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Research Paper

The impact of futures skills on decision-making: A dairy company case study

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Abstract: This study analyses the work between a global dairy company and a corporate foresight consultancy over a four-year, three-project span. It evaluates the development of two primary futures skills: anticipation and cognitive flexibility, and their impact on decision-making. This study was conducted by employing a thematic analysis of semi-structured interviews with company personnel involved in these projects. The interviews covered the participants' experiences, the use of the selected futures skills, and the impact on decision-making. The interviews were coded, and emergent themes were identified and refined. While there were no direct changes to decisions because of the projects, the futures work has influenced the participants' futures skills, namely anticipation and cognitive flexibility. This influence, in turn, had a discernible impact on their decision-making processes and the company's decision-making culture.

Keywords: Corporate foresight, futures skills, anticipation, cognitive flexibility, decision-making

1. Introduction

In an era characterized by rapid change and pervasive uncertainty, combined with an endless flow of information, a company's ability to strengthen its decision-making processes is crucial for long-term success (Alhawamdeh & Alsmairat, 2019). Research indicates that strategic foresight can significantly improve flexibility and decision-making rationality (Haarhaus & Liening, 2020). More broadly, corporate foresight plays an important role in the business environment (Fergnani, 2022). Engaging in foresight has been shown to have a positive impact on a company's future preparedness. In addition, future-prepared companies had 33% higher profitability and 200% higher growth than average firms (Rohrbeck & Kum, 2018). Additionally, the impact of corporate foresight – and specifically scenario work – has shown that participants tend to transition towards more intuitive-based decision-making styles (Chermack & Nimon, 2008; Bodin et al., 2016), and this improves their self-perception of resiliency (Chermack et al., 2017).

Corporate foresight has a wide spectrum of applications, from identifying trends (Battistella, 2014) through incorporating long-term contextual perspectives (Ruff, 2015) to influencing research agendas (Farrington et al., 2012). While there are many approaches to engaging with foresight, participation is often a core aspect (Heger & Boman, 2015). Participation is primarily realized through workshop formats as the balance of internal and external participants improves outcomes (Marinković et al., 2022).

The primary aim of this study is to investigate the impact of the futures projects on the decision-making of participants and of the company involved. Additionally, this paper seeks to understand how the projects impacted participants' futures skills, specifically anticipation and cognitive flexibility. This focus is designed to offer a unique insight into the role and value of futures work in a corporate setting. Decision-making has been selected because it can be a clear way to measure the impact of futures work.

This study analyses three futures projects: the initial "Picture of the Future 2030" project in 2019, the "Updated Picture of the Future" in 2021, and the "Future Proofing Energy Management" project in 2023. Although these projects varied in purpose, scope, methods,

Citation:
Hoefnagels, J., Ott, J. D., & Berger, J. (2024). The impact of futures skills on decision-making: A dairy company case study. *Prosperitas*, *11*(4), Article 2. Budapest Business University. https://doi.org/10.31570/prosp_2024_0106

History:

Received:	22 Feb 2024
Revised:	2 Aug 2024
Accepted:	6 Sep 2024
Published:	21 Oct 2024

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participants, and deliverables, they all share a common theme of requiring anticipation and cognitive flexibility in futures work.

Interviews with 11 individuals, who participated in one or more of the projects, form the basis of this research. These interviews delve into participants' experiences, their use of anticipation and cognitive flexibility, and the consequent impact on decision-making.

1.1. About Themis Foresight

Themis Foresight is a corporate foresight think tank that performed the consulting work discussed in this study. Themis Foresight combines science-based research with a distinct methodological approach, leveraging years of proven foresight expertise to deliver forward-thinking solutions. We specialize in Delphi studies, scenarios, technological roadmaps, and long-term business strategies that proactively evolve with emerging opportunities. Themis Foresight delves into the pivotal developments that will shape the coming decades, scrutinizing the interplay of social, technological, economic, environmental, and political forces to understand how they may transform business models and industry landscapes.

1.2. About the company

Established in the early 1900s, this family-owned European dairy business produces, refines, and distributes an array of cheese products. In 2022, the company achieved a sales volume of over 400,000 tonnes and generated revenues exceeding 2 billion EUR. Deeply rooted in its region, the company has built strong relationships with farmers who provide the raw materials needed for production.

The company's global presence is extensive, with its products available in over 30 countries. Its production network is international, with cheese factories across Europe and the USA. Beyond retail, the company has established itself as a dependable partner in the food and gastronomy sectors. This company was selected for this study due to its global activities and various projects conducted with Themis Foresight.

1.3. Research purpose and questions

While there is some literature that focuses on the impact of corporate foresight and decision-making, there is little that includes the discussion of specific futures skills in concrete case studies. Therefore, the purpose of this research is to provide a unique perspective on the impact that futures projects had on participants' futures skills and how this influenced their decision-making.

The two research questions this study will answer are:

RQ1: How did the futures projects impact participants' futures skills, anticipation, and cognitive flexibility?

RQ2: How did anticipation and cognitive flexibility influence participants' and the company's decision-making?

To answer these research questions, we reviewed existing project materials, conducted 11 interviews with project participants, and did a thematic analysis of the interviews to extract findings.

2. Theoretical framework

As the research questions state, the primary focus is on futures skills and decision-making. The link between corporate foresight and decision-making has been discussed in the literature, especially in terms of scenario development (Chermack & Nimon, 2008; Bodin et al., 2016; Chermack et al., 2017), but the granular nature of looking at the role of specific futures skills is lacking.

In the following sections, we discuss two key futures skills – anticipation and cognitive flexibility – and decision-making literature. The literature will provide the theoretical framework for this study.

2.1. Futures skills

When discussing the action of engaging with futures studies, various concepts are used, such as futures education, futures literacy, futures consciousness, or futures orientation (Pouru-Mikkola & Wilenius, 2021). The term futures skills is the underlining characteristic and is a core component of futures literacy when these broader concepts are discussing, as noted by Slaughter (2001). This study focuses on the skills layer of working with futures to get to the core of how futures may impact decision-making.

