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FORESIGHT, SENSEMAKING, AND NEW PRODUCT DEVELOPMENT: CONSTRUCTING MEANINGS FOR THE FUTURE

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1. Introduction

Foresight has become a relevant research stream in strategy and innovation, its rise to prominence being driven by the growing pace of change and uncertainty in the business environment (Coates, Durance and Godet, 2010). Foresight encompasses a wide range of practices and the activities that decision makers might use to enhance their ability to detect new events and trends early, as well as to explore their future evolution and effects and identify the likely response options (Fergnani, 2022; Vecchiato, 2015). There is a growing stream of literature that underlines the role of foresight in new product development (NPD) (Li et al., 2020). Innovation managers are looking to transform collectively future trends and latent user needs into new products (Jissink, Schweitzer and Rohrbeck, 2019; Cooper, 2019; Wagner, Bican and Brem, 2021), and recently, foresight researchers called for further investigation into the contribution of foresight in the early, ambiguous stages (opportunity identification; idea generation and concept development) of the NPD process (Ehls, Gordon, Herstatt, and Rohrbeck, 2022).

Similarly, sensemaking is a theoretical perspective that is especially relevant for the management of uncertainties and external changes (Brown et al. 2014; Drazin et al. 1999). It constitutes a social process through which organizational actors collectively assign meaning to past experiences (retrospective sensemaking; see, for instance, Weick, 1995). Sensemaking can help an organization enhance its understanding of market changes and contribute to its NPD efforts (Henneberg et al. 2010). Scholars have focused on the processes through which

organizational players not only rationalize past and current situations but also assign meaning to future scenarios and user realities (future-oriented or prospective sensemaking; see, for instance, Ybema, 2010; Gephart, et al. 2010; Stigliani and Ravasi, 2012). Other sensemaking researchers called for further investigation into the relationship between future-oriented and retrospective sensemaking (Bruskin and Mikkelsen, 2020). Sandberg and Tsoukas (2020) advocated that sensemaking involves an ongoing interplay between the past, present and future; however, it is not yet clear how this interplay impacts foresight.

Despite the promising potential of a productive overlap between sensemaking and foresight, these fields developed relatively discretely. Hakmaoui et al. (2022) highlighted the opportunity for organizations to integrate different anticipatory systems and approaches to the analysis of the future evolution of the business environment, but how such an integrated approach can be applied at a microlevel of analysis remains to be further explored. Foresight scholars have only recently tried to merge these two research streams at the microlevel of practice, and they have investigated how individuals understand uncertainty and develop foresight (Tapinos and Pyper, 2018; Klos and Spieth, 2021), but how teams who engage in prospective processes such as NPD make sense collectively of the future and generate foresight is a research area that has received limited attention and requires further study (Ehls et al., 2022).

This paper builds on previous work to expand the understanding of the mutual relationship between foresight and sensemaking and its role in affecting the cognitive team dynamics, especially during the early stage of the NPD process. Specifically, we explore this relationship amidst technological changes and market shifts in NPD by attempting to answer the following twofold research question: *What is the interplay between foresight and sensemaking? How does this interplay affect NPD responses to market shifts and technological changes?*

Accordingly, this paper provides a dual contribution. First, it extends previous foresight-sensemaking research (Tapinos and Pyper, 2018; Klos and Spieth, 2021) by illuminating for

the first time the role of sensefacilitating, a new cognitive mechanism that is triggered by mental playing and mental travelling and which enables the gradual development of new collective mental models that are less constrained by the past of the company and more focused towards the future. Second, this work answers the call for further investigation on the impact of foresight and sensemaking in innovation management, specifically in NPD (Iden, et al. 2017; Li et al., 2020; Calof et al.,2020; Sarpong and Meissner, 2018; Ehls et al., 2022), and expands our understanding on the contribution of a future orientation (Jissink, et al., 2019) and a user focus perspective (Cooper, 2019; Wagner, et al., 2021). We show that the cross-fertilization of foresight and sensemaking enables the collective discovery and formal diffusion of user foresights, which in turn inform the development of meaningful and novel brand worlds early in the NPD process. According to our study, novel products are therefore no longer a means of simple profit making but ways to materialize the potential of these new future worlds; thus, they enhance internal alignment and long-term commitment within the NPD teams, which have been highlighted as critical factors of NPD success by innovation management scholars (Beverland, Mitchelly and Farelly, 2016).

The paper is organized as follows: First, we explore the extant literature on foresight (i.e., Rohrbeck et al., 2015; Vecchiato, 2017; 2020) and sensemaking (i.e., Weick, 1995), with a focus on NPD and decision-making under uncertainty (e.g., Ulrich and Eppinger, 2000). Second, we present our methodological approach, which is based on a systematic coding procedure of our empirical data drawn upon a longitudinal study of an entire NPD project as it unfolded in real time and in situ from its early stages through to its market commercialisation. Third, we discuss our findings and the theoretical contributions. Fourth, we present the practical implications of our research for innovation managers and organizational leaders faced with the increasing pace of market shifts and technological changes in their business environments.

2. Foresight, sensemaking, and decision-making under uncertainty

2.1 Foresight

Ehls et al. (2022, pg. 483) define strategic foresight as a collective process that enables “decision-makers see and evaluate future situations so as to better consider alternative courses of actions and the future outcomes of their choices”. While foresight has existed for several decades as a separate research stream, more recently, research in this field has explored its connection with the core theories and frameworks of strategy and innovation (Gordon et al., 2020). Scholars have particularly emphasized the linkage between foresight and the cognitive processes that help managers renew their mental models in a dynamic environment by igniting a forward-looking strategic discussion, supporting prospective problem solving, and eventually transforming future trends in new products and services (Ehls et al., 2022). A recent report of the EU commission highlighted the role of foresight in fostering the resilience of local companies and their capacity to cope with environmental uncertainty (EU Commission, 2021). In this vein, some scholars have emphasized a trend of applying networked and collaborative approaches to strategic foresight by arguing that these are particularly suited to the needs of broader innovation ecosystems. Networked and collaborative foresight involves the active contributions of different network partners (Heger and Boman 2015; Van der Duin et al. 2014) and better responds to the call for “fully-fledged” foresight integrating forward thinking, strategic planning, and broadening participation (Miles, 2010; Loveridge, 2009).

Foresight encompasses a wide range of practices and techniques from relatively agile focus groups, such as panels (Mauksch et al., 2020) and workshops (Rohrbeck et al., 2015; Klos and Spieth 2021), or narrative techniques, such as storytelling (Milojević and Inayatullah, 2015) and the worldbuilding creation of the context of the story (Zaidi, 2019), to more complex techniques, such as scenario planning, roadmapping (Porter et al., 2004) and environmental

and horizon scanning (Heger and Rohrbeck 2012). Despite the different techniques and approaches to foresight, a typical feature is the use of analogical reasoning, which entails the elaboration of knowledge from previous experiences to anticipate future changes, their evolutions, and their impacts on an organization (Gavetti and Menon, 2016). Specifically, foresight involves the search for a response to a future change, e.g., a new technology or user need, through a perceived similarity between this future instance and one encountered in the past. The familiar previous instance (the “source analogue” or “source problem”) is then used to make inferences and assumptions about the novel situation (the so-called “target problem”). The transfer of insights from the source problem to the target problem requires adapting the lessons (knowledge and understanding) inferred from the source problem to interpret the peculiarities of the target problem. Such interpretations might take the form of a suggested solution or a threat warning (Gary et al. 2012). Thus, the application of foresight and analogies from a past problem to a novel situation can reduce complexity and uncertainty and enable managers to adapt their managerial beliefs (i.e., mental models) to a dynamic environment (Gavetti and Menon, 2016; Vecchiato, 2020). Boe-Lillegraven and Monterde (2015) tested from a cognitive perspective several propositions regarding foresight and deduced that managers involved in foresight activities reap greater cognitive benefits. Indeed, scholars emphasize that the ultimate objective of foresight is not the anticipation of the future per se but rather the development of new mental models that enable decision-makers to respond more quickly and effectively to environmental changes—including new technologies and user needs (Grant, 2003; Phadnis et al. 2014).

2.2 Sensemaking

Similarly to foresight, sensemaking is an established research stream in the management literature that addresses decision-making under the growing uncertainty of the business

environment (Introna, 2019). Sensemaking refers to the process through which individuals seek to understand the implications of current issues or events that are ambiguous, complex or novel for their organizations (Christianson and Barton, 2021; Brown et al. 2008), such as market changes and emerging user needs. According to Weick (1995), ambiguity is the result of the lack of information about a new phenomenon, which makes it more difficult to assess the consequences of management decisions. In such cases, senior managers need to improve their ability to interpret external events and sensemaking, that is, to assign meaning to a complex reality. Specifically, Weick (1995; 2020) attached several complementary meanings to the term “sensemaking”, including gaining an intellectual grasp of an ambiguous situation, developing a perception, defining meaningfulness, generating an understanding, and reflecting. Similarly, Starbuck and Milliken (1988) suggested that sensemaking involves comprehending, understanding, explaining, articulating, extrapolating and predicting external changes and novel situations. Brown et al. (2008, p1055) indicated that to “make sense is to organize, and sensemaking refers to processes of organizing using the technology of language—processes of labelling and categorizing for instance—and routinizing memories into plausible explanations”.

Accordingly, sensemaking continuously occurs within specific practice worlds (Sandberg and Tsoukas, 2020; Mills et al. 2010), whereby individuals or groups seek to “extract cues and... make plausible sense retrospectively while enacting more or less order into those circumstances” (Weick et al. 2005, p409). Sensemaking is commonly understood to be a process of social construction that emerges from individual interactions and is situated in conversational and social practices (Weiser, 2021; Maitlis, 2005; Martens, et al. 2007). However, collective sensemaking does not necessarily involve an explicit group agreement; rather, it mostly entails a mutually co-constituted process that occurs retrospectively when sufficiently similar understandings are constructed among individuals (Maitlis and

Christianson, 2014). When groups are involved in ambiguous situations, sensemaking based on discussion is central (Gioia and Mehra, 1996). Constructing intersubjective meaning, mental models and schemata within work groups entails not only discussion and interpretation but also mutual influence; sensemaking involves “attempting to influence the meaning construction of others towards a preferred redefinition of organizational reality” (Gioia and Chittipeddi, 1991, p442).

In addition, Weick et al. (2005) proposed an integrative process of sensemaking that involves four iterative phases: 1) noticing and bracketing (extracting cues from flows of experiences and sources of inspiration, followed by labelling); 2) articulating (framing, verbally articulating, and making sense of a circumstance by linking materials, cues and abstract categories); 3) elaborating (storing, sharing and retrieving mental content; integrating and refining emerging mental structures; making provisional interpretations; and visual integration); and 4) influencing or sensegiving (explaining, accounting for choices, communicating meaning, and persuading others about the suitability of a creative response). Empirical studies of hospitals illuminate an iterative phase of a different nature, i.e., the facilitation of sensemaking efforts (Hofmann et al. 2009). Nursing practitioners introduced a guiding approach to manage complexity in sensemaking and to help patients’ family members rationalize past events and their present roles; this approach is “facilitated sensemaking” and involves the collection of cues, two-way communication and reflective inquiry (Davidson, 2010). Although facilitation interventions are deemed necessary for sensemaking, no empirical studies have explored the nature and role of such facilitating approaches in other organizational settings and contexts. Thus, research on foresight might help bridge this gap in the literature. Previous scholars have argued that managers tend to implement foresight when they are aware of a substantial deficiency in their capability to make sense of external changes (Meyer, 2019; Burt and van der Heijden, 2008). Accordingly, foresight practices are likely to support all

phases of sensemaking, facilitating in particular the elaboration of knowledge from previous experiences, and the use of this knowledge to assign meaning to anticipated future events.

2.3 Foresight, Sensemaking and NPD

The next sections provide a brief introduction to NPD theory and discuss insights drawn from previous studies that explore the intersections between sensemaking and NPD; sensemaking and foresight; and their relationship to NPD.

2.3.1 NPD.

NPD involves the adaptation of current products and services and the generation of new ones to address environmental changes, especially technological and market discontinuities, and to meet emerging user needs before and more effectively than competitors (Hakonsson et al. 2015). The NPD process broadly involves the four stages of opportunity identification; idea generation and concept development; implementation; and market launch (Kahn, 2005; Veryzer, 1998). The strategic fit and novelty of new ideas/concepts (Wagner, Bican and Brem, 2021) and the innovation financial performance of commercialised new products (such as market share and sales and profit evolution) are considered key indicators of success in NPD endeavours (Dziallas and Blind, 2019). Although NPD is a resource-intensive process, much of the value of the investment is lost because more than 40% of new products fail at market launch; for every 7 of 10 novel product concepts, only one is successful in the marketplace, and only 13% of organizations announce that their NPD efforts achieve their annual innovation financial performance objectives (Cooper, 2019); and a lack of market orientation and user focus are primary reasons for the failure of NPD projects, especially during their ambiguous and uncertain early stages (Cooper, 2019; Wagner et al., 2021). Most importantly, NPD project success depends on the capacity of different functional managers and external partners to

effectively collaborate; however, this capacity is often hindered by conflict due to contradictory individual mental models and schemata (Beverland, et al., 2016).

