinders* was that the *blueprinters* attempted to *pre*view the future, that is, they attempted to see beforehand the future state of the world and of ProRail in that world, prior to its actual unfolding. *Wayfinders*, by contrast, sought to *foresee* the future, that is, literally looking ahead one-step at a time, to be aware of the reasonable possibility of an occurrence or development at the cusp of its unfolding. An example for how blueprinters preview the future can be found in the following statement made by ProRail's Director of Operations:

Director of Operations: "But more important than all of these records and financial figures is the fact that Netherlands Railways will play an even more significant role than ever before in the county's mobility. With the new timetable we are able to transport more passengers on the existing network. In this way we are both helping strengthen the Dutch economy and improving the global environment".

The above remark shows how rational planning and belief encoding allow blueprinters to preconceive a future "state" that guides organizational choices for transformation at ProRail. Hence all the information 'records' and 'financial figures' developed through rational planning and belief encoding can be channelled into *previewing* the future where the railways become significant for Netherland's mobility. The need to *pre*view the future also explains why transformations require a 'new vision'. Therefore, in this mode, the future can be designed and *pre*viewed prior to its realisation.

This contrasts with the modus operandi of the *wayfinders.* Here's a wayfinding example from the Chief Executive Officer when asked about 'transformation' and the 'future':

Chief Executive Officer: "Transformation starts with a wealth of knowledge, both on our part and with the contractors. Both the project managers and the contractors are highly experienced. It's also important to maintain strict project implementation. We're also kept on our toes, not just by the carriers, but also by politicians. That keeps things moving".

As her statement reveals, the *wayfinders* were not interested in 'looking *at* the future'. Rather they were more interested in looking *into* the future, by essentially *watching* where they were going. The future, for them, is indeterminate. Not some fixed end point that can be projected backwards into the present. Hence their aversion to a *previewing* approach. Instead, they embrace a learning-by-doing approach that

increases their knowledge about the future. This in turn allows them to *feel* their way into the future by keeping '*things moving*'. It is this feeling their way into the future that we call foreseeing, literally entering the future one-step-at-a-time.

To summarise, in this sub-section, we have demonstrated how *blueprinters* attempt to preview the future, as doing so, they believe, allows them to strengthen their action-outcome linkages. *Wayfinders*, on the other hand, become knowledgeable about the future by foreseeing it along the myriad paths they take as they make their way through the world in the course of everyday activities. Foreseeing the future is therefore very different from *previewing* the future for previews are assembled using information obtained from numerous fixed future states of the world.

4.7. Section summary

In this section, we have explored how the prevalence of 'state', 'effect' and 'response' uncertainty lead to two distinct modes of "future-making" practices: blueprinting and wayfinding, summarised in Fig. 6. The former operates by fixing a future state of the world and then projecting this future state in the present to draw managerial implications. Therefore, blueprinting is characterised by rational planning, belief encoding, pre-conception and forward-looking cognitive-based choice processes that allow participants to preview the future. Wayfinding, in stark contrast, is an in-situ improvisatory movement that treats transformation uncertainty as open-ended and without a final destination. Participants feel their way into the future. It involves bounded rational muddling, belief updating, anticipation and feedback based experiential processes that allow participants to foresee the future. Further evidence to support blueprinting and wayfinding can be found in Tables 3 and 4. Table 5 lists the contrasting "future-making" practices that constitute the blueprinting and wayfinding modes of CF enactment.

5. Discussion

We began our article by highlighting the paucity of knowledge in how organizations undergoing technology driven transformation enact corporate foresight using distinct "future-making" practices. Our findings identify two distinct modes of "future-making" practices we call *blueprinting* and *wayfinding* and synthesize these "future-making" practices into a comprehensive process model for understanding CF enactment during organizational transformation. Our findings and process model have five important implications for CF and organizational transformation.

