



Probing the future: Mobilising foresight in multiple-product innovation firms

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Abstract

With rapid changes in technology and intense competition in the business environment the importance of cultivating and sustaining foresight in multiple-product innovation firms has been propelled to unprecedented heights. Yet, research on the processes through which such firms mobilise foresight in their working environment remains scarce. This paper seeks to explore the different processes through which a high-performing new product design consultancy probes into the future aiming to identify possible avenues for product development and potentially define trends in multiple industries. This inductive, theory-building study identifies seven key processes and stresses the importance of perpetual probing and learning for sustaining foresight in such high-change environments.

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1. Introduction

The importance of cultivating organisational foresight has long been identified as a critical feature in coping with the relentless change of the business environment. Today, this ‘ability to spot developments before they become trends and to grasp the relevant features of social currents that are likely to shape the direction of future events’ [44] seems more topical than ever before. Contemporary high velocity industries (from high-tech to FMCG) are operating in rapidly shifting competitive landscapes with short product life cycles. In this context, change is not a rare, episodic phenomenon, but rather endemic to corporate success [16,19]. The ability to sustain foresight is,

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therefore, propelled to unprecedented heights as an important factor in mobilising firms to innovate routinely.

Mirroring these developments, the identification of processes through which fast change organisations develop foresight has recently been in the foreground of academic interest [8,13]. However, research to date has largely focused on the strategic dimension of foresight, looking at processes such as ‘scenario planning’ [45] and ‘wild card management systems’ [35] and how they aid organisations in shaping visions for the future. Disappointingly, research on the processes through which organisations develop foresight to sustain innovation in high velocity industries remains scarce. Brown and Eisenhardt’s [8] seminal grounded theory-building paper has set the scene in this field. Their research on case studies of firms with successful multiple product portfolios highlights that multiple product innovation does not only require building on past knowledge but also necessitates frequently probing the future. Probing into the future equips organisations with opportunities to not only react to the future but also to anticipate and, often, even create it. Yet research to date has revealed very little about the underlying probing processes by which high-change, multiple-product firms develop foresight about the future in order to sustain continuous innovation.

To address this gap, we draw on an intensive theory-building study that seeks to extend thinking on the ‘probing the future’ processes through which high-change multiple-product innovation companies develop foresight to sustain continuous innovation. The setting is the high-velocity new product design consulting industry. This industry is an attractive one for this study for a number of reasons. First, firms in this sector have to perpetually present their clients with breakthrough solutions; change and foresightfulness are, therefore, inevitably part of their service offering. Second, similarly to other multiple-product innovation firms like the ones involved in Brown and Eisenhardt’s [8] study, this industry has to embrace the challenges of not only developing but also sustaining foresight. The continuous pool of clients and projects from multiple (mainly high tech) industries means that these firms need to constantly ‘stay ahead of the game’ of product innovation; the pressure is not only to foresee the future but often to define it. With these in mind the researchers embarked on a programme of inductive case studies of five of the world’s leading New Product Design consulting firms. The research has taken place in the US over the past three years. This paper presents some preliminary findings from the first case study of this programme that has been conducted in the setting of a leading New Product Design consultancy situated in the Silicon Valley area (Lunar Design Inc.).

Similarly to Brown and Eisenhardt’s [8] paper, the theory-building approach enables the researchers to induct insights from the case data. Extant theory in this field of research is scarce and, hence, grounded theory-building offers the opportunity to generate novel and accurate insights on the phenomenon under study [22].

The paper makes several contributions to the study of organisational foresight as well as innovation theory more broadly. First, it contributes to the theoretical understanding of the development of foresight in multiple-product innovation firms by providing a more contextualised view of the processes involved in probing the future during the innovation process. Second, by juxtaposing our findings with extant research, we are able to extend thinking beyond Brown and Eisenhardt’s [8] and Constanzo’s [13] findings in this topical

but under-researched area. We trust that our findings and the aforementioned existing case studies in the area will collectively enable theory development in this field.

The paper is structured in four main parts. We start with a brief literature review in order to clarify the key theoretical concepts and situate the study within the existing theoretical frameworks. We then discuss the research design adopted for the purposes of this study. Next, we present the key findings that have emerged from the case study and discuss the emerging theoretical insights. Lastly, we offer conclusions and highlight the implications of the study for management academics and practitioners.