2.3.2 Sensemaking and NPD

A common collective understanding of user needs and preferences, therefore, is considered critical for NPD performance (Agarwal, Brem and Grottke, 2018). Moreover, collective sensemaking capability, which involves internal and external communication, information gathering, information classification, building shared mental models, and taking experimental actions, has a positive impact on the information implementation and speed-to-market of new products (Akgün, et al., 2006; 2012). Sensemaking can also enable horizon expanding discourse (Beverland, et al., 2016) and improve the interpretation of constraining rules (Christiansen and Varnes, 2009) among those involved in NPD. A more recent NPD sensemaking study analysed the individual political decision-making processes for innovation portfolios (Roeth, Spieth and Lange, 2019). Although the findings showed that political behaviour manifests as an influencing or sensegiving (sensegiving and influencing will be used interchangeably in this paper) and a sensebreaking process, with innovation managers seeking to determine a NPD project's viability for commercialization by destroying its existing meaning and shaping portfolio decisions (ibid.), questions are raised as to whether sensebreaking is enacted during the creative early stages of NPD where groups of managers engage in collective sensemaking for the identification of opportunities and the generation of new ideas.

While sensemaking focuses mainly on past events and experiences, NPD entails a future orientation towards the creation of currently non-existent outcomes. New product concepts cannot be visualized and described using historical information alone because they reflect a reality that does not yet wholly exist; it is in the making. Moreover, understanding user needs in NPD has a future orientation conceptualized as user foresight (Sakellariou et al., 2020).

Indeed, a large empirical study found that a continuous future-looking focus enhances NPD success (Jissink, et al., 2019).

In lieu of the traditional retrospective approach, some scholars have recently emphasized a new approach to sensemaking: prospective (or future-oriented) sensemaking. Prospective sensemaking is concerned with the construction of new meanings and schemata that serve as springboards for future images and projects. Thus, rather than focusing on events that have already occurred, prospective sensemaking attempts to anticipate future changes and builds a collective understanding of these changes before they occur (Konlechner, et al. 2018; Morais-Storz et al., 2020). Stigliani and Ravasi (2012) extended Weick et al.'s (2005) original framework and proposed a multiphase, multilevel decision-making process that shows how prospective sensemaking can be applied in the creative design of new products. Their study revealed that a somewhat relaxed time pressure on prospective sensemaking provides the opportunity for prolonged and conscious articulations and elaborations of provisional interpretations.

Sensemaking scholars have argued that collective and deliberate sensemaking unfolds through chronological time (a succession of past, present and future) and existential time (when dimensions of past, present, and future take place not sequentially but simultaneously); this therefore involves an ongoing interplay between looking backwards in time to construct plausible interpretations that provide a temporary sense and acting forward to explore future possibilities (Kaplan and Orlikowski, 2013; Sarpong and Maclean, 2016). This perspective adds a temporal dimension to the prospective sensemaking construct but lacks empirical investigation and requires further study. Although the importance of prospective sensemaking has been increasingly acknowledged in the research on the management of innovation and NPD, this process remains rather understudied (as shown in Table 5), and further investigation is needed (Brown et al. 2014; Stigliani and Ravasi, 2012; Bellis and Verganti, 2020).

2.3.3 Foresight and Sensemaking

Most recently, two empirical studies drew their attention to the cross-fertilization of the foresight and sensemaking research streams. The first study (Tapinos and Pyper, 2018) explored individual foresight and was based on interviews with professional analysts who did not adopt formalised processes to anticipate the future; the findings revealed the role of developing mental ‘systems of relationships’ as a reference point for the foresight process in the effort to make sense of uncertainty. According to Tapinos and Pyper (2018), individual foresight is shaped by one’s own past knowledge, experience, external cues and disciplined imagination, and it is episodic. However, it is possible that the imagination of the professional analysts was constrained by their past mental models and schemata; this could explain why the participants in this study produced future-oriented outcomes that were short-lived; it is evident that more investigation of the temporal dimension across foresight and sensemaking is required. Moreover, because the Tapinos and Pyper (2018) research focused on how individuals develop foresight, further investigation is required on how teams of individuals with different mental models collaborate to understand and co-create a new collective mental model.

In the most recent empirical study on sensemaking and foresight (Klos and Spieth, 2021), the authors designed and conducted foresight interventions (workshops) on digital transformation with participants from the construction sector, and their data collection comprised interviews and group discussions. Their findings revealed that managers distinguished their sensemaking in sensegiving (or influencing) and sensebreaking during the foresight workshops and created a vision of their organization’s future development; however, the study showed that after the workshops, the managers ignored the foresight outcomes and returned to their initial technological frames due to the gravitation of the organization’s dominant logic. Further empirical in real-time and in situ research—regarding, specifically, the development and

sharing of collective interpretations of future changes and, generally, the effective establishment and use of these novel interpretations among groups of managers—would be necessary.

2.3.4 Foresight, Sensemaking in NPD

Foresight plays an important role in NPD by enhancing strategic consideration and external orientation and by increasing the number of new concepts and ideas developed (Li et al., 2020; Ehls et al., 2022). Despite the growing attention to strategic foresight and its use in corporate organizations, there is a limited amount of research at the theoretical and empirical levels on how foresight contributes to the collective identification and exploitation of opportunities specifically for product innovation at the microlevel of analysis (Calof et al., 2020). While there is general agreement that foresight can effectively support NPD, we still know relatively little about the relationship between foresight and group managerial decisions on new products and services (Yoon et al., 2018). There is also a lack of research exploring the link between foresight and (prospective) sensemaking and their role in NPD. Both research streams aim to anticipate future changes and build shared understandings of their future consequences, but few theoretical and empirical studies merge the fields of foresight and sensemaking in NPD. The growing interest in foresight and prospective sensemaking and the ongoing lack of empirical studies on their mutual influences in the NPD context offer a major opportunity for new research (Iden, et al. 2017). Therefore, in this paper, we seize this opportunity; that is, we extend current theory and create new insights by exploring *the relationship between foresight and sensemaking and the contributions of this relationship to NPD amidst major technological changes and market shifts*.

3. Research method

The research aim of this study was to explore the mutual influence between sensemaking and foresight and the impact of this influence on NPD. To study this emergent and complex phenomenon, a single case study was conducted. Case study research is considered most suitable as a tool used in the critical, early phases of the development of a new management theory, when key variables and their relationships are explored and complex processes are unfolding in time (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). A review of the existing sensemaking theory and research of the *Academy of Management Annals* (Maitlis and Christianson, 2014) reveals the suitability of the case study method for this stream of research: sensemaking researchers adopt predominantly the single-case study method because this research design is well suited to capture the complexity, temporality and full richness of the sensemaking process and the perspectives of the actors involved (Eisenhardt, 1989; Yin, 2003). Moreover, the limited amount of theoretical and empirical research on the relationship between foresight and product innovation calls for more case studies addressing this gap in the literature (Rohrbeck et al., 2015; Sarpong and Meissner, 2018). Although the results of this method are difficult to generalize, examining a single case longitudinally provides the opportunity for the generalizability of such theory building in subsequent studies (Yin, 1994; Siggelkow, 2007; Miles, Huberman, and Saldana, 2013).

Similarly, the case study method has been adopted extensively by foresight scholars, as evidenced in a recent systematic literature review examining five decades of foresight research published in *Technological Forecasting and Social Change* (Gordon et al., 2020). Foresight scholars have addressed the need for further in-depth and longitudinal case studies (Calof, et al., 2020; Li, et al., 2020) to provide novel empirical insights into the fields of foresight and NPD (Sarpong and Meissner, 2018; Ehls et al., 2022) and on their intersection with the

sensemaking stream of research (Boe-Lillegraven and Monterde, 2015; Tapinos and Pyper, 2018).

To answer this call, the single case study presented in this paper is longitudinal and was conducted in the context of an international consumer goods company. The authors had privileged access to the company and internal and external informants and could collect confidential data in real time, *in situ*, to explore foresight practices and sensemaking microlevel processes by following an entire project from its initial discovery and evaluation through to its market commercialization; this is an early-stage study of an under-researched and complex phenomenon, and the single longitudinal case study approach is thus considered suitable (Calof, et al., 2020; Eisenhardt and Graebner, 2007).

3.1 Research setting

Qualitative sampling is often purposive (Miles and Huberman, 1994) instead of random, with the subject of an investigation and its research objectives determining the selection of the given case, informants, and events to facilitate information-rich choices. The first criterion used to select the industry of the case organization was the kind and magnitude of market and technological changes. At the time of the study, European and chemical legislation was changing rapidly to shift towards more sustainable patterns of consumption, production, and waste management as well as towards the use of biodegradable packaging and raw materials in packaged goods. Accordingly, the fast-moving consumer goods (FMCG) industry was selected. The second criterion was that the case organization needed to have foresight and sensemaking capabilities integrated into its collective decision-making and a significant NPD project that could be studied in real time. The authors adopted the following list of criteria developed by Socolova (2015) based on which organizational projects qualify to be categorized as *foresight* projects: multistakeholder participation; future orientation and diligent application

of foresight techniques; and support of the decision-making process. A consumer goods organization, which we refer to as *Forward* (for confidentiality), met Socolova's (2015) criteria. It produces pharmaceutical and health care products, pet foods, and beauty products, as well as cleaning products with a cleaner brand we refer to as *Clearfutur* (pseudonym for confidentiality purposes). This paper focuses on an NPD project that was carried out for Clearfutur and which was categorized as a foresight project (Socolova, 2015): at the time, Forward was aiming to develop an NPD future-oriented roadmap for Clearfutur in response to major shifts in European chemical legislation and changes in user needs. As a result, the existing substances used by Forward would soon be obsolete. Moreover, the company had to meet growing environmental concerns from the public and negative associations towards existing product formulations that were perceived to be potentially unsafe and harsh. Forward therefore aimed first to explore whether more environmentally friendly ingredient options could become more attractive commercial features and second to implement new product solutions that would achieve sustainable positive financial and market performance in the long term. The project entailed the participation of internal and external actors and stakeholders, including agencies, functional managers and customers. Our study focused on the early stages of NPD that involved opportunity identification, idea generation and concept development for the future NPD roadmap as it was co-constructed by managers and foresight consultants. After implementation, we returned to the company to elicit the impact of these events. The NPD roadmap for Clearfutur eventually resulted in financial and market outcomes that were evaluated as successful by Forward managers. Over the course of the study, however, we could not possibly know that the implementation of NPD would achieve such positive performance, so we were able to study the Clearfutur NPD project without any retrospective bias.

3.2 Data collection

Much of the understanding of how sensemaking is accomplished and of what sensemaking helps accomplish comes from data that provide revealing descriptions of the sensemaking process as it unfolds over time. Case study sensemaking research draws on predominantly rich qualitative data, including interviews, observations, and archival data, to illustrate the process of sensemaking (Gephart, 1993; Gioia & Chittipeddi, 1991; Gioia et al., 1994; Maitlis, 2005; Weick, 1988, 1993). In the same way, foresight empirical studies with a sensemaking perspective also draw on qualitative data (Boe-Lillegraven and Monterde, 2015; Klos and Spieth, 2021; Tapinos and Pyper, 2018; Li et al., 2022). In line with this approach, the research strategy used in this study relied on multiple sources of qualitative evidence, including non-participant observation, the collection and analysis of documents, and interviews with expert informants over the evolution of the NPD project. This methodological approach provided a unique research opportunity to employ a longitudinal component. Thus, it overcame the problems associated with the “snapshot” approach—looking at case phenomena at a single point in time—that characterizes many research studies, while permitting observations of how collective, prospective and retrospective sensemaking evolved in a foresight project for NPD. The triangulation of data collection methods enabled us to overcome single method limitations and develop a rounded understanding of the investigated process.

The project began when a London-based foresight consultancy agency was employed by Forward to conduct environmental and horizon scanning and to suggest possible future developments for the NPD project of Clearfutur. During this phase, on the one hand, foresight consultants worked independently of Forward, and on the other hand, they were collaborating with senior company managers to share the progress of their work and to achieve collective sensemaking and consensus. Such presentations and discussions were taking place in company meetings on key milestone dates; next, the company was organizing future-oriented workshops with Forward managers, users and external partners to enhance sensemaking across the broader

organization. The academic research team in no way influenced the way in which Forward employed different foresight methods, analysed the data, drew insights or made decisions.