While not clearly defined in the literature, futures skills encompass a broad set of competencies that can be used in futures such as communication skills (Amer et al., 2013), futures thinking (Toivonen et al., 2021), or the ability to mentally project oneself into possible future events (Berntsen & Bohn, 2010). These futures skills enable individuals to work with futures through the ability to orient themselves, develop ideas, and points of view. The impact of developing futures skills has been described in the literature to some extent, notably by Emanuelli et al. (2018) as they developed futures skills in students and observed the impact this had on students' outputs. Although Emanuelli et al. (2018) discuss the development of futures skills, there are no clear definitions or concepts that provide a foundation of which skills are being developed and measured.

This study focuses on anticipation and cognitive flexibility as two core skills when working with futures. Anticipation and cognitive flexibility can be directly connected to theoretical models that also discuss decision-making in organizations. The dynamic capabilities model introduced by Teece et al. (1997) outlines how dynamic capabilities enable companies to achieve new forms of competitive advantage. To engage with dynamic capabilities, anticipation and cognitive flexibility are required. Critically, one must understand and anticipate the changing business environment, which includes engaging with future changes, analysing variables and causal changes, and navigating through uncertainty. The following sections will provide the theoretical foundation for these futures skills.

2.2. Anticipation

In response to an increasingly complex and rapidly changing business environment, scholars and practitioners have recognized anticipation as a crucial capability that helps individuals and companies prepare for and shape their future (Poli, 2017; Miller et al., 2018). Initially conceptualized by Rosen (1985), anticipation gained prominence as a strategic competence (Hamel & Prahalad, 1989) and has been a key component in futures studies (Poli, 2010).

Anticipation is crucial for decision-makers navigating volatile, uncertain, complex, and ambiguous environments (Bennett & Lemoine, 2014), which supports the transformation of various needs established by corporate strategy into innovation management (Poli, 2010; Tuomi, 2012).

A narrow definition of anticipation emphasizes the capacity to identify trends and topics, as well as to analyse causal chains of development over a long-time horizon (Flyverbom & Garsten, 2021).

However, a broader definition includes a growth mindset that enables these intellectual capacities (Dweck, 2019). This is an important inclusion as it recognizes the intrinsic role of biases such as ego, security, and inertia. It also accounts for the common default mental position, which assumes that future developments rarely lead to true fundamental change. This partly unconscious, partly openly professed denial about the reality of significant changes limits the use of anticipatory capacities. Even when future developments are perceived as game changers, ignoring concrete repercussions of these with respect to one's own business and life can become a psychological defence.

In this study, anticipation is understood in three successive layers: 1) As an open "growth mindset" (Dweck, 2017) that acknowledges the possibility of significant, unexpected future changes (Poli, 2010) and the potential obsolescence of one's current experience and skills. 2) The ability to reevaluate fundamental beliefs, to the extent that this triggers a sense

of impact and a need for action, even if it evokes negative emotions (Grant, 2021). 3) The imagination and intellectual rigor to thoroughly analyse variables and causal changes through new perspectives and with novel depths.

Researchers have begun demonstrating the impacts of anticipation on organizational performance and decision-making quality (Rohrbeck & Kum, 2018; Vecchiato, 2015). The literature positions anticipation as a core aspect of corporate foresight and a key element that impacts company decision-making. Additionally, it shows the need for further research to better understand the impacts of anticipation on decision-making in companies.

2.3. Cognitive flexibility

Cognitive flexibility has been identified as another important capability that enhances individuals' and organizations' ability to make effective decisions (Good, 2009). The significance of cognitive flexibility has grown, which caused researchers to develop metrics and various models to measure changes in cognitive flexibility (Martin & Rubin, 1995; Laureiro-Martínez & Brusoni, 2018; Cambaz & Ünal, 2021).

The ability to recognize the complexity and importance of working with the future in organizations has been noted by Hamel and Prahalad (1994). As they discuss, the capacity to think and imagine the future is a core leadership trait that reflects the value of cognitive flexibility.

The benefits of cognitive flexibility have been demonstrated in dealing with uncertainty, improving adaptive thinking, and engaging with multiple perspectives and solutions, which has made it an essential skill for decision-makers operating in dynamic and uncertain environments (Dennis & Vander Wal, 2010). These studies show cognitive flexibility as a key capability for enhancing decision-making, particularly in environments characterized by high complexity. There is also a clear need for further research that looks at the role it plays in companies.

Cognitive flexibility can have a wide variety of definitions (Ionescu, 2012). This study will focus on two cognitive abilities that are relevant for the futures context. The first aspect involves recognizing and understanding complexity in both quantitative and qualitative terms. This requires the skill to switch between numerous and diverse perspectives (Diamond, 2006) and derive new strategies (Bennett & Müller, 2010). The second part concerns the ability to consider various interpretations of information (Jacques & Zelazo, 2005).

From a complexity standpoint, analytical structures are necessary for thinking, yet they also act as simplifications and can introduce biases. Cognitive flexibility as a futures skill is the ability to make pertinent interpretations among a vast array of signals varying in intensity. It also involves the ability to navigate ambiguity and develop and evaluate various options.

2.4 Decision-making

Effective decision-making is a critical determinant of organizational success and longevity (Drummond, 1996). Early decision-making theory can be traced back to the foundational work by Simon (1947) laying the groundwork for understanding how individuals and organizations navigate choices under uncertainty.

As organizations faced increasingly complex challenges, decision-making theories evolved to incorporate insights from various disciplines, including psychology, economics, and organizational behaviour (Kahneman & Tversky, 1979; Cyert & March, 1963). This multidisciplinary approach has proven invaluable for leaders and managers grappling with high-stakes decisions in volatile markets and rapidly changing technological landscapes.