2. Theoretical background

According to the English dictionary, foresight is defined as ‘regard or provision for the future’. In an organisational context, foresight has been broadly considered as the ability to anticipate events before they happen, aiding organisations to cope with the future [16]. To date, several characteristics have been assigned to the concept of organisational foresight. First, the notion of time appears to be a key element in the development of foresight [6,8,13]. Foresight links the past, present and future; it emerges from building on the past, considering the present and looking into the future. This enables organisations to develop what Ingvar [30] calls ‘memories of the future’; to anticipate what is likely to happen and prepare for different ‘futures’ in the present. Second, foresight has been linked to a process of organisational learning [13,45,25]. Organisations make sense of the future by using probes; managers learn from these probes and use them to explore possible futures [13]. Foresight, therefore, revolves around a cycle of environmental scanning, interpretation and learning [15]. Managers scan the environment by collecting relevant information from different sources [12]. These may include customers, suppliers, competitors and other potential sources of useful input for the probing process. The extent to which managers are confident of their existing activities will influence whether this search process will be passive [21,28], with a bias towards confirming their existing schemata, or active [3,32,46], with an emphasis on looking for new activities and discrediting old ones. Managers use their cognitive schemata to interpret and evaluate the resulting probes of their search process in relation to past experience, and then develop possible futures [4,21]. By determining and implementing their future actions, learning is enhanced; organisations either select to continue or adjust their existing activities, or choose to completely change their activities if this means gaining greater rewards [33]. Consequently, a third characteristic that has been assigned to the concept of organisational foresight is that it is a directed process [39]. An organisation’s boundaries of perception are methodically broadened through the careful scanning of possible futures. This process helps companies detect and avoid potential problems or crises, allows firms to plan proactively by evaluating the implications of future events before they occur and enables the envisioning of possible futures.

The modern foresight field has been the focus, mainly, of corporate strategy studies. In this area, foresight has been considered as an essential building block for prediction and planning in strategy development [34]. The strategy literature has, therefore, focused on different tools that enable organisations to foresee the future and develop relevant visions

for embracing it. In its simplest form, organisations attempt to predict the future with the tool of forecasting, using econometrics to identify possible futures based on past evidence [23]. Linking the past, present and future, strategists also use more abstract ‘brainstorming’ to envision the future, apply ‘wild card management systems’ to predict and plan for potential disasters [35,42] and exercise scenario planning to identify possible futures that need to be taken into consideration when developing the corporate strategy [41]. The method of scenario planning is increasingly adopted in the industry, mainly in the form of either exploratory scenarios (creating scenarios that lead to a likely future based on past and present trends) or anticipative scenarios (building scenarios on different visions of the future) [23].

Recently, foresight is also receiving attention in the technology and product development field. In the technology studies domain, scholars have criticised the traditional forecasting method for contributing to the high rates of new technology product failures, arguing that forecasting promotes the notion that technology can always drive the market [2,11]. Increasingly, technology foresight is, therefore, rather related to a set of processes that aim to help organisations in determining possible technology futures through the combined consultation of relevant groups, such as R&D-related organisational members and users of the subsequent innovations [2]. Similarly, sustaining successful new product portfolios has been linked to a set of probing processes that allow organisations to balance the rigidity of planning and the chaos of reacting to future trends [7]. However, despite the importance of foresight in product development, only a handful of studies have analysed the processes through which organisations probe the future in their product development efforts [8,13].

Brown and Eisenhardt’s [8] seminal paper compared successful and less successful multiple product innovation firms in the high-velocity computer industry and concluded that innovation in successful firms is supported by a series of direct and indirect probes that look into the future and highlight possible development avenues. In their case studies, direct probes (hands-on experiences) emerged from the creation of experimental products that aimed to probe new markets, and from the development of alliances with existing and potential customers and other firms to understand future needs in existing markets and potential needs in new markets. Indirect probes emerged in regular internal meetings organised specifically for pondering the future; these were complemented by the employment of futurists, who had been assigned the responsibility to perpetually think about the future.