---Insert Table 1 about here---

Table 1 describes the data sources used for this study. Over twelve months, the first author acted as a non-participant observer (Williams, 2008) of key milestone project meetings and workshops; conducted formal interviews; and had informal discussions and conversations with Forward managers, foresight consultants and experts. During project meetings, this researcher took field notes focusing on the interactions between the managers and the foresight consultants and was allowed access to presentation material, reports, meeting minutes and flipchart notes. The researcher was also permitted to videorecord one of the workshops wherein interactive talks, collective discussions and subgroup talks and presentations of heterogeneous actors (cross-functional managers-project participants, communication agency executives, target users and one facilitator) unfolded. Over the course of the workshop, the first author also kept field notes and was allowed access to sketches, flipchart notes and other presentation material. The observational data were shared among the two authors, who used them to produce a map of the foresight techniques and sensemaking skills exhibited by the participants over the evolution of the NPD project (Figure 2).

The observations were supported by ten in-depth expert interviews. The foresight consultants who were employed by Forward were interviewed (twice) by the research team to gain an understanding of their sensemaking of the unfolding foresight activities and to triangulate our own interpretations of the observational data. Other in-depth interviews were conducted with information- and experience-rich internal and external experts in foresight activities, including senior Forward managers with a successful track record of NPD implementation and external foresight and innovation executives with international experience in managing foresight and NPD projects in different industries. The interview data were used to investigate the cognitive

microprocesses enabled by the foresight practices. To examine the impact of the foresight activities and sensemaking skills developed by the participants, the research team conducted two ex post interviews with senior managers from Forward who were involved in the foresight study and directed the implementation of the NPD foresight roadmap in the organization's marketplace.

The interviews lasted between 1 hour and one and a half hours and were conducted via telephone conversations, face-to-face meetings and video conferences. The interview process was based on the task diagram interview guide on Applied Cognitive Task Analysis (ACTA) for expert interviews (Militello and Hutton, 1998) and was augmented with themes drawing upon the evaluation criteria for foresight projects: design, implementation and impact (Sokolova, 2015). The academic research team concentrated on the microlevel of practice (Tapinos and Pyper, 2018) and examined how informants made sense of future-oriented innovation by undertaking their daily activities in the context of the NPD project and how they were making innovation-led decisions. The academic researchers asked interviewees general questions about the idea generation and concept development process, foresight approaches, key learnings and areas for improvement; the researchers also asked for additional clarification on how innovation-led foresight practices had impacted the performance of the organization, in turn highlighting sensemaking as an element of the foresight process. Thus, the interview questions focused on how the managers had interpreted ambiguity and cocreated future innovation roadmaps.

External documentation (corporate publications and reports, external agency publications and website information) was used to provide familiarization with the organizational context of the external experts. Internal documentation was used to support the reconstruction of the concepts produced in the NPD project (Figure 2) and to integrate and triangulate evidence obtained from observations and interviews.

3.3 Data analysis

Based on grounded theory building (Charmaz, 2006; Glaser and Strauss, 1967), the approach to data analysis was highly iterative and involved ten stages for the coding and elaboration of emerging constructs.

Stage 1. Tracing foresight practices. During the NPD project for Clearfutur, the foresight agency and Forward managers engaged in a series of activities, meetings, and larger-scale workshops, and a wide range of documentation material was produced, including minutes, reports, analyses, mood videos and PowerPoint presentations. We used foresight literature-informed codes and themes and identified five foresight practices and techniques employed by Forward during the evolution of the NPD project, namely, *environmental scanning* (analysis of markets, industries, and brands); *horizon scanning* (analysis of future trends); *expert panel* (external foresight consultation); *storytelling* (narrative foresight); and *future-oriented workshops* (structured participatory foresight activities). The themes, codes, measures and respective literature are presented in Table 2.

Stage 2. Creating a timeline. We created a storyline and timeline of events (Figure 1) by checking the dates of foresight activities from the foresight consultants, meetings and workshops at Forward and from material produced to gain a deeper understanding of the data (Fournier and Mick, 1999). As illustrated in Figure 1, to establish links between the events and the NPD process at Forward, the events were mapped against the NPD stages (Veryzer, 1998).

Stage 3. Tracing sensemaking skills. We followed the sensemaking literature review and suggestion of themes and codes for inclusion in the early analysis of the observational and documentation data and the interviews with the foresight consultants. We iterated this process numerous times using the literature-informed codes developed by Weick et al., (2005) and Stigliani and Ravasi, (2012); we elicited three aggregated themes for the sensemaking skills: *noticing and bracketing* (extracting cues); *articulating and evaluating* (explaining experiences

and integrating concepts into a mental framework); and *influencing* (persuading for the benefit of a future idea). The themes, codes, measures and respective literature are described in Table 2.

Stage 4. Tracing the temporality of sensemaking. The conversations among participants and the tentative verbal (spoken or written) articulation of emerging interpretations between the past, present and future were essential to Forward managers and foresight consultants moving from the historical analysis to opportunity identification and collectively agreed concept development. To elicit the temporality dimension in each of the incidents of the manifestation of sensemaking skills, we drew upon sensemaking (Sandberg and Tsoukas, 2020) and foresight literature (Sarpong et al., 2019) and elicited three themes for the dimension of time, namely, the *past* (sensemaking of participants of events occurring before a point in time); *present* (sensemaking of participants of events occurring at a point in time, in progress); and *future* (sensemaking of participants of events occurring after a point in time). The respective operationalizations and measures are detailed in Table 2.

Stage 5. Eliciting novel sensemaking skills. Coding is a heuristic process of qualitative inquiry (Saldaña, 2021). Consistent with the exploratory nature of the research (and following the elicitation of the temporality of sensemaking in the data analysis process), two novel sensemaking skills emerged and were labelled *sensefacilitating* and *discovering*. Sensefacilitating was operationalized as an underlying sensemaking mechanism that involved two cognitive microprocesses: mental travelling, or the conscious effort to connect points in time (augmented from Sarpong et al., 2019), and mental playing (this term was borrowed from psychology scholars Suddendorf and Corballi, 1997), or the conscious effort to disconnect points in time (by using prompts and questions) through a playful attitude, role playing and personification. Discovering involved shifts in understanding, links of contradictions (Stigliani and Ravazi, 2012) and the identification of weak future signals from future trends (Rohrbeck

et al., 2015). The term ‘discovering’ was borrowed from the innovation management scholars (Koen et al., 2001) (Table 2).

Stage 6. Tracing market and technological changes. We examined the data for evidence of market and technological changes in the evolution of the NPD project for Clearfutur. Following multiple readings and reiterations of tentative interpretations, we identified three respective changes labelled *brand user values* involving beliefs and the purpose of brands and of users (augmented from Zaidi, 2019); *user foresights* described as the nexus of tensions and negative emotions with future-oriented user aspirations and positive emotions (augmented from Sakellariou et al., 2021, 2020); and *brandworld-new product ideas* characterized by novelty and strategic fit (Wagner, et al., 2021; Dziallas and Blind, 2019). Operationalizations and relevant literature are summarized in Table 2. To establish links between the market and technological changes, sensemaking skills and the temporality of sensemaking, axial coding was used, and the results were mapped accordingly (Figure 3).

---Insert Table 2 about here---

Stage 7. Developing construct validity. We sought to triangulate using different data collection strategies and literature-informed measures for the phenomena investigated (Gibbert, Ruigrok, and Wicki, 2008). The codes and themes emerging from the interview transcripts were compared with the codes and themes drawn from the documentation and observational data. Finally, they were reviewed based on the discrete foresight and sensemaking streams of the literature. Representative examples of the triangulation process across the different types of data and for each of the themes are presented in Table 3.

Stage 8. Checking reliability. One of the authors coded the data, and the other author checked a sample of codes to ensure intercoder reliability (Gibbert et al., 2008). The results of the intercoder checks are presented in Appendix 1. Two of the respondents checked the findings to ensure the trustworthiness of the data.

Stage 9. Developing the conceptual model. The iterative process of the data analysis and the emerging interpretations led to the development of a grounded, multilevel process model accounting for foresight, sensemaking, and NPD amidst major market shifts and technological changes.

Stage 10. Checking for impact. To elicit the impact of the new Cleafutur products on the performance of Forward, the transcripts and virtual recordings of the ex-post interviews (and the accompanied documentation) were examined for codes of two performance indicators drawn from Dziallas and Blind (2019): *market shares*, involving trends of market shares versus competition, and *financial results*, comprising trends of sales, profits and gross margins as evaluated by the respondents.

---Insert Table 3 about here---

4. Foresight and sensemaking at *Forward*

The data analysis, according to the order of time, revealed the interplay between the various foresight activities that unfolded at Forward and their evolution across each stage of the NPD project. The timeline in Figure 1 clearly shows that foresight activities at Forward focused predominantly on the initial stages of the NPD project (Veryzer, 1998). Taking into consideration the results of historical environmental scanning, the Forward leadership delegated the expert foresight consultants (Figure 1: two circles with dotted lines) the formal role to suggest alternative future NPD roadmaps for Clearfutur. Following the initiation of the NPD project, it was concluded that 89% of the foresight events occurred during the opportunity identification and idea generation-concept development NPD stages.

---Insert Figure 1 about here---

The lower part of the timeline in Figure 1 shows the foresight activities and techniques adopted by the expert panel foresight consultants. The upper part of the timeline shows the activities

employed by the Forward managers. As can be observed, each foresight activity by the foresight agency led to one or more foresight and sensemaking activities at Forward and vice versa. For example, when horizon scanning was completed by the foresight consultants and they captured in writing their tentative interpretations of the results, Forward first organized a future-oriented workshop to enhance sensemaking within the Clearfutur cross-functional team and among external collaborators and then commissioned a large-scale qualitative business market research project to elicit the users' sensemaking of the recommended future alternative pathways. In turn, the business market research results were disseminated to foresight consultants who reviewed their tentative interpretations and revised their horizon scanning results and proposals for Clearfutur.

Figure 2 illustrates the interrelationship between foresight and sensemaking as they were unfolded in the NPD project at Forward. As the dotted lines and the bidirectional arrows in the five sensemaking skills (noticing and bracketing; articulating and elaborating; sensefacilitating; discovering; and influencing) indicate, this process proceeded through multiple iterations within and across the foresight practices (environmental scanning; horizon scanning; expert panel; storytelling; future-oriented workshops). The figure also shows how the sensemaking cognitive subprocesses (e.g., extracting cues; explaining experiences; shifts in understanding; mental playing and time travelling; persuading for the goodness of an idea) combined with verbal, nonverbal, oral and visual systematic communication efforts (e.g., categorizing from the flow of experiences; conveying, clarifying and making sense of a circumstance; adopting a playful attitude and role playing; communicating meaning to others) supported the collective foresight practices.

---Insert Figure 2 about here---

For example, in the first future-oriented workshop, the functional participants first adopted a role-playing game that prompted them to disconnect temporarily from their functional roles;

although they all had different mental models because of their different functional expertise and past experiences, through the cognitive mechanism of sensefacilitating with mental playing, they discussed, interpreted and agreed the Clearfutur environmental and horizon scanning report results without being involved in conflicts (e.g., user problems, such as skin irritation due to the harsh formulation, and future trends, such as the rise of conscience consumerism).

The contributions of the relationship between foresight and sensemaking to NPD at Forward amidst major technological changes and market shifts are illustrated in Figure 3. Based on their mutual understanding of the future trends and the pros and cons of the Clearfutur brand and users' values and on their shared discovery of the Clearfutur user foresights, the NPD project team members were able to reimagine collectively six novel and strategically fit brand worlds for Clearfutur, including their respective new product ideas. The diagram shaped as a cone-funnel depicts the temporal dimension of the Clearfutur NPD foresight that focuses on the future by maintaining weak links to the past of the company due to the integration of the user foresights.

In the remainder of this section, we provide a comprehensive overview of this process at Forward. We summarize the foresight practices deployed by Forward and then focus our analysis on the five sensemaking skills and their impacts on NPD for Clearfutur amidst market and technological changes.

4.1 Foresight practices

Environmental scanning at Forward involved the review and synthesis by foresight consultants of available past business research on market drivers and existing technology, Clearfutur user profiles and segmentation and Clearfutur user needs. Horizon scanning involved a thorough investigation by the foresight agency of future and mega user and market trends, new

technologies and insights. The future-oriented workshops involved a more extensive team of Cleafutur cross-functional managers and other participants and incorporated collective sensemaking, decision making, evaluation, interaction and discussion with the support of a facilitator commissioned by Forward. Video storytelling (Milojević and Inayatullah, 2015) was used by the foresight agency to transform the new brand worlds into a video story that supported the desired future and to disseminate the horizon scanning results to Forward managers. These approaches were systematically embedded in the decision-making processes of the company in NPD project meetings held on milestone dates agreed upon by both parties. Internal and external expert panels were employed to consult with Forward's managers.