First, our findings redirect the theoretical conversation on CF from "a dynamic, firm-level capability" (Fergnani, 2022, p. 820) "that cuts across all firm levels" (Marinković et al., 2022, p. 290) to CF enactment or "the work of enacting the yet-to-come by making sense of and giving form to imaginings of the future" using "future-making" practices for CF capability development (Wickert, 2025, p. 1). Prior to our study, research on "future-making" (Wenzel et al., 2025; Pettit et al., 2023; Whyte et al., 2022) had only offered little actionable advice to managers and strategists on how to understand and engage with the future. There was a paucity of empirical evidence outlining how CF, in circumstances of organizational transformation, is enacted and transformed into ways of working. Our process model overcomes this theoretical blind spot by delving "into 'the coalface' of future making" (Wickert, 2025, p. 3) at ProRail. Our model draws attention to the managerial practices and mechanisms through which CF is enacted to bring the future into being. Our conceptualizing of CF as an ongoing accomplishment achieved using "future-making" practices therefore complements our current capabilities-based understanding of CF.

Second, prior CF research has positioned CF as a concept that allows managers to understand and deal with "future environmental uncertainty" (Rohrbeck et al., 2015, p. 1). Within such a conceptualization, uncertainty, regardless of whether it is 'state', 'effect' or 'response' uncertainty (Vecchiato and Roveda, 2010), conveys a sense of incompletion -"of having not yet gained the full measure of the world that would yield to total predictive confidence" (Ingold, 2022, p. 10). While this was certainly true for the *blueprinters* in our study, the *wayfinders* faced the future, not in the realm of uncertainty but rather in the realm of *possibility*. For them, the very indeterminacy of the future allowed them to entertain new possibilities for the transformation of ProRail. Therefore, CF should not only be understood as a means for uncertainty reduction but should also be viewed as a means for possibility generation. The links between uncertainty reduction and possibilities generation is a question ripe for future CF research.

Third, the identification of blueprinting and wayfinding as modes of future-making also has five important consequences for the literature on Futures Literacy Framework (Miller et al., 2018) and anticipatory actions (Anderson, 2010; Poli, 2010). One, the concepts of blueprinting and wayfinding offer logics through which action in the present is enacted. In doing so, these concepts offer a "programmatic way of formalizing, justifying and deploying" CF enactment in the here and now (Anderson, 2010, p. 779). Two, the *blueprinting practices* of rational planning, belief encoding, pre-conception, forward-looking cognitive-based choice processes and previewing the future and the *wayfinding practices* of bounded rational muddling, belief updating, anticipation, feedback based experiential processes and foreseeing the future "give content to specific futures, including acts of performing, calculating and imagining. It is through these acts that futures are made present in affects, epistemic objects and materialities" (Anderson, 2010, p. 779). Three, our distinction between pre-conception and anticipation adds construct clarity within the FLF where 'anticipation' is treated as an "umbrella" construct for all efforts to 'know the future' (Miller et al., 2018, p. 52). Anticipatory action requires *perception*. Our findings identify pre-conception and anticipation as two distinct *kinds* of perception. Doing so also allows us to overcome the "*fallacy of assigning perception to the present and anticipation to the future*" (Stepp and Turvey, 2015, p. 109). By reconceptualizing pre-conception and anticipation as two distinct *kinds* of perception, we add construct clarity to the FLF. Four, this distinction between pre-conception and anticipation as two different kinds of perception also helps us to explain how managers account for the "hidden components" and "latent components" in future-making and CF enactment (Poli, 2010). Pre-conception targets "hidden components" whereas anticipation is more attuned to catching the "latent components" that impact how actions might play out in the future. Five, the practices of belief encoding and belief updating explain why ideal type 'anticipatory assumptions' from the FLF are of limited use within CF enactment. The dynamics of belief encoding and belief updating lead to constant shifts in 'anticipatory assumptions' within future-making. This in turn makes static 'ideal type' anticipatory assumption frames, less useful.