Costanzo [13] also later explored the probing processes used in the launch of a European stand-alone Internet bank in the UK banking industry. Similarly to Brown and Eisenhardt’s study [8], her research concluded that managers in the case firm probe the future on a regular basis through cheap and quick experimentation and by forming alliances with customers and external consultants. These probes, together with the constant monitoring of the external environment tracking the fast evolution of new technology, were useful sources of learning and planning for alternative futures. Costanzo’s [13] research also noted that this probing process is not an end goal. Foresight rather emerges continuously and firms’ visions and subsequent strategies for the future are developed and potentially discredited through the perpetual probing and learning process.

However, both studies highlight that our current understanding in this field is still in its infancy and urge researchers to further explore the area. This eminent need to extend our understanding of the underlying probing processes employed by high-change, multiple product firms (used to develop foresight with an aim towards sustaining continuous innovation) has triggered this research. The next section discusses the research methods employed for the purposes of this study.

3. Research methodology

This article draws on a case study that consists part of a larger programme of five qualitative cases of award-winning new product design consulting firms in the US. Although ultimately the aim of the wider research agenda is to build theory on the processes that mobilise foresight in multiple product innovation firms through the comparative multiple case study method [20,47], this paper presents our initial findings from the analysis of the first case organisation. We chose this theory-building approach since extant theoretical perspectives on the probing processes that mobilise foresight in multiple product innovation settings are relatively rare and underdeveloped [8]. The use of inductive methods has, therefore, enabled us to obtain and integrate rich descriptive information and to uncover new clues related to the area under investigation.

Based on Eisenhardt [20] and Yin [47], the research design of this multiple case study programme involved three stages: (1) the researchers selected five theoretically relevant samples of cases for comparisons, (2) we then collected data for each case, and (3) we are in the process of analysing data to determine similarities and differences among the cases. Having completed the analysis of the first case study we use this paper to present our emerging preliminary findings.

3.1. Case sample selection

This study is based on an award-winning new product design consulting firm in the US (Lunar Design). New product design firms are particularly creativity-intensive environments, constantly seeking to provide clients with innovative solutions for sustaining competitive advantage [26,27]. Their work is characterised by a constant quest for ground-breaking innovations in multiple industries, and this makes design firms interesting cases for advancing current knowledge on the processes adopted for probing the future and sustaining foresight in multiple product innovation settings.

Lunar Design, similarly to the other four firms involved in the wider research programme, has been chosen as a suitable case study because there was evidence supporting that it is high-performing in a number of ways. First, over the past 10 years, Lunar Design has been consistently ranked in the top 10 design firms of Business Week magazine's industrial design excellence awards (IDEA). Moreover, the firm has been operating for more than 10 years and remains profitable. Lastly, the firm's success is evident in a plethora of business and popular sources. It is regularly featured in *Wired*, *Inc.* and *Business 2.0* as a benchmark regarding best practices in design.

Lunar Design's services include product design, industrial design, engineering, digital media, corporate identity, user research, packaging and branding, as well as environment

Table 1
Lunar Design

Firm	Year founded	Numbers of employees	Number of offices	Number of award	Number of projects	Number of patents
Lunar Design	1984	33	2	226	More than 3000	93

design and strategy. Their clients range from start-up companies to Fortune 50 and span a diverse range of industries (e.g. from toothbrush manufacturers to medical products). Table 1 summarises the profile of this firm.

3.2. Data sources

The wider research programme used qualitative methods to gather data from multiple sources within each firm [47]. In particular, the researchers used three data sources (Table 2): (1) semi-structured interviews with key informants ranging from founders/CEOs to designers, engineers and support staff, (2) archival materials, and (3) observation. Table 2 below summarises the key data sources used in the Lunar Design case study:

3.2.1. Interviews

The main source of data collection was semi-structured in-depth individual interviews. In total, this case study involved 31 interviews lasting on average 70 minutes. The length

Table 2
Data sources

Firm	Informants ^a	Archival materials ^b	Observation ^c
Lunar Design	CEO (1)	Company handbook	Office observation (2 weeks)
	Senior management/directors (11)	Appraisal forms	Staff meeting (1)
	Product designer (1)	Values surveys	Brainstorming session (1)
	Senior industrial designers (2)	Marketing publications	Job interview (1)
	Industrial designers (7)	Articles	
	Graphic designer (1)		
	Senior engineers (2)		
	Engineers (3)		
	CAD and animation (3)		
	Total: 31 ^d		

^a This column shows the number of informants interviewed and their roles within the firm.