---Insert Figure 3 about here---

4.2 Sensemaking skills

4.2.1 Noticing and bracketing.

In sensemaking theory (Weick et al., 2005), making sense of ambiguous situations starts with the attendance of initial cues or stimuli that will then inform further cognitive work. Consistent with this view, in our study, noticing and bracketing involved extracting, labelling, and categorizing market and technological cues from flows of experiences, sources of inspiration and data. The foresight consultants and innovation managers collected existing brand, user and competitor information from the historic environmental scans and from their own experiences and categorized this information during verbal and written communication in expert panels and future oriented workshops. For example, the Forward managers reviewed the archived research on user needs for the previous 15 years and collected the key themes that underpinned the brand user profile in each document: *“We looked backwards and collected every piece of information gathered on this area, and we might have 500 pieces of paper with facts”*.

One of the managers explained how they prioritized and categorized these cues: *“Something we did which was very useful for us was that we made a “bible” or a concept element book.*

We obtained all the reports, information, advertising and newspaper articles about children's development, families, brands, etc. We asked everybody on the team to go through one, two or three of these publications and to take out the most important information and write it on a piece of paper".

These practices supported the unpacking of the core pre-existing brand and user values for Clearfutur, including user beliefs about the brand and the market and Clearfutur's preexisting purpose and brand culture. During the project, the managers, by exploring and discussing past information, were able to understand the past user profile; for example, one was summarized as *"women with traditional values who cared for their home and family"*. In the first future-oriented workshop, Forward's managers met with their external collaborators, and some users recalled ill-defined pre-existing values of the brand, such as *"its effectiveness"* and *"trust"*. The discussion continued for a while and led to several other abstract pre-existing values, each of which was noted by the moderator on a flipchart, which included the following: *"trusted expertise, cleaning solutions, disinfectant solutions, stain removal solutions, germ elimination solutions, versatility in use, hygiene solutions, ease of use, sense of freshness solutions, brightness solutions, whitening solutions"*. In the second future-oriented workshop, the participants noted the *"trustworthiness of the brand, its high quality and its effectiveness"*. They defined the three core cues that shaped the brand's value in the past as follows: *"trusted, expertise, and cleaning solutions"*. Noticing and bracketing therefore allowed foresight experts and Forward's managers to encode complex patterns of the past into explicit brand cues.

4.2.2 Articulating and elaborating.

In sensemaking studies, as new understandings emerge (articulating), the cognitive effort shifts towards the gradual integration of these understandings into further complex mental structures linking various parts of the task environment (elaborating) (Stigliani and Ravasi, 2012). Accordingly, in our study, when the participants of the NPD project labelled the initial cues,

they started to further explain their experiences with and understandings of these explicit brand cues. They then attempted to refine ill-defined mental structures and integrate the concepts into a more multifaceted mental framework of the pre-existing values of the Clearfutur brand and its users.

Thus, the initial cues of the pre-existing brand values (e.g., *trusted, expertise, and cleaning solutions*) were imbued with meaning through current and tentative interpretations, reflections and conversational practices. One of the external experts recalled that the abstract cues were usually meaningless without adequate reflection and discussion: *“Once I’ve done that, I try to hone in on one or two, maybe three particular areas, depending on the product category I’m working on, which would seem to feel particularly exciting... So, basically, once you have all your information, you then need to look for interpretation”*. Another Forward manager added *“we need to reflect about all sorts of information regarding numbers, consumers, dimensions of markets, and potentials of growth because each one of us had some different experiences about taste in terms of products”*. To deepen their understanding of the pre-existing brand values, the expert panel reviewed past communication material and research reports, as evidenced by the documentation analysis.

At the future-oriented workshop, deeper understandings emerged among Forward’s managers through conversations about the Clearfutur brand, where they connected market insights to their own experiences, memories, and day-to-day lives: *“I have used it, and it is the only one which is used in hospitals, in supermarkets, in butchers’ shops where meat and chicken are being handled, for germs, for salmonella, for all pathogenic germs, etc.”* (User A). For example, in their discussions, the managers discussed the user problem of garbage bags that posed dangers to consumers’ health as sources of harmful germs. User B said, *“We don’t leave the bags anywhere. We put them in the bin, and we take them out to the garbage bin”*. Next, the R&D manager recalled a family member’s product-related experience; she had never used

this product due to her potential allergic reaction. Other managers reflected upon their own practices: *“Because, in our houses we have different types of surfaces, e.g., tile, wood or carpet, if you put corrosive ingredients on them, you may destroy them”*. In the second future-oriented workshop, Forward’s managers considered how the brand had started *“to lose its emotional connection with the customers”* and how *“its harsh formulation was not harmonized with future customer needs”*. Some features of Clearfutur’s products, such as their formulation and performance, conflicted with consumers’ ongoing shift towards family safety and more environmentally friendly raw materials. Therefore, Clearfutur’s overall brand image was becoming more polarizing. In an initial meeting, Forward’s managers agreed that because of *“dramatic shifts in consumer attitudes”*, they needed to *“take the product portfolio into new product territories”*. The expert panel agreed that they needed *“to find a new meaning for the brand”* and to explore once again *“the ways and places...and what is believed to be provocative, relevant and new”*.

4.2.3 Discovering.

Discovering is a new sensemaking skill that was revealed in our study. It involved the cognitive integration of collective shifts in understandings and the elicitation of weak signals from the future that led to the generation of user foresights. In the NPD literature, user foresights refer to future unmet user needs drawn from market research (Sakellariou 2021;2020). In our study, we found that user foresights are the cognitive nexus of past and present user tensions or negative emotions with future user aspirations drawn from the integration of foresight and sensemaking in NPD. As provisional interpretations of the past and present of the Clearfutur brand and its users were developed, the project participants started to extract and combine cues from future market and users’ unmet needs through horizon scans, expert panels and future-oriented workshops. This iterative cognitive process led to ‘Aha’ moments and mental

epiphanies that involved cognitive intersections and improvisational connections between user tensions; negative emotions (fear, disappointment, and frustration); and prospective user wants, aspirations, and positive emotions (pleasure, joy, fun, and satisfaction). One of the foresight experts reflected: *“There are too many brands, and we would assume that there are going to be lapses in the future as the world gets bigger and wider and more global. Therefore, innovation in the future will not be about creating simply new ideas for new brands. It will be about taking existing brands and making them more meaningful”*. For example, when a cognitive linkage between past and present user insights and future user aspirations for Clearfutur was established, user foresights emerged. These user foresights revealed either novel tensions and contradictions or novel complementarities between past, present and future user needs. A senior manager described the approach to the generation of user foresights as follows: *“As an overview, the way you can drive creative leaps is to drive the understanding of commonalities from a series of sources and tensions, which arise from a series of sources—and the way that we like to work is to keep one eye on the external space (the environment and the consumer) and one eye on the internal space (the organization’s capability and ideology). If you can be open and combine those two spaces, that usually can drive a creative leap forward”*.

In addition, the foresight consultants identified numerous unexpected tensions between users’ present needs, such as between the fact that *“women need to achieve self-fulfilment via their individual needs”* and the *“need to achieve self-fulfilment via their maternal and family needs”*. They found that these tensions triggered negative emotions in women: *“Because modern women still have traditional values, they are playing multiple roles, but they are worried and are in need of rescue”*. Such an in-depth understanding led to the discovery of a user foresight that more elaborately connected modern women’s future-oriented aspirations with present problems and issues, such as the comments *“The desire to enjoy a multifaceted happy life. ... is*

a life that is ever more complex.....and this complexity delivers a sense of balance and completeness” and “The world has changed; new dangers, new threats, and new concerns require new solutions. Women can no longer isolate themselves to protect only themselves”.

This user foresight prompted the consultants to further reflect on how Forward was letting its users down: *“We are still stereotyping women; women’s lives are complicated enough; we are failing to recognize their world... and, pressures have evolved”.*

In addition, the expert team identified a similar user tension. On the one hand, Clearfutur’s users had a strong desire for home cleanliness; on the other hand, they had serious concerns about overly *“efficient”* products and their impacts on environmental and family safety. This tension was elaborated in the discussions among Forward’s managers during the first workshop, where they exchanged views on both the advantages and limitations of Clearfutur: *“[I]t has both positives and negatives (such as the bad smell)”* (User A). The manufacturing manager then explained that the strong smell was strongly identified by the target market with the brand itself. Such cues acted as a stimulus for discussion, leading to a reframing of understanding by linking different interpretations and contradictory views. The resulting novel mental connections led to new mental models about future user aspirations and expectations from Clearfutur. For example, the user foresight on carpet cleaning integrated an existing user problem, a product trigger and product misuse into a future-oriented aspiration: *“Strong cleaning products cause carpet colours to fade. However, carpets are germ and bacteria collectors, and there is a need for a product to clean carpets deeply and safely, thereby respecting them and keeping them in good condition at the same time”.*

According to one of the experts, the insight regional director, familiar insights were not deemed useful for innovation: *“You cannot innovate if you just address insights that have been addressed before. That may seem a little bit familiar to you. Get a little bit crazy on this 1st level of inspiration, because only when you get a little bit crazy can you open up the horizon*

and get many things into the pile". Hence, the discovery of user foresights was the result of gradual, novel connections of past and present information with future-oriented needs and aspirations, which highlighted the nexus of collective foresight and sensemaking efforts.

4.2.4 Sensefacilitating.

Sensefacilitating was identified as a supplementary novel sensemaking skill in our study, and it was blended with discovering. Sensefacilitating was employed in the horizon scans, expert panels, storytelling modes and future oriented workshops at Forward; it was the main process to activate and foster the interplay between foresight and sensemaking. Together with discovering, sensefacilitating enabled the generation of user foresights. Sensefacilitating was activated by the two enabling cognitive mechanisms of mental time travelling and mental playing. Augmented by Sarpong et al. (2019), in our study, mental time travelling involved the conscious effort to transmit cognitively across multiple time horizons using prompts, questions, or narratives. For example, foresight experts used the following prompts when presenting their findings to Forward's managers: "*Which values can we hold on to when the world moves on?*"; "*How is our industry letting people down currently?*"; and "*How can we translate our brand ideology into the future?*".

Mental time was also instantiated in the visual and video storytelling that was produced by the external consultants. An illustrative example is a short video narrative that contained imagery, protagonists and sound effects to bring life to old (traditional and polarizing) and new (confident or empathetic but safe) brand ideologies. The linkage of the past with the future was demonstrated by the words used in the video's two opening statements: "*Cleaning is about threat and guilt. We believe there can be another way—tomorrow's solutions*". Therefore, in the 2.14 minutes of the video narrative, the audience could mentally travel from the past to the present and the future.

Moreover, mental time travel was used in the two future oriented workshops to foster the identification of key features of future products through conversational practices. Numerous prompts were used to enhance such time travel among the participative actors: “*Clearfutur: today and tomorrow*” or “*We, ourselves, need to stretch, to squeeze our minds, our thoughts, and our ideas and come up literally by touching (reaching out to) the future and by looking within to see what we can trawl that would make our life better and easier in the present*”.

Mental playing was the other mechanism of sensefacilitating and involved the conscious effort to disconnect points in time through a playful attitude, role playing, and personification using prompts or questions. In addition, our data showed that mental playing was used in the first future-oriented workshop. The moderator gave Forward’s managers and collaborators a playful task: “*As a form of introducing ourselves, just give us your first name and tell us what you think you were in your previous life and why*”. This humorous prompt encouraged the participants to open up and discuss their inner dreams. Among others, the finance manager said he was a pharaoh, and the R&D manager said she was a cat named Garfield. Therefore, this playful game served as an ice breaker for the heterogeneous participants. Afterwards, the moderator triggered the first phase of the discussion by asking “*What secret makes Clearfutur such a popular product?*” The actors responded quickly, building on each other’s ideas. The moderator then introduced another mental game, and she suggested that they consider Santa Claus and the type of disinfectant product he would bring to each person in the room. The odder the idea was, the more valuable a prize each actor could take: “*I’d like to imagine there is a bucket where we put all our wishes for Clearfutur or what we expect. We are free to say anything. I shouldn’t forget to tell you: the weirder the idea is, the higher the value of the prize you will get. If someone has a crazy idea, he has the craft of an inventor*”. These mental games took place throughout the workshop, and the moderator referred to participants with their

imaginary names. She was “giving” each imaginary and amusing prize for their engagement and suggestions throughout the duration of the discussions.

By borrowing different cues from the user foresights and the use of the sensefacilitating skills, the project participants cocreated six future worlds for the Clearfutur brand. The findings show that each future brand world consisted of a tailored novel brand imaginary environment, aesthetics, symbolic associations, user profiles and new product solutions. These findings extend the foresight theory of worldbuilding that advocates the process of constructing a complete and plausible imaginary world that serves as a context for a story (Zaidi, 2019).