Fourth, blueprinting and wayfinding as modes of future-making also have significant implications for organizational transformation. Since blueprinting tackles 'state' uncertainty, blueprinters are most likely to respond to uncertainty using a 'preemptive strategy' that acts over threats that have not yet emerged as determinate threats so as to halt or stop the threat. Preemption is thus an incitatory form of intervention that is "justified on the basis of indeterminate potentiality" (Anderson, 2010, p. 790). However, a key challenge for blueprinters is that preemptive strategies, by transforming complex information about the environment into a manageable plan, could "critically affect the manner in which decision makers perceive important changes in their business environment" (Vecchiato and Roveda, 2010, p. 1529) during organizational transformation. This could lead to stereotypical thinking that inhibits creative problem solving required for organizational transformation. Wayfinders, by contrast, are attuned to 'effect' and 'response' uncertainty. They are therefore most likely to respond to uncertainty using either a 'precaution strategy' or a 'preparedness strategy'. A precaution strategy, as Anderson (2010) explains is underpinned by a "preventative logic with two characteristics. First,

preventative action is separate from the processes it acts on. Precaution begins once a determinate threat has been identified, even if that threat is scientifically uncertain. Second, precautionary logics act before the identified threat reaches a point of irreversibility (pp. 788-789)". A preparedness strategy, by contrast, "does not aim to stop a future event happening" (Anderson, 2010, p. 791). Rather, its intervention aims to stop the effects of an event from disrupting the organizational transformation.

Fifth, our process model also serves as a reflexive, diagnostic and prescriptive tool for CF enactment within organizations. Our model acts as a reflexive device because CF-constitutive interests are part of the implicit and rarely questioned 'hard core' of scenario planning for organizational transformation. Our model raises reflections about key uncertainties as both motivators for scenario planning and as grounds of explicit CF enactment efforts that are geared towards shaping organizational transformation. Based on such reflections, our framework is also a diagnostic device. For example, if participants are having difficulties with previewing the future, the facilitator can examine the 'belief encoding' practices or the 'forward-looking cognitive-based choice processes' at play to see if and how these processes impact executives who participate in CF exercises. Similarly, within *wayfinding*, it is possible to examine the 'belief updating' practices and the 'feedback-based, experiential processes' to see if and how these processes influence how executives foresee the future. Third, building on such diagnoses, our process model can also serve as a prescriptive device. Specifically, by identifying mismatches between the types of uncertainties and modes of future-making practices, our model can redirect managerial attention to develop insights based on the underattended mode of future-making.

Overall, our process model offers, both theoretical purchase and actionable advice for CF and organizational transformation. Our findings pave the way to develop more practice-based theories that complement current capabilities-based theories on CF.

5.1. Limitations

Even though our theoretical process model for CF enactment was developed from a single longitudinal field study, we believe that it has transferability to other contexts. This is because in contrast to quantitative methods, our longitudinal field study has sought to investigate CF enactment in context and *in real* time, rather than independent of context and time. This offers us the depth and detail necessary for capturing the 'hows' and 'whys' rather than only the 'whats' that link some critical cause and its purported effect. Put differently, rather than trying to *generalize from the particular*, our process model aims to see *the general in the particular*.

That said, our process model of CF enactment has several limitations. First, the model does not aim to cover the entire range of "foresight frames" (Minkkinen et al., 2019) and "anticipatory assumptions" (Miller, 2018) associated with CF enactment. Our study merely focuses on the intrafirm pattern of managerial activities associated with CF enactment. Experimenting with different foresight frames and anticipatory assumptions is definitely an opportunity for future research.

Second, the process model of CF enactment presented here is the result of qualitative pattern matching using future-making as a conceptual lens. While our pattern matching has been done carefully and reflexively, the patterns found necessarily reflect the conceptual lens used. Future researchers must therefore explore alternative modes of future-making practices for CF enactment. Third, our process model is an attempt at bundling the set of managerial activities involved in CF enactment, but this must be verified through further research.

Fourth, in our study, managers aligned with blueprinting stuck with blueprinting and managers aligned to wayfinding stuck with wayfinding. We did not observe any switching from the blueprinting camp to the wayfinding camp and vice versa. One of the reasons for this could be the absence of 'awareness-building' that "compels actors to confront and debate contradictory perspectives" (Malhotra and Hinings, 2015, p. 2) thereby paving the way for mutual exploration of organizational transformation. The absence of awareness building could have led to polarization and awareness-blocking between the blueprinters and wayfinders. This speculation, however, must be investigated further and is ripe for future research.