^b This column shows the different types of secondary data collected.

^c This column shows the different types of observation conducted within Lunar Design.

^d Interviews were carried out at the firm's two offices.

varied from 30 minutes to 2 hours and the interviews were conducted during our two-week visit to the company's offices. Initially, an entry interview using a semi-structured format was first conducted with the founders in order to find out more about Lunar Design's history, structure, culture, competitors and human practices. We then interviewed staff who were directly involved in the creative process (e.g. designers, engineers, directors), but also informants who whilst not directly involved in the process could, however, provide interesting insights regarding their organisation (e.g. admin staff, IT manager). All informants were interviewed once and were briefed beforehand regarding the scope of the study. All interviews were tape-recorded and verbatim transcribed.

As part of the wider research agenda, interviewees were asked to discuss their experiences in different projects, the challenges dictated by the nature of their work (especially with regard to multiple product innovation) and the ways through which they sustain foresight across different product categories and industry sectors. We adopted this focus since our primary objective was to understand how people acknowledge, experience and embrace the processes involved in probing the future in their work setting. In this initial case study, the questions were broad and aimed to gain understanding of the goals of the company, its culture, the existing human practices and the processes used for probing the future, to gain some insights as to how the firm sustains foresight in such a high-change industry.

3.2.2. Archival materials

Industry reports and internal documents were also examined as available. These included newspaper and magazine articles about the firm (sources included the *Business Week*, *Fast Company*, *Forbes*, *Fortune*, *Business 2.0* and *ID* magazines and local newspapers) and relevant information available on the Internet. We also gathered materials produced by the firm, including its employee handbooks and other written documents, such as marketing publications, press releases and appraisal forms, which also served as data sources describing the work, processes and culture of the firm.

3.2.3. Observation

Informal observations were also made and data were collected during our two-week visit in Lunar Design's offices. The researchers were invited to observe and take notes of the everyday working environment. Observations also included taking notes in a cross-company staff meeting, a project group's brainstorming session, and a job interview with a designer.

3.3. Data analysis

The adopted method of data analysis drew on recommendations by Glaser and Strauss [22] and Miles and Huberman [36]. We started by examining the text data of the Lunar Design case (interview transcripts from 31 interviews, archival data related to the company and observation notes) seeking variance in their descriptions. More specifically, we searched for cues that highlighted processes involved in probing the future during the innovation process. Once we identified several emerging categories we then studied the data again and looked for other fragments of data that fit each category. The iteration between the data and the categories assisted us in identifying the most prominent

categories. This paper presents these preliminary findings. We also used existing literature to sharpen the insights yielded by the aforementioned inductive process and link our findings with existing concepts and relationships. The second stage of the wider research programme will involve further analysis across the four additional case studies to verify and enrich, add or disconfirm the categories that have emerged from the Lunar Design case study. Once further revising is judged unlikely to lead to additional understanding, theoretical saturation will be reached.

3.4. Limitations

One limitation of this paper is the fact that its findings are based on the analysis of a single case study [20]. However, scholars support that one detailed case employing a viable methodology can play a significant role in generating and testing theories especially in under-researched areas such as the focus of this study [9,18,24,47]. Nevertheless, we do intend to extend our findings through the multiple comparison of the categories that will emerge from the analysis of the remaining four case studies conducted in our broader research programme.

4. Mobilising foresight for multiple-product innovation

Past research has emphasised that multiple product innovation necessitates building on the past, but also probing into the future [29,44]. Studies have, therefore, highlighted that innovative firms not only leverage their own competences to develop successful multiple products, but also probe the future through tactics such as quick experimentation, alliances with extra-organisational groups (customers, consultants, etc.) and the organisation of regular internal meetings with a specific agenda for pondering the future [8,13]. In the case of Lunar Design, we found that looking into the future was critical for sustaining successful multiple product innovation. The nature of the new product design consulting business requires companies like Lunar Design to perpetually innovate; this, after all, is the main source of their competitive advantage. Learning about and, often, setting the future is therefore in Lunar Design's DNA, as highlighted by two interviewees:

‘How would you use it now? How would people use it in the future? We are people who could, if not predict, help you to determine the trends for a particular product line or a particular way of life’. (Director of Marketing Communications, Interviewee 31).