The clearest part of the decision-making process is the final and concrete decision. Definitively verifying or falsifying the impact of participants' futures skills on their decisions would typically require alternative decisions available for analysis. This would involve scenarios where the choices for or against a certain decision are justified by a long-term perspective. However, such crystal-clear selectivity is rare in strategic, let alone operational, corporate decisions. Additionally, this narrow focus neglects the importance of other parts of the decision-making process.

Therefore, the following analysis is based on a broader understanding of the decision-making process. This study focuses on two primary aspects identified in management literature as fundamental to robust decision-making (Heath & Heath, 2013), namely: 1)

expanding the range of options available for selection, and 2) explicitly identifying, testing, and challenging the implicit assumptions that make the respective options appear promising.

The potential for futures-oriented decision-making processes to enhance organizational adaptability and performance is well-recognized. However, the field continues to grapple with understanding how specific futures skills, such as anticipation and cognitive flexibility, influence decision-making cultures within organizations. The scarcity of studies examining the impact of futures projects on participants' skills and subsequent decision-making behaviours presents a gap in the literature.

This theoretical framework underscores the critical role of futures skills, particularly anticipation and cognitive flexibility, in shaping organizational decision-making cultures. The paper highlights the need for continued research to clarify how futures projects impact these skills and, in turn, influence decision-making processes in organizations.

3. Research Methodology

This study uses a qualitative approach, thematic analysis, as it supports a nuanced and fluid exploration of an intricate topic. The research method falls within the case study approach in social science research as described by Yin (1994). Using an explanatory case study is particularly relevant for organizational and management studies and the focus of "how" type questions (Yin, 1994). This study employs a thematic analysis and examines 11 semi-structured interviews to assess how futures skills impact decision-making.

3.1 Interview design

Qualitative research interviews are used to understand the world from the interviewee's perspective and learn about their lived experience (Kvale & Brinkmann, 2009). As described by Kvale and Brinkmann (2009), the interview is an inter-change of views, which is precisely what is needed for this study to accurately understand the impact of the futures projects on the participants and the influence these skills have on decision-making. Semi-structured interviews were integral to the research design, chosen for their effectiveness in facilitating a thorough exploration of the subject matter and providing flexibility to probe into interesting areas that emerge during the interview (Adams, 2015). The questions were carefully crafted to elicit detailed responses about participants' experiences with the futures projects.

Interview participants were selected from a group of current employees who had direct involvement in one or more of the three futures projects. The group includes a group board member, general managers of country subsidiaries, various heads of departments dealing with sustainability, digitalization, and production, as well some specialized managers.

The interviews were conducted online via MS Teams and lasted approximately 45 minutes. This duration was deemed sufficient to cover all necessary topics comprehensively while remaining concise enough to maintain focus.

3.2 Thematic analysis process

Thematic analysis was used to identify and analyse themes from the interview data (Braun & Clarke, 2006). All interviews were recorded (with consent) and transcribed verbatim by MS Teams. The analysis followed Braun and Clarke's (2006) six-phase approach.

1. Data familiarization: Researchers thoroughly read and re-read the transcripts, noting initial ideas and patterns.
2. Initial code generation: Two researchers independently and manually coded the transcripts, giving equal attention to each data item. One or more keywords were attached to text segments. This process was primarily data-driven.
3. Generating themes: Codes were grouped into potential themes, with researchers collecting all relevant coded data excerpts under each theme.
4. Theme review: Themes were checked against the coded extracts and the entire dataset to ensure coherence and relevance. Overlapping themes were combined, and these ensured that enough data was present to support a theme.

5. Theme definition and naming: Ongoing analysis refined the specifics of each theme, generating clear definitions and names for each. These are the final themes that were selected: Importance of long-term orientation; Mindset shift; Alignment and clarity; and Reconciling with limitations
6. Report production: Final analysis and selection of compelling extract examples were performed, relating the analysis back to the research questions and literature.

Measures were implemented to ensure reliability and minimize bias in the coding process. First, two researchers independently coded the transcripts, employing inductive codes emerging from the data. The analyst triangulation approach helped to reduce individual researcher bias (Patton, 1990). Following the initial coding, we adopted a negotiated approach to resolve disagreements in our codes (Garrison et al., 2006). This method proved effective as both coders possessed in-depth knowledge of the research topic and were familiar with the interview content. We engaged in active discussions about our codes to arrive at a final, agreed upon version. This process allowed us to leverage our combined expertise while mitigating potential individual biases. These combined approaches helped to ensure a reliable coding process.

It is of note that some of the interviews were conducted in German, which introduced the possibility of translation bias. To mitigate this risk, we employed a careful translation process. The German transcripts were initially translated the translation software program, DeepL. Subsequently, we used the translator-moderator approach to ensure the accuracy and reliability of the translations (Nurjannah et al., 2014). However, due to cost and time limitations, a trusted bilingual third-party was used instead of a certified translator.

4. Findings

4.1. Sample background: the three projects

The three projects included in this study were selected to offer tangible, real-world insights into foresight methodologies within corporate environments. The projects span different organizational levels, from executives to operational teams, as well as cultural and professional backgrounds, which enable us to assess how foresight practices permeate and influence decision-making on various levels. By having a broader spectrum of participants, we reduce the possibility that the outcomes were due to working with a single hierarchy level or corporate environment. The projects were conducted over different time frames, providing insights into short-term and long-term impacts on decision-making.

At least one of the authors was involved in all three projects with the dairy company, which created a unique opportunity to examine foresight applications over various projects. While some participants were involved in multiple projects, the majority participated in only one, providing a blend of continuity and fresh perspectives.

The relationship involves Themis Foresight bringing specialized expertise in futures methodologies to complement the company's industry-specific knowledge and strategic objectives. This work was project-based, with Themis Foresight guiding the client through structured processes of exploring possible futures, challenging existing assumptions, and developing more robust, future-oriented strategies. The sections below outline the specific nature of the projects.