Each future world was given a title to capture its essence. Examples of these worlds were “*home love*”, which evolved around effective caring for the home and the family, and “*bright homework*”, which focused on the goal of effective cleaning without side effects. The third world, “*home collaborator*”, explored how a clean home could convey love and care when a user could not be there and capitalized upon “*the upcoming role of brands in home care practices*” and “*the more women will continue working*” trends. Furthermore, “*miraculous homecare*” was developed around the idea of fundamentally good products for a delightful home by drawing from the possible trend of “*rising traditional values*”. Each future world involved numerous novel product ideas that addressed the unmet needs of the users in this particular world, such as the following: “*quick spritz wipes, deep cleanse soaker, all-in-one complete-clean, individual treatments for different rooms, a product against mould, a disinfectant cloth for special surfaces or metal, paints for the walls, disinfectant sponges, shopping bags and garbage bags infused with disinfectant, a disinfectant product for sensitive skins to fight allergies, and a special foam for the refrigerator*”.

4.2.5 Influencing.

According to Weick et al. (2005), influencing refers to communicating meaning and persuading others about the suitability of a creative response. Similarly, in our study, influencing involved persuading others about the suitability of future solutions and permitting or not permitting future-oriented actions. In line with the NPD literature (e.g., Dziallas and Blind, 2019), we found that the consultants and managers used two criteria to permit or not permit the future implementation of the future worlds and their respective new product ideas: novelty (new to the market) and strategic fit (meeting the overall strategic objectives of Clearfutur).

At Forward, influencing targeted stakeholders, colleagues, and collaborators involved conversational practices: *“The question you need to ask is—who are the people who need to be on board but not in the lead to make the end result the same? How can we ensure that the people who oversee this work will ultimately make it work for them? We believe that those people are better approached with different techniques; often, it is about one-on-one conversations, listening to them very hard and understanding what their fears, objections, obstacles, and barriers are”* (Foresight Consultant).

Influencing others during the sensemaking process was a significant but also challenging task: *“The most difficult to implement... is the motivation and the willingness of the team to actually go for it”* (Forward Manager). Collective screening of the future responses was important to obtain agreement and to proceed to the selection and implementation phases: *“All the stakeholders get together and select ideas according to criteria. So, if your first criterion is that you want an idea that can work in the market, you search for technological feasibility”* (Insight Director). In the documentation analysis, it was evident that the foresight panel experts conducted feedback sessions with users and managers to assess the relevance of the future worlds to the present and the capabilities required in the present to create those worlds in the future.

In the first future-oriented workshop, influencing involved both screening and initial collective decision-making. The participants thus formed subgroups and presented and evaluated their new product ideas based on the criteria of novelty and strategic fit. For example, in presenting its ideas, the first subgroup argued strongly in favour of its creative idea: *“This is an excellent creative response... a product that changes colour to inform us that the product has worked”* (User C). The second subgroup presented a creative concept of a cleaning foam for refrigerators where *“if there are any germs, the foam will change colour”*. By the time the third subgroup presented, the colour-changing creative response had been so well elaborated that it was discussed as *“virtual imaging”* and *“ah yes, sure”* (User C) or *“you are able to check whether it is clean or not”* (R&D Manager).

Based on the criteria of novelty and strategic fit, the workshop participants selected a limited number of product ideas to further explore, including *“a micrograin scrub”*, *“a skincare range related to feet, head lice”*, *“hand wipes”*, *“a special self-disinfecting cleaning sponge”*, *“a product for cleaning carpets”*, *“a dishwashing liquid”*, *“a new, less abrasive, gentle, sensitive cleaning product”*, and *“a range of disinfectant-infused garbage bags”*.

More of Forward’s senior managers participated in the second future-oriented workshop, and they agreed on the overarching future product roadmap for the company. One of the participating managers recalled that influencing the other participants mainly involved conscious and systematic active listening: *“It was very helpful to make the other colleagues in the workshop know that their views were being heard. We captured, in writing on the flip chart, all their points, comments and concerns”*. Therefore, in both workshops, decision-making for the future product roadmap was framed as a collective effort.

5. The impact of sensemaking and foresight on NPD at *Forward*

At the end of the foresight project, Forward conducted user testing to further investigate the user foresights that had been identified and their related possible future worlds (Zaidi, 2019). Eventually, an R&D manager found that there was an issue with the technical feasibility of some of these user foresights, whereby certain new product ideas could never progress to market. *“From a technical point of view, some future worlds were not feasible and did not strategically resonate with our customers”*.

The chronological analysis of the data showed that two future worlds (*“home love”* and *“home collaborator”*) were positively evaluated by users. The two optimal futures provided the framework for the detailed planning of the NPD roadmap for Clearfutur. One manager elaborated on the need to provide structure to the vagueness of the original idea: *“An idea has got to be really tangible, to have detail. It’s got to have, you know—it’s a blue bottle that flows like silk, that has a flip-top opening, and curves in the middle—you could even draw it on a piece of paper. Because if you all have a lid or a pink bottle or a blue bottle or a gold bottle or an upside-down bottle, you’ll have a whole list of small, very small, ideas that won’t go anywhere. So, I think the trick when you do idea generation is to bridge these ideas”*. Table 4 illustrates the example of the *“home love”* future world. In this world, the *“very effective”* products *“would deliver high efficiency”* with packaging *“in bold confident colours”* that would deliver *“a more appealing natural human imagery”*. Additionally, the *“home collaborator”* future world featured a brand that was *“complete, expert and supportive”*, which was manifested in new packaging ideas with *“warm natural colours”* to convey a more *empathetic* brand image.

---Insert Table 4 about here---

Forward’s Clearfutur NPD roadmap entailed the development and launch of a new all-in-one complete-clean range of products with gentle cleaning properties for different rooms and surfaces. Their packaging designs featured young families and pets in clean, everyday, and real

homes. Two years later, another innovative cleaning product was launched that was made only of natural ingredients, was safe to use in children's rooms and had an easy-to-use handle. Moreover, Forward designed and developed another group of bolder and more aggressive new product solutions that involved a range of highly effective cleaning products with strong active ingredients in black packaging. Both NPD routes involved higher value products with more sensorial properties and higher qualities. The product manager who implemented the NPD roadmap said, *"These years, a lot of innovation and redesigning was taking place. The introduction of a premium portfolio was mostly focused on every single segment of the market; new variants, new formulations, new fragrances and more premium propositions"*. The product manager recalled that the work that was done was important because it engaged all stakeholders in designing the future of the brand; that is, every innovation on the NPD roadmap was faithful to the outcomes of the foresight project and the related vision of how Clearfutur would move into the future.

In the following years, the company organized an annual one-day NPD planning workshop to assess the dynamics of the market and to review and change, when necessary, any step in the NPD roadmap planning process. A senior manager said, *"We had a series of launches in place, but we held one planning workshop every year with approximately 10-12 participants, and we collectively agreed on what to do next to identify the market opportunities or gaps in the short term and put a short-term action plan in place as the world changes. The decisions for the new NPD portfolio were right. The new Clearfutur products had a massive consumer appeal"*.

For example, in one of these workshops, Forward's managers had to make some difficult decisions to facilitate the NPD roadmap implementation, even postponing one of the new products. This decision was based on the financial information that the new product range would have a low gross margin, which would negatively impact its forecast profits: *"We made the decision not to launch two months before the launch. It was a significant disruption of the*

plans but a brave choice. We needed to withdraw, otherwise it would have been a failure in terms of the business results". In four months, following a series of formulations and financial revisions, the gross margin improved, and a new decision to finally launch the postponed innovative product was made.

Prior to the development of the NPD plan, Forward's industry was in decline, and Clearfutur was losing market share. The challenge for Forward was to reverse this decline into a growth plan. The product manager said, *"The NPD execution was make it or break it! We had to have a strong footprint in each segment and a high value in each segment to increase profitability. The first year, we achieved a seven-share-point increase and since then we have been growing year by year"*.

The documentation analysis showed that the interplay between foresight and sensemaking led Forward to create meaningful future worlds, which users were willing to pay a premium price to experience. Therefore, the NPD roadmap consisted of a range of products with higher prices and gross margins (Dziallas and Blind, 2019). As one product manager recalled, *"The NPD portfolio enabled Clearfutur to achieve successful business performance on an annual basis in terms of its revenue, profit and market share"*.

6. Discussion

To date, there is a relatively limited understanding of the relationship between foresight and (prospective) sensemaking in NPD. Despite the growing interest in research on foresight, there is a lack of empirical and theoretical work exploring whether and how foresight supports the identification of specific opportunities and the generation of new ideas for product innovation (Calof et al., 2020; Ehls, et al., 2022). The scarce foresight studies that adopt a (prospective) sensemaking perspective (i.e., Tapinos and Pyper, 2018; Klos and Speith, 2021) do not take into consideration the specificities of the NPD context. Looking beyond the foresight lens and

despite recent findings showing that NPD benefits from a future orientation (Jissink, et al., 2019), the very few empirical sensemaking studies with an NPD focus have mainly a retrospective orientation (Stigliani and Ravasi, 2012). Our work contributes to addressing this theoretical and empirical gap and answers the twofold research question: *What is the interplay between foresight and sensemaking? How does this interplay affect NPD responses to market shifts and technological changes?*

6.1 Theoretical implications

Drawing upon the findings of our study, we propose a conceptual model of the relationship between foresight and sensemaking for NPD at the microlevel of analysis under technological and market changes (Figure 4). First, the model expands our understanding of the cognitive microfoundations of foresight and sensemaking, and second, it adds to our understanding of the role that the relationship between foresight and sensemaking plays in NPD.

---Insert Figure 4 about here---

6.1.1 Microfoundations of foresight and sensemaking

Our conceptual model shows that foresight involves understandings through articulation and elaboration of the past and the present while simultaneously being a process of thinking about the future. This is in line with the Tapinos and Pyper (2018) findings related to the informal cognitive process followed by individuals to make sense of the future. Our model expands these insights (Tapinos and Pyper, 2018) by showing that foresight practices (including expert panels, environmental and horizon scanning, workshops, and storytelling modes) when formally embedded into organizational practices enhance a gradual and iterative collective sensemaking of the future. More specifically, our model is the first to unpack the role of sensefacilitating, a cognitive mechanism, which enables the gradual development of new collective mental models that are less constrained by the past of the company and more focused

towards the future. Sensefacilitating through mental time travelling was used in formal foresight practices at Forward and allowed for incremental and tentative new understandings of past, present and future issues. While the focus of Forward's sensemaking efforts had traditionally been on changes that had already occurred (retrospective sensemaking), the use of foresight and sensefacilitating through mental playing helped shift this focus to future changes (likely changes that have not occurred yet, i.e., prospective sensemaking). Thus, our work sheds light on the use of foresight for enacting the prospective sensemaking processes that enable the establishment of new dominant beliefs regarding emerging markets and products—beliefs that represent a discontinuity with traditional ones that stem from the history of a company and its previous markets and products. Our longitudinal real-time and in situ study demonstrates that the outcome of this integrated, iterative and gradual process is a long-lasting foresight for Forward, which contrasts with previous studies (Tapinos and Pyper, 2018; Klos and Spieth, 2021) that found episodic foresight outcomes as a result of new mental models that were largely shaped by past logic and schemata.

Previous foresight research findings (Klos and Spieth, 2021) showed that managers who during foresight activities emphasized the dual role of sensebreaking and influencing as forms of the destruction and reconstruction of meaning in their decision-making during the creation of new organizational visions for digital transformation eventually did not pursue these foresight outcomes. Although our study at Forward revealed the role of influencing as a means to secure the consensus of the group members after making sense of the new interpretations and practices, our data analysis did not identify incidents of sensebreaking but instead demonstrated that the interplay of foresight and sensemaking acted as an open flexible system that allowed the foresight outcomes to be gradually embedded in the group's decisions and thereby contributed to the development of new beliefs and the implementation of novel responses to market and technological changes.

Furthermore, by showing the collective dynamics that underpin how intersubjective future-oriented meaning is constructed with groups from the interplay between foresight and sensemaking, our empirical study advances the foresight stream of literature that explores the multiple systems used by organizations for anticipating environmental changes (Hakmaoui et al., 2022; Miller, 2018).

6.1.2 Foresight and sensemaking in NPD

The model that we develop sheds light on a missing theoretical link between, on the one hand, the interconnected system of foresight and sensemaking and, on the other hand, NPD. Previous foresight studies with an NPD focus have emphasized the role of a future-oriented view in NPD (Jissink, et al, 2019) and an outward perspective such as openness to recommendations from external parties (Li et al., 2020; Calof et al., 2020) and the integration of user understanding (Cooper, 2019; Wagner et al., 2021) and user foresights (Sakellariou et al., 2020; 2021). At the other end, some sensemaking researchers argue that sensemaking supports NPD by enhancing an outward-backward in time focus, such as the collective understandings of past market information and longstanding organizational rules (i.e., Stigliani and Ravasi, 2012; Akgün et al., 2012; Christiansen and Varnes, 2009). Our study advances this prior knowledge (Table 5) by revealing that the integration of foresight and sensemaking in NPD enables the collective discovery and formal diffusion of user foresights (e.g., “women who are liberated and organized want to enjoy a diverse, multifaceted and happy life at home with their families, and they know that balance will be the key to getting it”). Our study therefore answers the call of NPD researchers to gain a better understanding of the collaboration mechanisms for exchanging communication and eliciting user needs in a timely manner during the NPD process (Wagner, et al, 2021).