‘...most of the people we hire are highly interested in learning, highly interested in growth...’. (CEO, Interviewee 16).

How does Lunar Design manage to look into the future and perpetually be a trendsetter in multiple industries? The data revealed that staff in this firm are expected and enabled to constantly probe the future through a variety of established processes.

4.1. Experimentation

Staff in Lunar Design probe the future through constant experimentation. Experimentation is inherent in Lunar Design's culture, which promotes an inquisitive attitude that mobilises creative 'accidents'. These findings are similar to the 'risk-taking' culture discussed by Amabile [1], Basadur, Graen and Green [5], Burnside [10] and Tushman and O'Reilly [43]. In this respect, the president of Lunar Design, for instance, noted:

'So, we benefit from different viewpoints and benefit from kind of creating enough chaos; enough happy accidents have happened that go with the best results at the end. So, we are going out and searching in the forest for good ideas, you've got some people that just look under rocks, right, and you've got other people who tend to look up in the trees. And when they are sort of out together they go 'Oh what you're looking, that's interesting you're looking up in the trees, well I am looking at the rocks' and you get this...'. (President, Interviewee 14).

Similarly, the director of ventures highlighted the value that the firm places in pushing people to constantly challenge the status quo and probe into the future:

'I am sure the design group pushes the people in different ways but mostly in terms of asking them 'Have you thought about this? Have you thought about that?' when they are reviewing the design concepts...for the engineering group the way I generally approach pushing people to think harder, do more thinking and planning before doing work and ask yourself always the question 'Is there a better, smarter, faster way to do this? And constantly ask yourself that question'. (Director of Ventures, Interviewee 19)

Experimentation is mobilised through 'quick and dirty' trial and error experiments, which are a central part of the creative process in Lunar Design. Highlighting this, a graphic designer, noted:

'Actually I would rather look at things hands-on because I think that we will use plastic so I pick up a bunch of little plastic parts and want to make one piece of this jacket and I want to be exactly sure that it is going to work so I will pick up anything that looks like it might work and try to stick on that graphics and pick the one that works and I think that hands-on is appropriate to that and pick up different materials. We are going to try different plastics and see which one I am going to be able to put the graphics on and show a clear way, and have the right size and must have the right feeling and experiment with all sort of pieces that we picked up'. (Graphic Designer, Interviewee 25).

Interestingly, respondents revealed that the company tries to involve its clients in this forward-looking stance. The president was among several interviewees who argued that 'pushing the client' to explore new avenues in product development is part of the project management agenda:

'Take the X programmes, with them at the beginning they were all about beating Y and to me that is not a leadership position that is a competitive position. A leadership

position says ‘We don’t really care what Y is doing’, we are going to be the leaders because we are going to assert the right design for the market and not just compare ourselves with what Y did last’. (President, Interviewee 14).

4.2. *Knowledge brokering*

Similarly to Hargadon and Sutton’s findings [26], the data also revealed that knowledge brokering is a key process for sustaining foresight in Lunar Design. This is mobilised by making connections between different industries or projects, looking at the company’s existing portfolio or the wider competitive environment. In this respect, an industrial designer discussed how she is inspired by products from different industries:

‘I like the mix, so I think if I take again this example of the medical cart I was really thinking about furniture and home furniture when I was designing that...it is something that is moving into corridors in the hospital and is going really close to people so why couldn’t it look like a piece furniture...yes, it came from another field, that is why I really like to do many different things in the same time so the ideas just cross one to another’. (Industrial Designer, Interviewee 22).

4.3. *Updating*

Building on the past is key for mobilising foresight [29] and respondents argued that this is enabled within Lunar Design through several formal and informal ‘updating’ processes that keep them informed about past and recent developments. These in return allow employees to stay on top of advancements in multiple domains and draw inputs for the identification of potential futures in multiple industries.