In 2019, the first project with the company was initiated by two key factors: the company's routine five-year review of its corporate vision and the recognition of rapidly changing external factors influencing the business landscape. The executive board aimed to ground their vision in a thorough understanding of the evolving global context to ensure future readiness and relevance.

The project's objective was to construct a picture of the future in 2030, forming the foundation of the company's corporate vision. Their Vision 2025 defined five fields of strategic engagement, which were the reference points to evaluate the company's decisions. The process involved distinct but interconnected phases:

1. Futures research and analysis:

Initial stages focused on extensive research to build an understanding of key variables, using an in-house developed 'Trendcycle' method and environmental scanning, laying the

groundwork for subsequent analysis. A two-round Delphi process involved interviewing 20 global experts from various fields, aiming to generate ideas, test hypotheses, and delve deeper into industry-shaping developments.

2. Scenario development:

Insights from the desk research and expert interviews informed the development of scenarios, immersing participants in potential future realities and providing a framework to understand possible future developments. The project spanned five workshop days with 26 company personnel, including the executive board, all executive boards of their national subsidiaries, and heads of departments, such as R&D, HR, and quality management. These workshops engaged participants in thesis development, scenario creation, and guided discussions on key technologies and global shifts. This participatory approach was essential for collectively shaping the future picture and laying the groundwork for the 2025 company vision.

Shortly after announcing its new vision, the company faced the onset of the COVID-19 pandemic, leading to immediate crisis management and disrupting the timelines and expectations established in the first project. Concurrently, a growing concern about the accelerating environmental regulations in the dairy industry prompted a focused exploration into climate and consumer logics.

Starting in May 2021, the second project aimed to update the picture of the future, specifically focusing on climate neutrality implications and developing future-oriented products.

1. Research and scenarios:

The project began with a desk research phase, which included environmental scanning to understand the landscape and to identify future trends. This research phase led to the creation of four scenarios using the 2x2 method. These scenarios were designed to illustrate futures, facilitating immersive explorations, and setting the foundation for backcasting exercises.

2. Backcasting:

Executed in four distinct sprints, the backcasting focused on identifying practical initiatives for achieving target states by 2030. These targets included achieving climate neutrality in product manufacturing and enhancing digital integration across processes, customer interactions, and consumer engagement.

The project was primarily conducted by the company's German subsidiary, partly due to logistical challenges in organizing another extensive group-wide project and partly because of Germany's more immediate exposure to environmental regulatory changes.

The third project focused on a specific operational area: the development of an advanced energy management system emphasizing sustainability and climate neutrality.

The project's objectives were to develop a comprehensive framework for evaluating emerging energy technologies and a guideline for energy and plant managers to initiate the development of a new energy management system. This included a twofold approach:

1. Technology mapping and matrix evaluation:

The project's first phase involved creating a detailed matrix to assess future energy generation and storage technologies, emphasizing their commercial viability and potential integration into operations. These technologies were then mapped on a timeline to show the time horizon of each technology.

2. Guideline development for energy and plant managers:

The second phase involved creating guidelines to assist plant and energy managers in initiating the development of a new energy management system. New financial decision-making criteria were drafted, reflecting investment decisions in climate-focused futures.

Distinct from the previous projects, the main participants were sustainability and energy managers, given their deep understanding of the company's sustainability targets, energy needs, and business operations. Themis Foresight's researchers conducted the research and analysis, continuously incorporating feedback from the client to integrate their insights and company perspective. A site visit to a major production facility was integral, allowing the team to directly assess the current energy management situation and align the project's objectives more closely with actual operational realities.

4.2. Interview questions, responses, and interpretation

The interview questions were developed to align with the study's research questions, focusing on the impact of futures projects on participants' futures skills and the subsequent influence on decision-making processes. Questions were designed to elicit reflective responses about participants' experiences working with the futures projects. This approach allowed us to gather rich, qualitative data that directly addressed how the futures projects affected participants' skills (RQ1) and how these capabilities influenced decision-making at both individual and organizational levels (RQ2).

Given the semi-structured nature of the interviews, not every minor question and follow-up question is included but the primary questions that guided the interviews are listed. The participants' responses and our interpretations are provided to offer deeper insight into the interview data. This approach allows a more nuanced understanding of the participants' experiences and perspectives. While the interpretations are not part of the thematic analysis, they offer additional context to the participants' responses. This comprehensive view offers transparency in our analytical process and allows for a more thorough examination of the impact of futures projects.

4.2.1. What decisions were made differently because of the futures projects?

This question aimed to identify specific decisions influenced by the futures projects, whether directly or indirectly. Interviewees found it challenging to pinpoint strategic or operational decisions directly altered by the projects. While the Picture of the Future project was valued as the foundation for Vision 2025, most impacts on decisions were attributed to the Vision itself, such as investment strategies and R&D centralization. The projects generally affirmed existing decisions rather than changing them, with one notable exception of a country subsidiary investing in a vegan cheese start-up. This decision was made despite personal doubts as to the market potential of non-dairy-based cheeses, but the interviewee felt the need to diversify and "buy a learning curve".

The interpretation suggests that the projects served more as a process for refining existing ideas rather than catalysing radical changes. However, some participants noted that the projects influenced their decision-making process more subtly, providing a "futures perspective" or "mental filter" when considering decisions, even if they could not identify specific decisions that were made differently as a result.

4.2.2. Did you gain any new insights that were surprising to you?

This question was asked to determine if the projects revealed anything unfamiliar to the participants. If so, this question was to gauge the impact this newfound awareness had on the company's decision-making. Most participants reported that the projects did not reveal entirely new information, as they were already familiar with the presented trends and technologies. However, many noted that the projects provided new perspectives and approaches to known topics, such as exploring different growth patterns or investigating wider implications of fossil fuel trajectories. One notable exception was a participant's first serious engagement with artificial intelligence (AI), which served as a wake-up call for their team's preparedness.