---Insert Table 5 about here---

An emerging foresight stream of research advocates the importance of world building narratives for the design of emotionally resonant futures that inspire real-world action (Zaidi, 2019). To our knowledge, our study reveals for the first time the role of world building in the idea generation and concept development stage early on in NPD (as illustrated in Table 4), as emerged from the integration of foresight and sensemaking. At Forward, sensefacilitating and discovering skills triggered by formal foresight practices fostered a capacity to envision multiple different future brand worlds for Clearfutur that represented a discontinuity from the history of the company. The integration of horizon scanning and storytelling foresight practices during opportunity identification; and idea and concept development enabled the co-construction of future brand worlds with detailed characteristics and visual manifestations such that they became more vivid and meaningful; they were filled with detailed aspirations (i.e., a future brand vision) and context (i.e., future user profiles and foresights); thus, they instilled a greater cause to pursue. Hence, new products were no longer means of simple profit making but ways to materialize the potential of new future worlds. These future brand worlds enabled innovation managers and experts at Forward to make sense of shifting markets and changing technologies by illustrating novel mental models with cues for meaningful novel product ideas, such as “an empathetic, convenient, and high-quality new product”, rendering the current products “old fashioned and commoditized”.

More specifically, our findings show that having a sense of collective future-oriented purpose from the very early stages of NPD enhanced internal alignment and motivated Forward innovation managers to dedicate themselves, throughout time and across emerging obstacles, to successfully pursue and implement new ideas (i.e., in our case study, the decision to stop the launch of the new product range due to its low gross margin was rectified a few months later following a series of corrective actions). These findings illuminate how the integration of foresight and sensemaking can enhance internal alignment and long-term commitment within

NPD teams, which has been highlighted as a critical factor of NPD success by innovation management scholars (Beverland, et al., 2016); furthermore, the findings of this study advance innovation management research that supports agile approaches to NPD to elicit faster and more adaptive responses to market environmental changes (Cooper and Sommer, 2016).

6.2 Practical implications

Our model invites innovation managers and experts to harness NPD efforts strategically and proactively by creating structured and systematic opportunities for cross-functional groups and users to interact, co-discover user foresights and generate collectively meaningful future brand worlds prior to the generation of new ideas. By co-constructing meaning through a brand's narratives and making sense of the role of the new ideas in future brand worlds, managers and experts can build a mutually agreed upon purpose-driven NPD strategy early on.

It is likely that innovation managers may benefit from acquiring future literacy (Miller et al., 2018) and, more specifically, sensefacilitating skills for NPD foresight practices, such as the ability to systematically anticipate future-oriented user needs, communicate future trends through storytelling, and embed playfulness into collective decision making; such a skillset can enhance managers' preparedness to work in new uncertain and ambiguous environments, anticipate more innovation opportunities and make better decisions in the present.

Beyond NPD management, sensefacilitating has important implications for strategic management, marketing and human resources. CEOs, board members and functional managers can be trained to activate this mechanism in instances where heterogeneous actors are required to make decisions on critical, novel or ambiguous issues. Sensefacilitating can foster dialogue instead of conflict, leading to collectively shared future-oriented and meaningful interventions in both profit-making and governmental organizations in times of uncertainty and change.

7. Conclusions

Our research is based on a longitudinal study that was conducted in real time and in situ. However, a single study limits generalization and therefore raises opportunities for further research. A fertile area for further research would be to explore and compare how sensefacilitating mechanisms act in other NPD contexts and phenomena (e.g., the service and high technology sectors). Researchers need to explore similar foresight processes and more instances of heterogeneous actors in other organizational settings (e.g., management board meetings). Moreover, future studies could explore the interplay of foresight techniques, such as agile focus groups, with idea generation approaches, such as creative workshops (Brem, 2019), and their role in NPD performance. Researchers could also investigate similar processes occurring in different types of companies (e.g., SMEs or start-ups) where NPD processes adopt a more agile and iterative orientation. A promising avenue for further research would be to focus on the synergies of foresight and sensemaking and their impact on disruptive innovation whereby a newcomer with fewer resources can successfully challenge established incumbent organizations (Rasool et al., 2018). Our study explores the relationship between the microfoundations of foresight and sensemaking and its impact on NPD. Future studies may also investigate the relationship between organizational sensemaking and their futures particularly through the dynamic capabilities and business modelling perspectives (Teece, 2018) which highlight the need to renew and align organizational resources and operational models when faced with uncertainty and external changes.

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Table 1. Overview of Qualitative Data

Observational Data			
Code	Description	Location	Type of Data
O1	Non-Participant observation: Meeting/discussion (first milestone) between foresight consultancy agency and Forward managers (n=10)	Office	Presentation n=16 slides
O2	Non-Participant observation: Meeting/discussion (second milestone) between foresight consultancy agency and Forward managers to discuss the consultants' proposals (n=7)	Office	Presentation n=118 slides Storytelling video 2:25 min
O3	Non-Participant observation: First future-oriented workshop with 9 managers, 2 users, 1 facilitator (n=12)	Office	Video recording 7 hrs Transcript n=181 pgs Field notes n=12 pgs Sketches and flipchart notes

Interview Data

Code	Expert Informant	Job Position	Firm	Experience
IE1	Internal Expert	Senior Product Development Manager	International Consumer Goods Company/Clearfutur	10+ years of experience in international innovation strategy in FMCG
IE2	Internal Expert	Consumer Insight and Strategy Director	International Consumer Goods Company/Clearfutur	20+ years of experience in international marketing and innovation strategy in FMCG
IE3	Internal Expert	Senior Product Development Manager	International Consumer Goods Company/Clearfutur	10+ years of experience in international innovation strategy in FMCG
IE4	Internal Expert	Senior Product Manager	International Consumer Goods Company/Clearfutur	20+ years of experience in innovation strategy in FMCG

IE5	Internal Expert	R&D Manager/Departmental Head	International Consumer Goods Company/Clearfutur	25+ international experience in innovation research/development and legislation in FMCG
EE6	External Expert: Agency	Founder/Strategist	Foresight Consultancy Agency (Clearfutur foresight/NPD Project)	25 years of international experience in ideation, strategy, and foresight in FMCG and pharmaceutical industries
EE7	External Expert: Agency	Founding Partner/Insight Director	Foresight Consultancy Agency (Clearfutur foresight/NPD Project)	20+ years of international experience in business research and insight for decision making in FMCG, pharmaceuticals and others
EE8	External Expert: Panel	Senior Inventor	Ideation-Innovation Agency	15+ years of international experience in ideation and innovation strategy in FMCG and financial services (ex-Clearfutur senior manager)
EE9	External Expert: Panel	Director	Market Insight Agency	15+ years of international experience in market research and insight for decision making in FMCG; automotive; technology; pharmaceuticals; health care and financial services, retail and leisure, B to B
EE10	External Expert: Panel	Founding Partner/Director	Ideation-Innovation Agency	20+ years of international experience in ideation and innovation strategy in FMCG, pharmaceuticals, health, retail and leisure

Documentation Data		
Code	Description	Type of Data
D1	Environmental Scanning (Historic Report)	Report n=50 pgs
D2	First Meeting Notes	Report n=11 pgs
D3	Environmental Scanning	Report n=13 pgs
D4	Formation of Project/Criteria/Objectives	Report n=16 pgs
D5	Market Research/Initial Evaluation	Report n=58 pgs
D6	Second Future-Oriented Workshop	Presentation n=23 slides
D7	Second Future-Oriented Workshop Agenda	Notes n=2 pgs
D8	Environmental and Horizon Scanning	Report n=66 pg
D9	Company Research “How to Foster Better Innovation”	Report n=80 pgs
D10	Company Innovation-Foresight Guidelines	Presentation n=36 slides
D11	Ideation-Innovation Agency’s Publication on Ideation Projects	Book n=64 pgs
D12	Ideation-Innovation Agency’s Case Studies	Webpages n=22

Table 2. Themes, Codes and Measures

Themes	Codes	Measures	References
<i>Foresight techniques and practices</i>			
Environmental scanning	Analysis of markets, industries, and brands	Market, technology and drivers, target market/users, user needs, and market segmentation	Heger and Rohrbeck 2012
Horizon scanning	Analysis of future trends	Future markets, technologies, user trends and insights	Heger and Rohrbeck 2012
Expert panel	External foresight consultation	Foresight consultants with in-depth thinking, evaluation and vision indicating future direction selected by Forward	Mauksch et al., 2020
Storytelling	Narrative foresight	Transforming the brandworld—metaphor—held to one video story that supports the desired future developed by Foresight consultants	Milojević and Inayatullah, 2015
Future-oriented workshops	Structured participatory foresight activities	Groups, collectives, decision making, evaluation, interaction, discussion, and facilitation organized by Forward	Rohrbeck et al., 2015; Klos and Spieth 2021
<i>Sensemaking skills</i>			
Noticing and bracketing	Extracting cues	Labelling, categorizing from flows of experiences, sources of inspiration and data	Weick et al., 2005 Stigliani & Ravasi, 2012
Articulating and elaborating	Explaining experiences	Conveying, clarifying and making sense of a circumstance by linking materials, cues and abstract categories	Weick et al., 2005 Stigliani & Ravasi, 2012
	Integrating concepts into a mental framework	Storing, sharing and retrieving mental content; integrating and refining emerging mental structures; and making provisional interpretations	Weick et al., 2005 Stigliani & Ravasi, 2012

Discovering*	Shifts in understanding contradictions	Aha moments, cognitive epiphanies, ill-defined solutions, identifying market gaps, and reframing of mental cues	Stigliani and Ravazi, (2012)
*emerged for the first time in this study; the term 'discovery' borrowed from the innovation management stream of research (Koen, 2001)	Identifying weak future signals and future trends	Extracting, capturing future market and user cues from market research, reports and user interactions	Rohrbeck et al. (2015)
Sensefacilitating*	Mental travelling	Conscious effort to transmit cognitively across multiple time horizons using prompts, questions, or narratives	Augmented from Sarpong et al., 2019
*emerged and conceptualized for the first time in this study	Mental playing	Conscious effort to disconnect points in time through a playful attitude, role playing, and personification using prompts or questions (imagine, think of, and what if you were)	Emerged and conceptualized for the first time in this study (term 'mental playing' borrowed from psychology scholars (Suddendorf and Corballi, 1997)
Influencing	Persuading about the goodness of a future idea	Explaining, accounting for choices, and communicating meaning to others	Gioia and Mehra, 1996 Weick et al., 2005 Stigliani & Ravazzi, 2012
<i>Market and technological changes</i>			
Brand user values	Beliefs and the purpose of brands and users	User beliefs, brand vision, purpose, and culture in the preexisting brandworld	Augmented from Zaidi, 2019
User foresights	Nexus of tensions and negative emotions with future-oriented user	Cognitive intersections and improvisational connections between brand tensions; users' negative emotions (fear, disappointment, and frustration) and future-oriented user	Augmented from Sakellariou et al., 2020; 2021

	aspirations and positive emotions	wants, aspirations and positive emotions (pleasure, joy, fun, and satisfaction)	
Future brandworlds/product ideas	Novelty	Brandworlds and stemming product ideas new to the company and new to the market based on collective decision making and/or market research	Zaidi, 2019; Dziallas and Blind, 2019
	Strategic fit	Brandworlds and stemming product ideas that meet a company's strategic objectives based on collective decision making and internal statements	Zaidi, 2019; Dziallas and Blind, 2019
<i>Temporality</i>			
Past	Sensemaking of events occurring before a point in time	Old, traditional, preceding, long ago, prior, histories, backwards, heritage, nostalgia, and memories	Sandberg and Tsoukas, 2020; augmented from Sarpong et al., 2019
Present	Sensemaking of events occurring at a point in time, in progress	Reality, current, contemporary, ongoing, and existing	Sandberg, and Tsoukas, 2020;. augmented from Sarpong et al., 2019
Future	Sensemaking of events occurring after a point in time	Unknown, forward, dream, coming, imminent, prospect, outlook, fantasy, expectation, and trend	Sandberg and Tsoukas, 2020; augmented from Sarpong et al., 2019

Table 3. Aggregated Categories, Themes, Codes, Representative Examples and Triangulation