Formally, the company organises staff meetings where employees learn about current projects, discuss industry trends and exchange information about new materials, processes or technologies. A product design engineer, for instance, noted:

‘...we have little monthly meetings about the latest technology...we try to send out little periodicals, magazines around about different materials and processes’. (Product Design Engineer, Interviewee 20).

Apart from these staff meetings, directors have also assembled teams whose main goal is to update staff on latest developments on a regular basis and mobilise forward-looking thinking. The senior vice president of design talked about this in some detail:

‘...we have these meetings called monthly design meetings...and basically this is getting the team together to kind of have a pretty open dialogue, and it’s pretty free form in the sense that it can be business related, it can be process related, but just an open forum to talk about different elements of what we do. So sometimes they turn into creative workshops, kind of like brainstorming workshops. There are some technical things that we do. We encourage people to learn technical tools like Alias, so we have people in house, we kind of build this little technology team and they are always trying to get new pieces of technology or new tools for us to use and if we

find something that works we're trying to get as many people exposed to it as possible'. (Senior Vice President of Design, Interviewee 17).

Updating is also enabled formally through Lunar Design's established databases, materials and idea banks. In this firm, employees have access to past projects (successful or not), sketches, proposals and a wealth of material that could provide inspiration about future trends. Keeping past ideas alive often mobilises the identification of possible futures in multiple industries [27]. A mechanical engineer discussed how this worked in one occasion:

'Recently I was looking at the big wall where they are putting the X brand and I saw these ideas, those concepts that Y has sketched and I saw this huge volume of ideas and I said that 'Wow, this is cool, this is really nice...'. For engineering...if the nature of the detail for instance or the way in which we attack a problem might be shared, for instance, this X analysis that I did for another project is a methodology for solving problems and it is something that we sort of developed for that particular project and it turns out to be useful for another project so we sort of take the same knowledge...'. (Mechanical Engineer, Interviewee 3).

Lunar Design's databases are key in enabling employees to build on past knowledge, as noted by the same interviewee:

'... designers have like a design database, huge stack of design that was rejected at some point and was not appropriate for that particular project making it...and we (engineers) have what we call a knowledge database because our database is more abstract and is not like straight ideas, it is more of a methodology and so for that we have on-line this knowledge database'. (Mechanical Engineer, Interviewee 3)

Informally, staff are also updated about current or past developments through Lunar Design's email system, as noted by a product design engineer:

'...we are encouraged to send out emails about things we find interesting or funny and just forward them'. (Product Design Engineer, Interviewee 20).

4.4. *Blue-sky projects*

Lunar Design also encourages blue-sky projects that enable the generation of wild and impractical ideas. Interestingly, the company has formalised this activity in order to ensure that identifying even remotely possible futures for different industries is constantly part of the day-to-day work activities. An industrial designer explained how the blue-sky concept was first initiated in Lunar Design:

'Initially, four people were a little bit frustrated with clients' projects and once in a while they wanted to explore using all their imagination; now this is like a regular activity'. (Industrial Designer, Interviewee 26)

Lunar Design's management was from the very beginning supportive towards this activity. Interestingly, our observation in the company's offices also highlighted that participants tended to regularly discuss their blue-sky projects both informally during

impromptu meetings with other employees but also formally through presentations in staff meetings. Staff used these meetings as opportunities to ‘sell’ the vision of the project to fellow employees and proselytise them to the work.

Most of the times, blue-sky projects start small at the individual level, taking the form of self-expression or internal investigation. As blue-sky initiators start talking about their ideas, they generate an interest and, hence, other colleagues, who may feel that they have similar interests or that they can contribute to the project, start ‘buying into’ the work and the team begins to grow. The company operates an all-inclusive strategy where anybody who has an interest in exploring any blue-sky projects further may initiate his/her own internal blue-sky programme. As the director of technology pointed out:

‘...then we have the blue-sky project. Anybody who has an idea, they kind of run with it. They use all our resources; I think that for designers is the ultimate. It helps them and it helps Lunar at the same time’. (Director of Technology, Interviewee 11)

