HOW DOES AN ORCHESTRA LEARN TO PLAY JAZZ?

Essays on Emergent Change from Innovation at Bang & Olufsen

PhD dissertation

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EXECUTIVE SUMMARY

The rise of new technologies that disrupt entire industries threatens incumbents that cannot swiftly evolve their competences and identity and re-align with the demands of a new environment (Henderson and Clark 1990, Christensen 1997). Incumbents are often aware of what the new conditions demand of them and many are the strategies that have been proposed to grant their survival (Gans 2016). Yet these incumbents often struggle to understand *how* to get there. Understanding the complexities, barriers, and drivers of this process of change is key if we want to properly advise organizations threatened by such dynamics, as well as develop theories that can be effectively applied to such challenging contexts. In this perspective the process of strategic renewal has been proposed as a type of change that can re-establish the alignment between organizational competences, its identity, and the new market demands (Burgelman 1991, Floyd and Lane 2000, Agarwal and Helfat 2009). The role of innovation has been underscored in its contribution (Dougherty 1992b, Brown and Eisenhardt 1995b), but the extant scholarly work is inadequate in fully understanding how it does so. Recent developments in the literatures of innovation management and processes of change jointly point at understanding such a phenomenon across multiple levels of analysis, and inquire on how the process of innovating can transform the very structure and processes that enable it (Garud et al. 2013, Langley et al. 2013). The research question this dissertation aims to answer is "*how does innovation change an incumbent company?*".

I use as the setting of my inquiry the case of Bang & Olufsen, a Danish manufacturer of high-end consumer electronics. The company was founded more than 90 years ago, and has recently faced one of its biggest threats: the rise of digital. By employing qualitative methods, I developed rich and deep insights on the company's answers to such a threat. This dissertation is composed of three studies, each of which explores a different research question and provides

unique contributions. In study #1, I ask how, and under which conditions, managers can make the best of innovation conflicts in a renewing organization to improve its strategic fit. I find how particular typologies of conflicts emerging throughout the new product development process can become the trigger for a process of renewal at the organizational level by allowing either the reinforcement of best practices or the regeneration of malfunctioning ones. In study #2, I ask how product teams within a firm undergoing identity threats use representations to sustain innovation efforts under ambiguity. I find multiple mechanisms through which they actively promote change by using symbolic representations that directly address organizational ambiguity, enable the coordination of work and trigger the commitment to action. In study #3, I ask how inertial barriers to integration impact diverse processes of exploratory learning. I find how such barriers to, and the diverse structural forms of exploratory activities impact the institutionalization of learning about evolving market conditions and bottlenecks for change. As a joint contribution of this dissertation and as the answer to the overarching research question, I find innovation to be at the core of an emergent process of change that develops through multilevel learning, and in which identity and competences are explored and renewed to better fit the new demands of market and technology. I discuss the theoretical implications of my contributions at the interfaces of the individual, group and organizational levels, and conclude by offering avenues for further research and recommendations to practitioners.

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RESUMÉ

Fremkomsten af ny teknologi, der udløser disruption i hele industrier, truer etablerede virksomheder, som ikke er i stand til hurtigt at tilpasse deres kompetencer og identitet til den nye virkeligheds krav (Henderson and Clark 1990, Christensen 1997). Etablerede virksomheder ofte bevidste om, hvad den nye situation kræver af dem, og der er blevet foreslået mange strategier til overlevelse under de nye vilkår (Gans 2016). Og dog kæmper disse virksomheder ofte med at forstå, *hvordan* de skal nå derhen. At opnå en forståelse af kompleksiteten, barriererne og drivkraften i disse forandringsprocesser er altafgørende, hvis vi ønsker at yde en forstandig rådgivning af organisationer, der er truet af disse dynamikker, samt ønsker at udvikle teorier, som kan anvendes effektivt i denne udfordrende kontekst. I dette perspektiv er strategifornyelsesprocesser blevet fremlagt som en type forandring, der kan genetablere relationen mellem organisationens kompetencer, dens identitet og de nye markedskrav (Burgelman 1991, Floyd and Lane 2000, Agarwal and Helfat 2009). Innovationens rolle og bidrag er i denne kontekst blevet fremhævet (Dougherty 1992b, Brown and Eisenhardt 1995b), men den eksisterende forskning formår ikke i tilstrækkelig grad at gøre rede for innovationens rolle. Nyere bidrag i innovationsledelses- og proces litteraturen peger samstemmende på en forståelse af fænomenet på multiple niveauer og undersøger, hvordan innovationsprocessen kan transformere den struktur og de processer, der muliggør den (Garud et al. 2013, Langley et al. 2013). Forskningsspørgsmålet, som denne afhandling søger at besvare, er: "*Hvordan ændrer innovation en etablerede virksomhed?*"