These responses can be interpreted in many ways. Perhaps Themis Foresight may not have presented enough novel technologies or trends, or the participants may have already possessed a broad understanding of the futures landscape. The varying responses to AI engagement raised questions about the level of anticipation among participants. However, a greater impact and added value for participants seemed to lie not in learning about new signals, but in the systematic, in-depth exploration of relevant variables, expanding the depth and clarity of key trends and their possible implications for the company.

4.2.3. Did the decision-making process change in terms of different justifications for investments or more multi-tracking of different options?

This question was designed to assess the impact of the futures projects on the decision-making process. For example, did anticipatory skills from the futures projects lead to more

long-term-oriented investments? Or did the cognitive flexibility experienced during the futures projects enable participants to widen the number of options they considered, rather than making binary decisions?

The answers to this question varied considerably. Prior to the Picture of the Future project, investments were primarily justified based on quick amortization and profit generation. Post-project, there was a shift towards aligning investments with a longer-term perspective. The Energy Management project introduced possible new financial decision-making criteria that consider a more complex set of variables. Additionally, there was broad agreement that the Picture of the Future led to more multi-tracking decisions, with the company positioning itself to develop alternatives alongside traditional products and keeping various procurement options open.

While the responses do not indicate fundamental changes to concrete decision-making procedures, they suggest that the futures projects fostered greater anticipation and long-term thinking. This shift motivated participants to justify decisions with a longer-term perspective and to consider multi-tracking options more frequently. The projects seem to have encouraged a more forward-looking and flexible approach to decision-making, even if formal processes remained largely unchanged.

4.2.4. What was the added value of a futures project with an over 10-year outlook compared to conventional strategy development with a 3-5-year horizon?

This question sought to capture the value of working with a futures company and to understand the benefits the respondents associated with long-term anticipation at that time.

Responses varied, with some participants noting their existing familiarity with long-term thinking, while others found the 10-year focus novel and helpful in overcoming short-term thinking. All interviewees emphasized the importance of immersing themselves in a long-term perspective, valuing the process of working with the future more than specific results. The participatory nature of the process was particularly appreciated for its positive impact on culture-building within the international leadership team.

The interpretation suggests that the varying responses reflect different levels of familiarity with long-term futures work. Participants acknowledged the value of shifting perspectives, citing benefits such as breaking tunnel vision, fostering interdepartmental connections, and considering unconventional options. This indicates that the projects enhanced participants' cognitive flexibility. Moreover, the company's decision to engage in multiple 10+ year projects demonstrates an open growth mindset necessary for anticipation, while also revealing a proud self-image of the company's strengths in planning, implementation, agility, and resilience.

4.2.5. What were the three main takeaways for you from the project?

This question was asked to specifically identify the main impact areas. There were four main categories of responses. The first was that the futures projects initiated a mindset and perspective shift in how they view the present and future. Secondly, many found working proactively in shaping the future to be inspiring and motivating. The third main impact was that the projects provided a clear and structured approach to work with important future topics. Lastly, multiple participants stated that the futures projects not only helped them better manage the crises but also to re-engage in long-term initiatives that were stalled during the crises.

The various takeaways show the multi-dimensional nature of the projects. Participants were able to connect with and internalize different parts of the project. Additionally, their ability to quickly re-initiate long-term initiatives that were paused during the crises suggests that the company internalized a long-term perspective.

4.2.6. Which topics and questions triggered the most controversial discussions in the projects?

This question aimed to understand the role of anticipation and cognitive flexibility throughout the project. Anticipation requires imagination and intellectual rigor to thoroughly think through variables and causal changes with new perspectives and depth. Cognitive

flexibility requires the ability to take in, comprehend, and compare numerous and diverse perspectives. Hence, on a group level, friction and heated discussions amongst participants can be a sign of anticipation and cognitive flexibility in action. On the other hand, certain types of group harmony can be a deceptive sign of deep and solid alignment based on denial of complexity and diversity.

Participants reported a range of challenging topics, including alternative forms of cheese, consumer behaviour, digitalization, artificial intelligence, and internationalization. These discussions covered expected development paths, company implications, and necessary actions. Interviewees acknowledged that considering and evaluating diverse perspectives and futures were challenging but crucial for building a shared future vision.

The presence of challenging discussions suggests several interpretations. This highlights the inherent difficulty of working with futures due to uncertainty and a vast options space. It also indicates the use of anticipation and cognitive flexibility skills, and a company culture that values open discussions on complex topics. The diversity of perspectives, especially in the first project with managers from different countries, contributed to these discussions. The fact that the most controversial topics were also mentioned as ones providing the biggest takeaways suggests that the process led to gained clarity and alignment, and resulted in challenging participants' cognitive flexibility and anticipatory skills.

4.2.7. Did you share the picture of the future or use it as an enabler in your communication?

This question was asked to understand the role and impact of the projects beyond the project teams. The Picture of the Future was widely disseminated among participants' teams, with the scope and form of communication varying by manager and country. The Picture of the Future ranged from small team meetings to large management workshops and nationwide roadshows, with the most extensive distribution occurring in Germany. The Group management also used the Picture of the Future when presenting Vision 2025 to strengthen motivation. However, in some countries, the communication process was interrupted by the COVID-19 pandemic. The Energy Management project guidelines were also distributed to energy managers for feedback and further development.

The effort to distribute the projects' findings beyond the project team and to discuss them with employees at all levels as part of developing a participatory culture is significant. Even more so since they could have solely used Vision 2025, which is more specific in terms of objectives and measures. Therefore, it stands out that the Picture of the Future was used as a leadership tool to align and motivate. To this end, the specific question that only the Picture of the Future with a long-term horizon could answer was not about the 'what' and 'how' but the 'why', which is an often missed but crucial element in guiding organizational behavior (Sinek, 2011).

4.2.8. Was there a stronger focus on opportunities or risks? With hindsight and knowledge of the consequences of the Corona pandemic and the Ukraine war, would you shift the focus?

This question was intended to gauge the participants' self-awareness about their learning curves and the limits of their anticipatory skills (growth mindset) and cognitive flexibility (biases).