Aggregated Categories	Themes	Codes	Representative Examples and Triangulation
Sensemaking Skills	Noticing and Bracketing	Extracting cues	<p><u>Documentation (D2); Observation (O1, O2); Interview (EI3):</u> The minutes and the observations from the first meeting (O1) show that the managers agreed quickly and noted that the brand had suffered for years from “<i>a lack of technical discrimination and a meaningful purpose</i>” (pg 3). Foresight Consultant (EI3): “We also look at the research data, the information that we’ve got in our filing cabinets, so we go through that and harvest information in the foresight workshop” (O2). The facilitator triggered the first phase of the discussion with the question: “<i>What is the secret that makes Clearfutur such a popular product?</i>” This led managers to recall spontaneously its benefits and weaknesses, such as “<i>its effectiveness, its reliability, its trustworthiness, its harshness</i>”.</p>
	Articulating and Elaborating	Explaining experiences	<p><u>Documentation (D5) Observation (O2); Interview (IE1):</u> Foresight workshop managers were involved in a dialogue to gain further clarification (O2): “<i>So there is no other similar, you talked about it. Yes. Let’s say there is a company which has made... Understandable. The gel... the gel for big surfaces and bathtubs, which sticks... huh? What do you think? It’s not really a gel... Scrub. Scrub is in</i>”. Product Manager (IE1): “<i>It can be very helpful to have somebody who’s really good at taking things out of your head and putting them on paper</i>”. Market Research report’s explanation of one of the potential territories for the future world: “<i>cleaning therapy: a purely physical reaction like going to the gym and letting off steam</i>” (pg 23).</p>
		Integrating concepts into a mental framework	<p><u>Documentation (D2); Observation (O2); Interview (IE2); Product Manager (IE2):</u> “<i>Each team member selected a list under each insight area of potential specific insight for his own; then we list all the insights and we put the insight cards in the research for each pole</i>”. In the first meeting, the managers agreed to discuss further three main themes (D2): “<i>1. What do success and failure look like?; 2. Strengths, weaknesses, opportunities and threats; and 3.</i></p>

		<p><i>Characteristics of great brands</i>". Users' quotes (D3) including "I like the process of restoring order; housework is the new medication" were placed by the foresight agency into the category "cleaning therapy" (pg4). At the foresight workshop (O2), each subgroup was given a handout with the past survey and the ethnography results for the brand, and each subgroup categorized the results during discussions based on different categories of usage, namely, <i>use in the bathroom, use in the kitchen, use in the rest of house, use on other surfaces, and use against difficult stains.</i></p>
Discovering	Shifts in understanding and contradictions	<p><u>Observation (O2); Interview (IE2, EE9); Director (EE9):</u> "It is all about emulating those connections and drawing out the latent knowledge in some people's heads about the market, the consumers, and putting it all together. Then you get that "aha" moment, which is basically an intuitive conclusion". Consumer Insight Director (IE2): "At that stage people will go and do research, some qualitative research may be some insight development work in order to mine that area and to more deeply understand what the real opportunity is and where the gaps are". Foresight workshop, Manufacturing Manager (O2): "This new product could have a double hole, one for pouring the liquid and another one for controlling the amount for control usage".</p> <p><u>Documentation (D1); Observation (O1); Interview (EI9):</u> First meeting notes (O1): "What is the protection in the future? Urban protection that can be bought into the home". Horizon and Environmental scanning report (D8): "Coming context: home cultivation, upgrading, growth in smaller households, home as a reflection of identity" (pg52).</p>
	Identifying weak future signals and future trends	
Sensefacilitating	Time travelling	<p><u>Observation (O3); Interview (IE2); Consumer Insight Director (IE2):</u> "There is always a danger that our conditioned understanding of the present will constrain our ability to recognize the opportunities of the future. If we do not use fresh and challenging perspectives to find unexpected opportunities, our competitors will. Unconventional ideas can be gained in many ways". Second foresight workshop presentation (O3): "brand value creation. (Think) this way (arrow on the slide shown on the right) for tomorrow and (think) this way (arrow on the slide shown on the left) ...for today"</p>

		Mental playing	<u>Observation (O2); Interview (IE1, EE10); Foresight workshop (O2):</u> User B proposed the idea of a product that cleans the soul, and the facilitator gave her the imaginary gift of the “ <i>Cleansing Wall</i> ”. Product Manager (IE1): “ <i>Good—keep for innovation projects: team meetings—to have fun with a purpose</i> ” Founding partner/Director (EE10): “ <i>We generated lots of issues and how to’s around the task, and then we got stimulus in which you had to imagine you were a packet of peas having a chat with a packet of carrots and... So there was some role play as if you were the object that was in the freezer and you had to vote who was going to stay in the freezer and who was going to leave</i> ”
	Influencing	Persuasion about the goodness of a future brandworld/idea	<u>Observation (O1,O2); Interview (EI9):</u> The Founder/Strategist presented at the meeting the agency’s proposals with the alternative future brandworlds and relevant ideas. Because managers reacted rather negatively to some of the alternative pathways that did not present such a good strategic fit with the existing brand values, the presenter talked with enthusiasm about proposals that initially received a more positive response (O1). In the foresight workshop, in presenting its ideas, the first subgroup tried to influence the other participants by arguing positively that this was “ <i>an excellent idea... a product which has a self-cleaning agent to ‘inform’ us that the product has worked</i> ”. Senior Inventor (EE8): “ <i>Innovation thrives when somebody gets passionate about an idea and they take it and they run with it, and this person inspires others and it gets others on board to help them see the idea through until it’s actually there in the marketplace</i> ”.
Market technological changes	Brand user values	Beliefs and the purpose of brands and users	<u>Documentation (D1); Observation (O1); Interview (EE7);</u> Insight Director (EE7): “ <i>A lot of the concept work is not very stimulating. It’s not very exciting... and that’s an issue. That is why (the future brandworlds) were made through pictures and music and description, and that’s worked really well.</i> ” Horizon and Environmental scanning report (D8) description and imagery of one of the six future worlds: “ <i>magically simple cleaning: fundamentally good products+my endeavour=a lovely home, manifestation: look and feel; tangibles, idealised user self characteristics: positive sense of nostalgia, simplicity, authenticity</i> ”.
	User foresights	Nexus of tensions and emotions with future-oriented user aspirations	<u>Documentation (D8); Observation (O2); Interview (EE7);</u> Environmental and Horizon scanning report “ <i>key tension: cleanliness absolutism versus moderate progressiveness; user needs products and brands that are transparent and responsible, the ultimate in effective cleaning with no harmful effects</i> ” (pg. 42-43). The facilitator captured on the flipchart the list

of user foresights; one of them was *“Cleaning sponges become very dirty with use and a kitchen sponge is a source of germs; ‘they end up being germ collectors!’ User likes cleaning utensils to engage in active cleaning.”* (O2). Founder/Strategist (EE7): *“Great brands and innovations have come from the resolution of a tension, and tensions arise from a series of sources—and the way that we like to work is to keep one eye on the external space (the environment and the consumer) and one eye on the internal space—what we call the capability and the brand’s ideology”*

Future
brandworlds/
product ideas

Novelty

Documentation (D1); Observation (O2); Interview (IE4); Market research report (D5): *“A future idea of a very advanced, effective, eco-friendly product has not been evaluated positively by the users, as the brand’s strength does not lend itself to ecological considerations; in contrast, a future idea of an effective product with a softer, warmer image is considered new and appealing”* (pg. 33; 50). The foresight workshop participants voted for the most innovative ideas according to their own views, and they listed 12 on the flipchart (O2). R&D Manager: *“Over the last years, the brand differentiated from the old brand and used alternative active raw materials that contributed to cleaning without harsh effects on the surfaces; this was a breakthrough”*.

Strategic fit

Observation (O1, O2); Interview (IE1, EE6); Meeting notes (O1); “The project objective is to develop a new positioning approach in the specified strategic cluster to grow business at the expense of competitors (pg1). Meeting presentation (O2): *“The future roadmap builds and moves forward an inherently strong brand and fits with the strategic vision”* (pg 103; 108). Founder/Strategist (EE6): *“We all want to go towards this direction; nobody goes there and there... You have to be sure that you innovate with a purpose, that you don’t just innovate to innovate”*. Product Manager (IE1): *“There’s a very clear picture from high-level management about what should be launched, when it should be launched and how it fits the bigger picture, so that’s a clear mid- and long-term strategy”*

Table 4. Illustrative Examples of Foresight, Sensemaking, and NPD for Clearfutur



Past	Future	User	Future	Future
Brands/User	Trends	Foresights	Brandworlds	Product
Values				Ideas
<p><i>“Traditional”.</i></p> <p><i>“High endorsement”.</i></p> <p><i>“No emotional connection”.</i></p> <p><i>“Harsh formulation”.</i></p>	<p><i>“Modern mothers balancing personal satisfaction and family commitment”.</i></p> <p><i>“More sustainable consumption, production, waste management, biodegradable packaging and raw materials”.</i></p>	<p><i>“Modern women still have traditional values; they are playing multiple roles</i></p> <p><i>BUT are worried and in need of rescue”.</i></p>  <p>(Storytelling Video)</p> <p><i>“Women want to be liberated and organized to enjoy a diverse, multifaceted happy life AND they know that balance will be key to getting it” (D1&2).</i></p>	<p><i>“Home love: Caring and effectiveness for the home and the family”.</i></p>  <p><i>“In this world, products are empathetic with human imagery, convenient and of high quality”.</i></p>	<p><i>“All-in-one complete-clean individual treatments with gentle cleaning properties for different rooms.</i></p> <p><i>Packaging will feature young families and pets in clean, every day, and real homes with bold and confident colours”.</i></p> <p><i>“A new dishwashing liquid; not only does it get rid of difficult stains easily,</i></p> <p><i>but it also removes smells and offers disinfection</i></p> <p><i>while respecting the skin”.</i></p>

Table 5. Empirical Sensemaking-NPD Studies and Findings of This Study

Authors	Findings Related to Sensemaking Skills	Findings Related to Prospective Sensemaking	Findings Related to the Impact on NPD (or Innovation Management)
Current study	Noticing and bracketing, articulating and evaluating, <i>sensefacilitating*</i> , <i>discovering*</i> and influencing <i>*new skills found in the current study</i>	Temporality of sensemaking in NPD through mental time travel and mental playing in sensefacilitating Interplay between discovering and sensefacilitating	Co-construction of user foresights that enable the effective transition from the opportunity stage to the idea generation and concept development stage early on in NPD Future brandworlds and new product ideas imbued with purpose and meaning from early on in NPD enhanced internal alignment and motivated innovation managers to dedicate themselves, throughout time and across obstacles, to pursue and implement disruptive ideas despite emerging obstacles
Roeth, Spieth and Lange, 2019	Sensegiving (or influencing) and sensebreaking	Prospective sensemaking not considered in that study	A political sensemaking process complements formalized innovation portfolio management decision-making processes
Beverland et al., 2016	Exposing, co-opting, and repurposing	Prospective sensemaking not considered in that study	Horizon-expanding discourse among those involved in NPD
Stigliani and Ravasi, 2012	Noticing and bracketing, articulating, elaborating, and influencing	Prospective sensemaking is based on interrelated cycles of retrospection	Material embodiment of experiences and ideas important to make these experiences and ideas permanently accessible and reusable during the concept development stage of NPD
Akgiin et al., 2012	Internal and external communication, information gathering, information classification, building shared mental models, and taking experimental actions	Prospective sensemaking not considered in that study	Information, implementation and speed-to-market of new products
Christiansen and Varnes, 2009	Practices are influenced by the interpretation, use, and feedback of the senior manager	Prospective sensemaking not considered in that study	Sensemaking of rules might reverse elaborate and exhaustive rules into quite flexible systems in practice

Akgün, et al., 2006	Information acquisition, information dissemination, information implementation, memory, thinking, improvisation, unlearning, and sense-making constitute interrelated subcomponents of a higher-order team information-processing construct	Prospective sensemaking not considered in that study	Information-processing facilitates new product success primarily through the positive effects of superior information implementation
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Figure 1. Timeline of Events during the NPD Project at Forward