4.5. Brainstorming

Brainstorming is also used on an everyday basis to probe the future and identify potential avenues for new product development. The senior vice president of design discussed how brainstorming in Lunar Design often enables employees to consider and potentially generate novel solutions:

‘We do it (break the rules) in every project. Because I think that’s necessary. When you do a brainstorm, the premise of a brainstorm is that there are no parameters and as you as you take the parameters there’s a high potential that in that process you’ll lead to some ideas that are very applicable even with all the parameters put back on. Sometimes it’s a notion or a concept of the way you might interact with the product. For instance, voice activation. You might be brainstorming for a recorder and you might say how can’t I just record with my voice when it hears it, instead of pushing a button. That’s an instance when you break the rules and then certainly you have to say look at that, does the technology exist and then really evaluate it...and so part of our service to them is to, in essence, break those rules and at least expose them to some new ideas, make them stop for a moment and think’. (Senior Vice President of Design, Interviewee 17).

Brainstorming has long been acknowledged in the innovation literature as an effective technique for mobilising creativity in the workplace [40]. It offers staff ample opportunities not only to contribute their viewpoints, but also to gain knowledge from others relevant to the problem at hand.

4.6. Scanning the external environment

The data also revealed that Lunar Design staff are encouraged to constantly scan the external environment as a means of identifying future trends in different industries. This

has also been highlighted in the innovation literature as an important factor in updating knowledge in creative environments [12]. Scanning in Lunar Design takes place throughout the projects, but is particularly evident in the ‘problem definition’ and ‘idea generation’ phases. Respondents discussed that they use different ways for scanning the environment. Some talked about visiting different establishments (from toy and hardware stores to technology exhibitions), as the following quote indicates:

‘...for example, last Friday ‘Hey, we should go on the X store’ to see the products and projects that X is working on and two others joined me and say ‘That would be good because they can help me at this project’...we did not have to check with anybody, we went for two hours, we have taken pictures came back and shown everybody...unstructureness that you can basically take innovation by the ‘horns’ and do what you need to do and inspire you that is encouraged, there is a lot of trust that you are still going to get your work done’. (Interviewee 29, Senior Mechanical Engineer, Company E)

Others talked about attending technology-related training seminars to ensure that they are constantly informed about new opportunities provided by emerging technologies:

‘We are trying to stay on top of the technology so we go to training sessions, if we feel that we need some knowledge we will go to training for it. Also basically working on projects sometimes there is challenge in a project that we might not do’. (Product Designer, Interviewee 1).

4.7. *Alliances*

Collaboration between companies that do or could compete has attracted growing attention in the literature as a means of sustaining competitive advantage [14,17,31,37,38]. In Lunar Design’s case, the firm has formed a virtual network of partners that they use according to the needs of a project. This allows the firm to gain insights from consumers, suppliers and technologists regarding the future of an industry and is a valuable input in the new product development efforts. The director of ventures, for instance, noted:

‘This company has sort of remained like a boutique consultancy and the way we tackled the projects is that we partner with people like X (market research) or technology-focused companies so we have sort of formed a virtual network...’. (Director of Ventures, Interviewee 19).

4.8. *Discussion*

This study highlights how Lunar Design, a high-performing new product design consultancy, probes into the future to mobilise and sustain foresight regarding future trends in multiple industries. Our findings not only reveal the probing processes evident in Lunar Design’s working environment (experimentation, knowledge brokering, updating, blue-sky projects, brainstorming, scanning the external environment and alliances) but

also highlight that these practices are an established part of the firm's daily routine and a key input to the perpetual learning process that is central to its multiple product innovation efforts (Fig. 1 below).

These findings mirror and extend Brown and Eisenhardt's [8] and Costanzo's [13] findings on the probing processes evident in high-velocity firms. The 'experimentation' and 'alliances' practices are similar to the 'cheap and quick experimentation' and 'alliances' findings identified by both studies. The 'scanning the external environment' process also mirrors Costanzo's [13] findings on probing the future through 'monitoring the external environment'. Yet the 'knowledge brokering', 'updating', 'blue-sky projects' and 'brainstorming' practices, which are regularly noted as creativity-enabling practices in the innovation literature [26,27,29,40], are also clearly enabling the generation of valuable 'futures' in Lunar Design, in relation to spotting new product development trends. There is, therefore, a clear need to integrate research in these fields to shed more light in these practices and their input on sustaining foresight in multiple industries.