The interviewees described the focus on opportunities as part of the company's DNA. The management perceives their role in translating and communicating challenges not as threats but as opportunities. Reflecting on the unexpected crises of the past five years, considerations were expressed about increasing the focus on risks. For example, geopolitical shifts should have been looked at more closely. Additionally, some suggested a more detailed examination of country-specific differences.

The interpretation suggests that the focus on opportunities can strengthen motivation for long-term future planning, while an excessive focus on risk hedging might demotivate managers facing increasing variables and uncertainties. The responses indicate a learning curve among participants, with an increased recognition of company culture biases, weaker signals, and the importance of considering risks and geopolitical influences. This shift in

perspective demonstrates growth in anticipatory skills and cognitive flexibility, even as certain reassuring biases continue to affect anticipation.

4.2.9. Which time horizon would you choose for the next futures project?

The purpose of this question was to assess whether participants had internalized the benefits of looking at long-term horizons despite the challenges inherent in anticipation and cognitive flexibility.

All respondents expressed a preference for maintaining a 10+ year time horizon for future projects, with some suggesting additional medium-term gradations to bridge the gap with five-year strategic planning and account for varying development speeds across different countries. However, they emphasized that the exact year was less critical than regular practice in long-term anticipation, and many expressed an interest in iterative review processes.

The interpretation highlights the significance of this preference, given the company's culture of five-year planning and short-term agility. The consistent choice of a 10-year outlook across different managerial levels and countries suggests that participants found value in this longer-term perspective despite the challenges of increased complexity and uncertainty. This preference appears genuine, as evidenced by the company's continued engagement in corporate foresight. The 10-year horizon seems to serve as a useful framework for clarifying five-year strategic planning, enabling prioritization and alignment in strategy formation and decision-making despite the inherent complexities and uncertainties involved.

4.2.10. Looking back, what could have been done differently to improve the project?

This question aimed to assess the participants' self-reflective ability regarding the limitations and potential improvements of the process. It sought to understand the significance they place on fostering anticipation and cognitive flexibility. Additionally, it questioned whether a direct influence on decision-making is their primary expectation from a corporate foresight project.

Responses fell into three main categories: satisfaction with the project as conducted, desire for more practical exercises to make futures more tangible, and interest in considering more weak signals and less directly related aspects like geopolitics. A common theme was the desire to better integrate futures into short-term work. Notably, no interviewees suggested that the projects should directly impact specific decisions. Instead, they valued the 360-degree perspective for identifying blind spots and understanding global developments' relevance. Top leadership emphasized the importance of regularly practicing long-term perspective work for organizational maturity.

The interpretation suggests that while many were satisfied, responses might have differed if asked immediately after the project. The desire for more tangible discussions could reflect varied expectations of a futurist's role versus a strategy consultant. The interest in weak signals and less related topics may be a response to unexpected events following the first project. The management's emphasis on long-term horizons and continuous anticipation practice indicates a strong commitment to facing complex issues and uncertainties demonstrating a growth mindset.

4.3. Results of the thematic analysis

The interviews provided insights into the influence the projects had on participants' futures skills and the impact the skills had on decision-making. After coding the interviews, specific themes emerged highlighting the role of futures skills and their impact on decision-making. The emerging four themes are the following: the importance of long-term orientation, mindset shift, alignment and clarity, and reconciling with limitations.

4.3.1. Importance of long-term orientation

The importance of long-term orientation emerged as a critical theme from the coding. Participants discussed the significance of having a long-term perspective.

"Decisions are better when using long-term thinking."

"Looking ahead has a huge added value in the discussion when it comes to implementing decisions."

"The decisions are getting better because you're not just thinking short-term, you're thinking long-term. Decisions are getting better. Pre-decision preparation is becoming more difficult because you have to take more aspects into account, especially these longer-term aspects."

"For me this long-term thinking and the long-term plan have opened up a new world."

While participants recognized the value of long-term orientation, they were acutely aware of the constant pull of short-term priorities. It is challenging to not only recognize the importance but to actively work on building long-term orientation. This tension between recognizing the importance of long-term thinking and the difficulty in implementing it aligns with the findings of Rohrbeck and Kum (2018), who highlighted the challenges organizations face in integrating futures thinking into their strategic processes.

"Let's start with the fact that every managing director is probably very deeply immersed in operations, whether they like it or not. And there the horizon is sometimes even shorter than 2-3 years, and it always has been."

"I have to take care of the next 6 months; will we still get our raw materials?"

The futures projects served as a catalyst, bridging the gap between acknowledgment and integration, providing a structured framework for participants to actively engage with long-term thinking and incorporate it into their decision-making processes. The projects provided a platform for the systematic exploration of future possibilities, which further developed their long-term perspective.

"In respect of the specific project that we had together, it was possible for us to have the long-term perspective. … Working with you is very helpful because you open up this perspective."

"Then you make assumptions, and this making of assumptions is a completely different way of working, which is demanding for many, but it is also incredibly good because you break up patterns and new perspectives arise, resulting in new points of view, new aha moments. … It's demanding but incredibly good for you."

The development of anticipation skills through these projects supports Poli's (2017) assertion that anticipation is a crucial capability for preparing for and shaping the future. This aligns with the theoretical framework's emphasis on anticipation as a core futures skill that enhances organizational flexibility and decision-making in uncertain environments (Vecchiato, 2015).

This long-term orientation was not merely theoretical; it translated into tangible benefits for the company. Notably, the enhanced long-term orientation contributed to the company's resilience during recent crises, enabling them to quickly re-initiate long-term projects once immediate pressures subsided:

"With profitability on track, material surpluses on track, sales volumes on track, we are now slowly getting back into a routine and now we have to devote ourselves to other things again and we are getting back to the long-term strategy and the nice thing is that before the crises, we had already prepared many areas of the company for the long term."

These findings reinforce the theoretical framework's emphasis on anticipation as key futures skills that impacts organizational decision-making.