Finally, our process model shows the pattern of managerial activities through which corporate foresight is produced, but we do not seek to explain variation in this pattern (Mohr, 1982). Further research involving large samples is required to identify the contingency factors that might explain variance in the CF enactment process across different types of organizations in different types of environments. Such research may indicate which CF practices are missing or redundant in the present CF enactment process model, and whether the pattern of sequential and simultaneous activities as depicted here needs to be modified, and how.

5.2. Section summary

To summarise, our research paves the way for developing more temporally sensitive practice theories within CF research. Future research can also examine the effectiveness of the *blueprinting* and *wayfinding* modes of CF generation. Overall, our research supports the need for "more anticipatory and future-relevant management inquiry" (Wenzel, 2022, p. 849) within CF research.

6. Conclusion

In our study, we have shed light on how organizations undergoing technology driven transformation enact CF using distinct "future-making" practices by identifying two distinct modes of "future-making": *blueprinting* and *wayfinding*. We have also synthesized these modes into a process model that explains CF enactment during organizational transformation. We thus make three distinct contributions to the CF and organizational transformation literature.

First, our research paves the way for developing more practice-based theories on CF to complement the existing capabilities-based theories (Marinković et al., 2022; Fergnani, 2022; Schwarz et al., 2020) that dominate the field. By shifting our understanding of CF from something organizations have to something people do, our findings suggest that CF requires more than helping "companies to develop a vision to try to understand the complex forces that drive the change, to accordingly support the decision-making process" (Battistella, 2014, p. 61). We also show how differing temporal experiences and anticipatory assumptions of the 'future' can lead to distinct yet contrasting modes of future making like *blueprinting* and *wayfinding*. Future research can profit by investigating conditions where *blueprinting* maybe more effective than *wayfinding* for CF generation and vice-versa.

Second, within the 'variance-theory' dominant landscape of CF research, we have developed and introduced a process theory on CF enactment within organizations. *Blueprinting* and *wayfinding* represent two distinct modes of future making that reveal how organizational actors envision, process, and engage with the future (Wenzel, 2022). Embracing process/practice-based theorizing can therefore spur further research that generates the 'know how' knowledge sought by theorists and practitioners to understand how organizational actors *actually*, rather than *ideally*, engage with the future.

Third, we have also uncovered how 'state', 'effect' and 'response' uncertainty impacts CF enactment during organizational transformation (Vecchiato and Roveda, 2010). Until now, CF research lacked a conceptual model for unpacking "mechanisms that shape the trajectory of continuity and change and have consequences for the potential of achieving" (Malhotra and Hinings, 2015, p. 5) organizational transformation. Our CF enactment model will help managers to match and deploy preemption, precaution or preparedness strategies to handle the impact of 'state', 'effect' and 'response' uncertainties. Further, by extending the future-making lens into CF, we can now explicitly pay attention "to the experiences of individuals being exposed to and

participating in" (Bartunek and Jones, 2017, p. 161) organizational transformation. Our model could be an important step forward for furthering the theoretical integration between CF, future-making practices and organizational transformation.

Overall, we have argued for a theoretical shift in CF scholarship from CF as an organizational capability to CF practices that explore the emergence of foresight as an ongoing accomplishment within organizations. Such a shift, as we have demonstrated, is required to complement the 'capabilities'-based conceptualization that have rendered current CF debates sclerotic. Our process theorizing on CF also provides methodological ammunition to scholars who wish to capture expressions of temporal complexities, inherent within CF enactment, to be taken seriously at a time when objective 'variance' based theorizing is making its way into all areas of CF scholarship. Finally, we highlight how the 'future' is a problematic temporal category (Wenzel et al., 2020) within CF enactment and organizational transformation. We illuminate some of the cognitive and temporal complexities inherent within the *blueprinting* and *wayfinding* modes of future-making. Our theoretical contribution, we believe, offers a useful steppingstone for further conceptual and empirical work on CF, future-making and organizational transformation in management research.

CRediT authorship contribution statement

Anup Karath Nair: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **George Burt:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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