Findings also highlight that by probing into the future, Lunar Design constantly identifies potential avenues for development in multiple product sectors and accordingly develops cutting-edge innovations. Developments within or out with the firm (in the form of new discoveries, changes in technologies, the economic environment etc.) constantly validate or discredit potential futures (rather than strategies as in the case of Costanzo's research) and spark new probing processes that perpetually enhance Lunar Design's foresight in multiple industries. This learning process appears to be the backbone of the firm's operations and reflects Daft and Weick's cycle of environmental scanning, interpretation and learning [15].

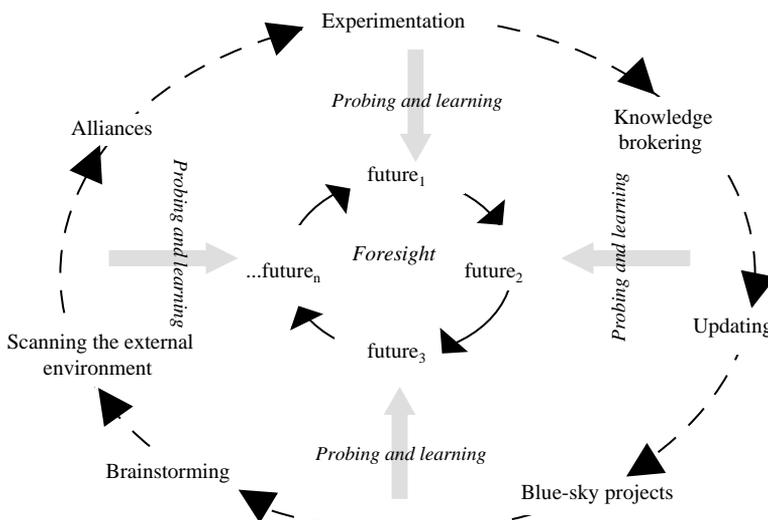


Fig. 1. Sustaining foresight for multiple-product innovation: perpetual probing and learning processes.

5. Conclusions and implications

The ability of multiple product innovation firms to perpetually probe the future and set the trends in multiple industries is an important yet understudied area in the foresight literature. To date, foresight research has been mainly the focus of strategy studies looking at tools such as forecasting, scenario planning and wild card management systems as different means for identifying potential futures and, accordingly, developing different strategic directions. In the innovation literature, research on the role of foresight remains scarce and only a few studies have looked into the processes that firms apply to mobilise foresight in their work setting [8,13]. The inductive case study discussed in this paper extends extant literature by highlighting seven key practices that mobilise foresight in multiple-product innovation settings and underlies the perpetual probing and learning process that drives the generation and confirmation/disconfirmation of possible futures for different industry sectors.

Our research has significant theoretical implications for studies addressing the ways through which multiple-product firms sustain foresight in their new product development efforts. Although this initial case study strongly supports recent writings [8,13], our findings will be developed through the analysis of the remaining four case studies in order to verify, reject or extend the identified practices and shed more light into the perpetual probing and learning process that is so critical for sustaining foresight in multiple-product innovation settings. We also encourage scholars in the area to further expand our findings in other knowledge-based research organisations/industries in order to aid the development of theory in this under-researched domain. The scarcity of empirical evidence particularly highlights the need for more inductive, exploratory research to identify more processes that mobilise foresight in such settings. We hope that our findings will help stimulate research efforts to build a solid theoretical framework in this topical area.

Our findings also have significant implications for managers in multiple-product innovation companies. Our results suggest that managers of such firms should recognise the importance of ‘probing into the future’ as a learning process that mobilises foresight and, hence, seek to formalise practices such as the ones discussed in this paper. The seven practices that we have identified in Lunar Design not only enable the identification of potential ‘futures’, but also provide team members with opportunities to explore potentially uncharted territory (thereby expanding their creativity). In addition, they enhance employees’ knowledge and experiences by exposing staff to external stimuli. Innovation can take many forms in society and, hence, it is important for employees to be open-minded and seek for its expressions outside their particular field.

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