4.3.2. Mindset shift

Interviewees often discussed how the projects and working with futures requires a shift in mindset. This shift aligns with what Emanuelli et al. (2018), who states that the development of futures skills enables individuals to work with futures through the ability to orient themselves, develop ideas, and points of view. Participants reported thinking differently, more broadly, and making new connections among trends, indicating an enhancement in their cognitive flexibility:

"It definitely was a spark then that made a difference to me. … It was a mindset change for some people involved."

"After this experience, I would do it the same way again. In addition, I think in the field of foresight, you have a broader view, you have visons, thoughts that go beyond the horizon. To me, consulting firms tend to only know what they know, what they learn from somewhere else. But they only have knowledge up to the horizon, that is what I have experienced."

As defined in the theoretical framework, cognitive flexibility involves the ability to switch between numerous and diverse perspectives (Diamond, 2006), and consider various interpretations of information (Jacques & Zelazo, 2005). The projects also led to increased comfort in working with uncertainty and complexity. This aligns with Spiro et al.'s (1988) assertion that cognitive flexibility is essential for dealing with uncertainty and improving adaptive thinking. This was evident in participants' responses:

"One of the biggest benefits of the futures study is that it shows that there are many influencing factors. It provides more clarity if you just engage with, and it just makes you more open-minded."

"In futures, you approach topics in a completely different way, you always need cross-functional teams and colleagues to think about certain topics, to move them forward, to develop strategies. You realize that if you're stuck in, say, a 3-5-year horizon, you're actually stuck in your usual pattern. I usually have this 18-20 or 24-month mindset that's totally in my blood and it helps a little bit, but it doesn't help with sustainability issues, because you really need this long-term mental leap to challenge yourself."

This mindset shift had tangible impacts on decision-making processes. Some participants reported adopting a multi-track approach to decisions, while others developed a "mental filter" for considering long-term implications in their decision-making. These changes reflect what Vecchiato (2015) describes as the integration of strategic foresight into organizational decision-making processes.

The mindset shift observed in this study supports the theoretical framework's emphasis on anticipation and cognitive flexibility as key futures skills. It demonstrates how these skills can be developed through futures projects and subsequently influence organizational thinking and decision-making.

4.3.3. Alignment and clarity

One of the most significant themes from the interviews was the crucial role of futures projects in clarifying and aligning the company Group's strategic direction. Although there was a general understanding of the company's direction, it was not always clear to all. As one interviewee explained, there was sometimes frustration when certain initiatives would be accepted while others were not, as the priority areas were not always explicitly defined. These futures projects gave clarity to the company's direction and a clear logic for decision-making. This clarity of direction supports the way Slaughter (1995) defines foresight as the clarification of emerging situations.

"The goals have always been clear in a way, but it was not so structured and expressed."

"That's why it's important to simply look at where we want to be in 10 years' time. As the saying goes, you have to put your big stones into the container first and then the pebbles and then fill it up with sand and water. But if you do it the other way round, it doesn't work. We need the big stones first, the north stars, to which we orient ourselves and therefore we have a clear commitment."

While setting goals and commitments can theoretically offer clarity, participants noted the difference made by involving managers from different countries, hierarchical levels, and professional backgrounds. This participatory approach differed from previous top-down strategy developments, which typically involved only a few top group managers and some external experts. This approach boosted commitment and motivation in creating a participatory culture that truly values futures thinking and incorporating it into decision-making. This aligns with Rohrbeck and Gemünden's (2011) assertion that corporate foresight activities can enhance strategic direction and alignment within organizations.

"I would not say that it made it more difficult but made it more clear in discussions."

"The journey was the reward. I believe that there was also a lot in the process for us. Simply the fact that we sat down together several times at the GM level, at the board level, at the expert level, exchanged ideas, discussed results openly it came out great."

"It's not that it wasn't discussed beforehand, but now that sustainability is clearly stated in the strategy and the vision was helpful."

This alignment and clarity had additional impacts. Most notable, is the Picture of the Future project's effect on managing long-term projects during recent crises. Some participants attributed the ability to re-initiate long-term projects once the crisis management slowed to

lessons from the futures projects. Interviewees credited the projects and the Vision 2025 for enabling a seamless transition between short- and long-term decision-making as contexts fluctuated. Several projects, cumulatively representing the largest investment program in the company's history, were maintained and completed despite the crisis years. The clear orientation and focus on anticipation provided by the long-term outlook supported this effort. Additionally, interviewees expressed confidence in the company's long-term future, regardless of market disruptions. This confidence in navigating future uncertainty and complexity is attributed to increased cognitive flexibility.

"Who knows what the price will be in the future? How do I react to that? In the long term, I know that we are well positioned, I have my colleagues on board. I don't think we have any major issues that we won't solve."

"The nice thing is that once you've established sustainability so firmly in the organization, you can always get the discussion going again, it never goes away completely, we never lose sight of it and now that we have the ship back in calm waters, the discussion comes up again very clearly."

"And projects that were started before the crises, they can just start running again now."

4.3.4. Reconciling with limitations

The next theme that arose was about the participants reconciling with the limitations and challenges when working with futures and integrating it into their work. Firstly, participants reported challenges in working with abstract futures, uncertainty, and complexity. This aligns with the work of Judge (2010), who discusses the challenges associated with working with futures.

"People kept saying 'I don't have the time for such long-term planning."

"I think the difficulty is putting it into practice. The interconnectedness thinking that is required makes it very complex."

"10 years is so far away and it's a challenge to establish a way of working, to say now, imagine the world in 2030 and so what does that mean for 2025? To take this mental leap backwards, it's very challenging."

Participants also struggled to relate futures work to their day-to-day operations. This challenge echoes the findings of Rohrbeck and Kum (2018).

"At the very beginning was the scoping phase, which was very high level and was so general that it's very difficult for us now to work with the results."

"I think we still have a bit to learn in that regard. What I had described before about the long-term thinking that we wanted to implement in the network, it's been a bit difficult to bring the network to life, to keep it alive."