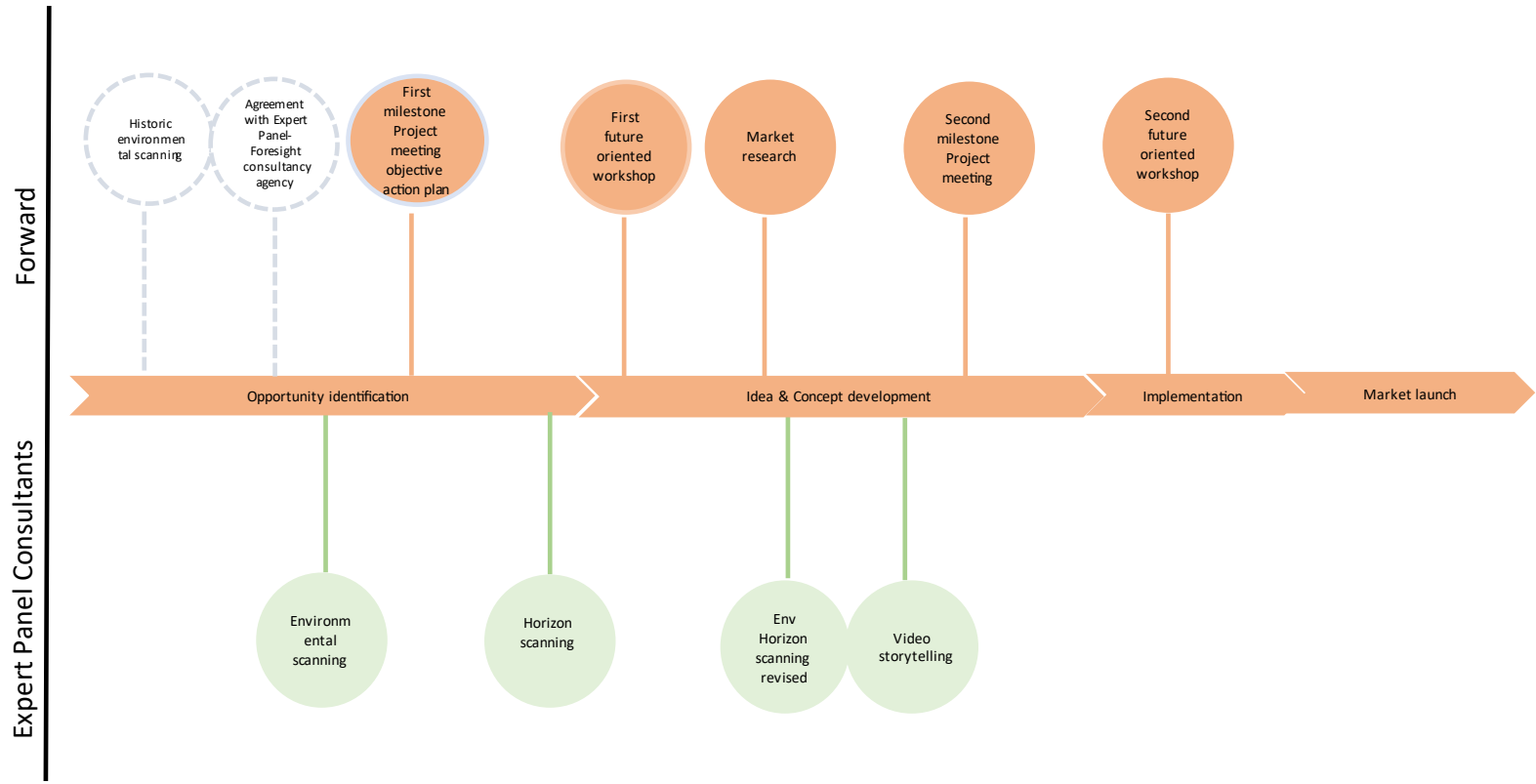


Figure 2. Foresight and Sensemaking Skills at Forward

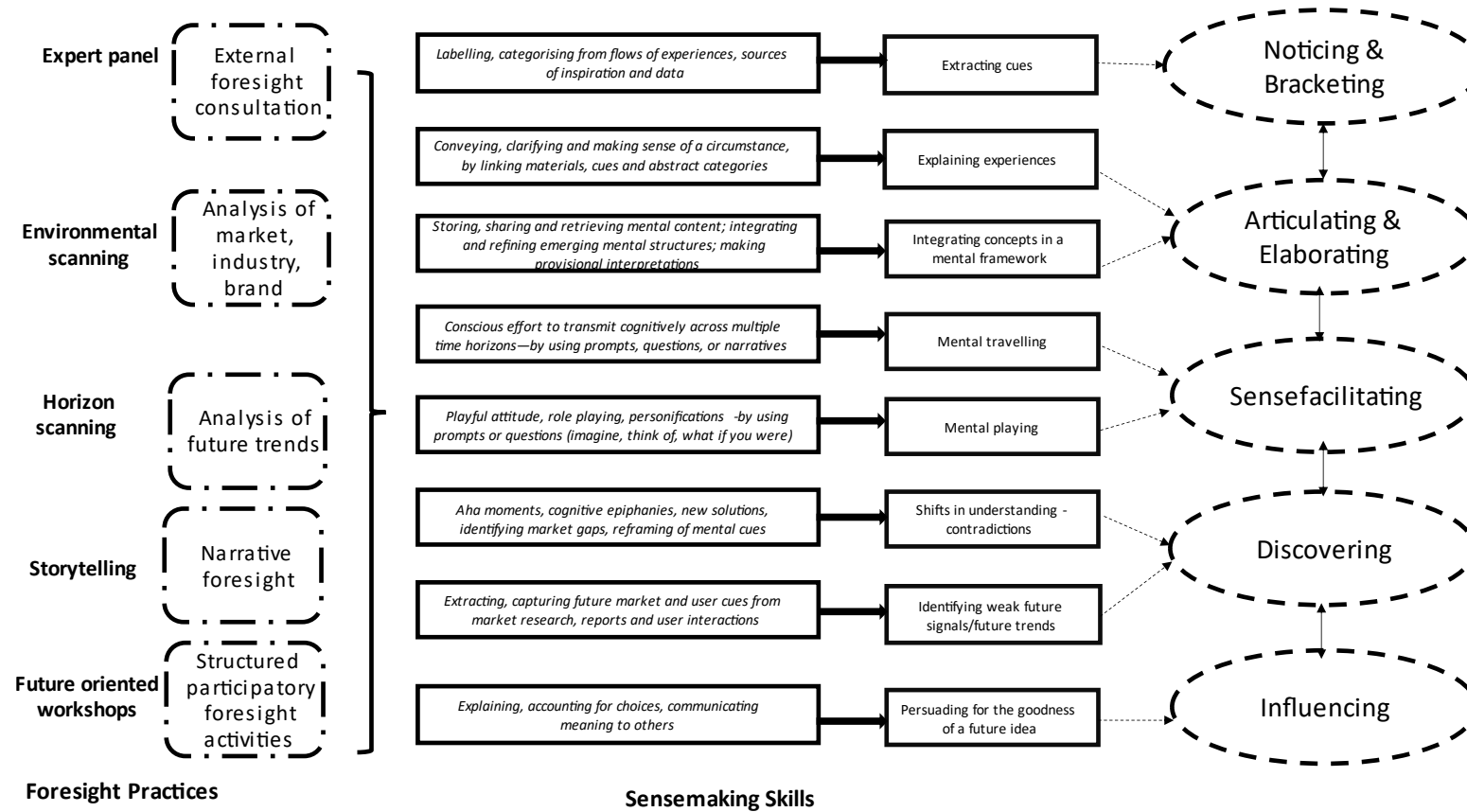


Figure 3. Foresight, Sensemaking Skills and Impact on NPD amidst Technological and Market Changes Across Time

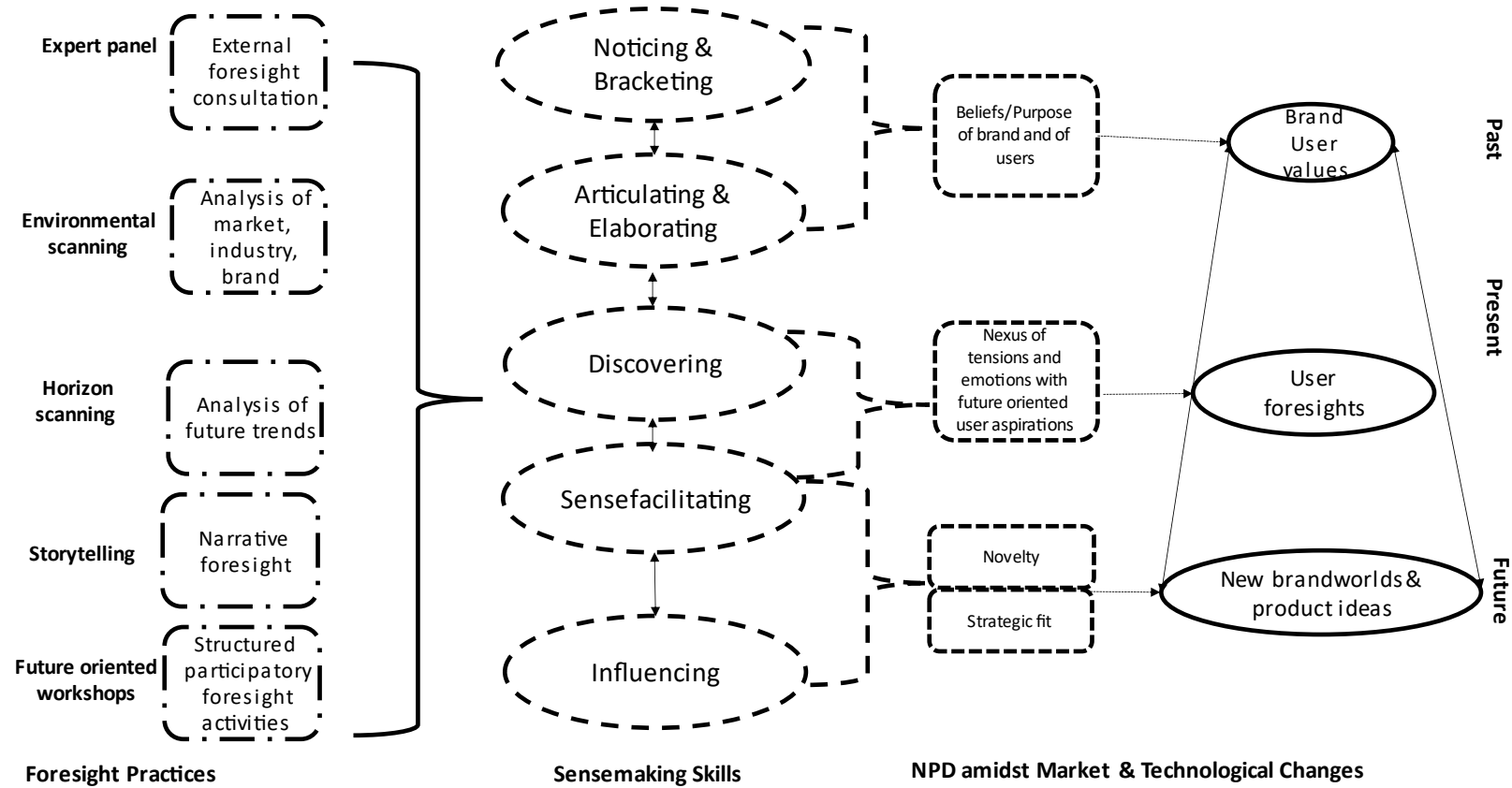
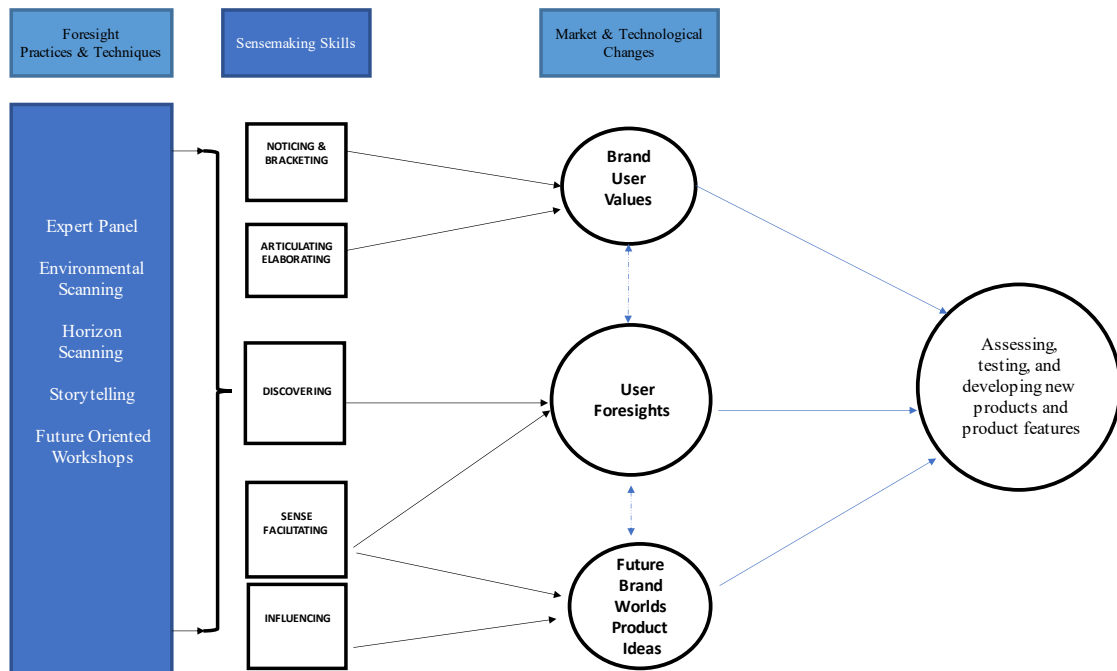


Figure 4. Conceptual Framework of the Relationship Between Foresight, Sensemaking, and NPD



Appendix 1. Intercoder Reliability Results

Sensemaking Aggregated Themes	Researcher 1	Researcher 2	ICR%
Noticing and Bracketing	11	9	82%
Articulating and Elaborating	14	12	86%
Discovering	17	15	88%
Sensefacilitating	19	18	95%
Influencing	10	10	100%