"The issue of sustainability is that it is being put off in the long term for short-term reasons. We say we have to remain profitable now, but these are investments for the future, this will bring us something in the future. … But the fact is that a lot of things just don't pay off in the next 2-3 years and I calculate for the next 2-3 years."

Lastly, implementing the results of futures projects proved challenging. This was partly due to the level of urgency fading after a project and participants getting used to the new normal. For example, the energy crisis in Europe was initially a core issue but faded as the company adjusted to the new normal.

"This is the challenge if we think so long term. When we discussed it several times how we can integrate it, they are not sure if we can really do it. Can we really have a 10-year plan for the whole company? It's challenging to make a plan with so much complexity."

"In this whole energy transition, there's a lot of uncertainty in how much is possible for our locations. Every country is completely different with completely different situations on the local energy level and the political level."

The difficulty in working with abstract futures and complexity tests participants' anticipation skills and cognitive flexibility. Participants recognition about still seeing the value of futures work suggests that, while reconciling with the limitations of futures work is challenging, it is also seen as a necessary and beneficial process for developing futures skills and enhancing organizational capabilities.

5. Discussion

This study aimed to evaluate the impact that futures projects can have on individuals' and a company's cultures on decision-making. The literature suggests that foresight has a positive impact on company performance (Rohrbeck & Kum, 2018). However, there has been a lack of focus on the role of futures skills in decision-making. To investigate this, we focused on two research questions:

RQ1: How did the futures projects impact participants' futures skills, anticipation and cognitive flexibility?

RQ2: How did anticipation and cognitive flexibility influence participants' and the company's decision-making?

With regard to research question 1, the findings suggest that the futures projects had an impact on participants' anticipation despite their already strong baseline abilities. There was a strong familiarity with anticipation given that the participants' role is to lead and therefore strategize for the future. Many interviewees discussed engaging in anticipation through formal or informal processes. The request for not just one but three futures projects showed their readiness to anticipate the future.

By utilizing anticipation, participants were not only able to familiarize themselves with the various trends and possibilities, but it also made participants more adaptable to emerging trends and shifting directions of the market. As one interviewee stated, they are confident regardless of the market's direction, and believe in their strong understanding of the possible paths the market could take.

The fact that the participants would again choose a 10+ year horizon for a hypothetical new project could be interpreted as having learned that long-term anticipation is valuable and needs continuous effort despite challenges.

In terms of cognitive flexibility, participants demonstrated a high willingness to engage with the complexity and uncertainty of futures. This readiness was evident in their consideration of weak signals and the desire to hear new perspectives that may challenge their views on familiar topics. Throughout the interviews, participants discussed the challenges associated with navigating the complexities of their industry and managing an international organization with diverse backgrounds and contexts. While cognitive flexibility is another key skill that is exemplified by business leaders and was present with the participants, some of the challenges faced such as managing complexity and uncertainty and investigating undesirable scenarios indicated some room for growth.

The improvement of cognitive flexibility was also evident in the participants' increased comfort with complexity and uncertainty in futures work. The projects fostered an environment where diverse perspectives could be openly discussed and challenged, which enabled participants to develop a more holistic understanding of possible futures. Interviewees stressed the importance of breaking usual patterns and getting out of their operational thinking to imagine the future they wanted and be purposeful about getting there.

Most critically, cognitive flexibility enabled participants to look beyond the noise of today, allowing them to identify the fundamental logics and drivers shaping the future. This was a crucial factor in ensuring that future orientation, especially in the Picture of the Future project, was grounded on a solid foundation for developing their vision, strategies, and goals.

Regarding the second research question on the impact on decision-making, while the projects did not directly alter specific decisions, they did influence decision-making processes. A multitude of responses indicated that the development of anticipation and cognitive flexibility had impacted their individual decision-making processes. As one interviewee described, he now has a "mental filter" that incorporates long-term future considerations when making decisions. Additionally, several respondents discussed incorporating a multi-track approach when making decisions.

The process of balancing a focus on opportunities and risks has also evolved. Some participants discussed the need to review additional risks and weaker signals. These participants do maintain a primary focus on opportunities but acknowledge that there should be an increased inclusion of diverse futures. Additionally, interviewees said that they would continue integrating a 360-degree perspective in decision-making. These impacts on the decision-making processes can be attributed to a growth in anticipation and cognitive flexibility skills.

6. Conclusions and recommendations

This study's findings largely support existing theories on the value of foresight in organizational decision-making, while also revealing nuances in how futures skills are developed and applied. The research aligns with Rohrbeck and Kum's (2018) assertion that foresight has observable outcomes on organizational performance and decision-making quality. However, it extends this understanding by demonstrating that even for experienced managers with existing anticipation and cognitive flexibility capabilities, structured futures projects can enhance futures skills. This supports Emanuelli et al.'s (2018) work on the development of futures skills, while providing more concrete information about futures skills and their impact in a corporate setting.

While this research contributes to the growing body of evidence on foresight's organizational value, it also highlights areas requiring further exploration. Future research could benefit from comparative studies across different industries and could provide insights into how context influences the development and application of futures skills. Finally, there is a need for investigation of other futures skills and the role they play in organizational decision-making. Such research would further bridge the gap between foresight theory and practical application in corporate environments.

This study is limited in the following respects. It conducts a retrospective analysis of futures projects that were completed up to five years ago, rather than employing an evaluative framework concurrent with the projects' execution. The study evaluates the subjective, and therefore limited and filtered, memories of the participants.

The selection of futures projects and the choice of interview partners – while guided by well-intentioned concerns for feasibility – were subject to a selection bias despite all efforts. To further limit biases in conducting the interviews, it was ensured that all interviews were led by someone not involved in any of the concerned projects.

11 of the 17 project participants approached agreed to be interviewed. They represent diversity in terms of country, management level, and professional background. At the same time, the sample size is too small to conclude the extent to which their responses are influenced by their specific country, management level, or professional background.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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