Jeg bruger Bang & Olufsen – en dansk virksomhed, der producerer forbrugerelektronik i den dyre ende af skalaen – som case-virksomhed. Virksomheden blev stiftet for mere end 90 år siden og har senest måttet se en af de største trusler mod den i øjnene: den nye digitale teknologi. Ved hjælp af kvalitative metoder udviklede jeg en rig og dyb indsigt i

virksomhedens respons mod en sådan trussel. Denne afhandling omfatter tre studier, som hver undersøger forskellige forskningsspørgsmål og yder unikke bidrag. I det første studie spørger jeg, hvordan og under hvilke vilkår ledere kan få det bedste ud af konflikter i forbindelse med innovationsarbejde i en organisation, der forsøger at forny sig for at optimere sin strategi. Jeg påviser, hvordan særlige typologier af konflikt, der opstår i produktudviklingsprocessen, kan udløse en organisationel fornyelsesproces ved enten at styrke best practice eller ved at gentænke praksisser, der ikke fungerer. I det andet studie undersøger jeg, hvordan produkt-teams i en virksomhed, der føler sig truet på sin identitet, bruger symbolske repræsentationer til at understøtte innovationsaktiviteter under uklare forhold. Jeg påviser flere mekanismer hvorigennem Bang & Olufsen aktivt promoverer forandring ved at bruge symbolske repræsentationer som direkte adresserer organisationel tvetydighed, faciliterer koordinationen af arbejdet og udløser et engagement til handling. I det tredje studie, undersøger jeg, hvordan integrationsbarrierer influerer diverse processer af eksplorativ læring. Jeg påviser hvordan organisationelle barrierer og forskelligartede strukturelle former for eksplorative aktiviteter påvirker institutionaliseringen af læring om hvordan markedsforhold og flaskehalse udvikler sig. Som denne afhandlings overordnede bidrag og som svar på det overordnede forskningsspørgsmål fandt jeg, hvorfor innovation er det centrale i dén gryende forandringsproces, som udvikler sig gennem læring på mange planer og gennem hvilken identitet og kompetencer fornyes for bedre at passe til de nye markedskrav og teknologier. Jeg diskuterer de teoretiske implikationer af mit bidrag i snitfladerne mellem individ-, gruppe- og virksomhedsniveau, og jeg afslutter med at anvise veje til videre forskning og anbefalinger til praktikere.

CONTENTS

INTRODUCTION TO THE DISSERTATION

"*We all go Do, Re, Mi, but you've gotta find all the other notes yourself.*"

Louis Armstrong

The history of Bang & Olufsen (B&O) started in Struer, a small village in the North of Denmark. In 1925 two young engineers, Peter Bang and Svend Olufsen, pursued the dream of developing the perfect radio. Over the following decades the dream became a reality and grew beyond what the two founders could fathom. Their uncompromising attention to design and quality awarded B&O with worldwide recognition and, in 1972, a spot in the prestigious permanent design collection of New York's Museum of Modern Arts. In the 90s, the brand of B&O resonated with luxurious music and TV systems, integrating the "best of both worlds: the unique combination of technological excellence and emotional appeal" (Cattaneo et al. 2015, p.223). B&O reached its peak of innovation through what was known internally as an "orchestra"-model, in which a conductor – a concept developer, or a CEO – embodied a powerful vision balancing technology, design and business sense. This conductor would direct highly specialized individuals towards the creation of iconic products as if performing great pieces of classical music. The recent rise of digital technology over its analog counterpart has challenged the appropriateness of the orchestra model. Having an impact beyond technology and disrupting the whole consumer electronic industry, digitalization has come as a threat for the Danish icon characterized by fine hardware technology and industrial design, transforming its core competences into core rigidities (Abernathy and Clark 1985, Leonard-Barton 1992).

The new industry has become too complex and fast-paced for a single conductor to develop a timely and integrated vision. Scholarly work has suggested how a tight and ongoing integration of functional contributions from across the organization would not only make the threatened company more aware of the environmental developments, but also trigger the development of novel and relevant innovation (Henderson and Clark 1990, Gans 2016). At B&O such a mode of operation has recently been called a "jam-session". Differently to the orchestra model, the jam-session – a reference to a jazz practice born in the US in the 1920s – allows for musicians skilled in a particular instrument to intimately come together, and based on a few basic rules of interaction, improvise original tunes. Innovation through a jam-session, from a product development standpoint, no longer relies on a conductor integrating technology, design and business, rather it is distributed across specialists in those domains, and is emergent through their ongoing integration. Many are the companies that, due to major shifts in their industries, are aware of the need to transition to such an innovation model if they are to survive. B&O is one of those, and yet like many others, it is still struggling. B&O in the early 2010s is still imprinted with the orchestra model, and has only rarely been able to innovate as in a jam-session. The challenge then is not in appreciating the value of a jam-session model, but rather understanding *how* to move away from an orchestra model and change the rigid organization's structure, processes, and identity so that you can play jazz. Understanding the complexities of this process of change is crucial if we are to advise organizations threatened by similar dynamics, as well as develop theories that can be applied to such challenging contexts.

The process of transitioning from an orchestra type of organization to a jam-session one is an example of a specific type of organizational change defined as strategic renewal. This process that holds the promise of restoring strength and vigour if decayed elements are replaced

following times of creative destruction (Agarwal and Helfat 2009). The goal of the renewal process is to re-establish an alignment between organizational competences and the evolving environmental dynamics of market and technology (Floyd and Lane 2000). At the same time, we know how such a process is restrained by inertial forces at both the cognitive and behavioural level (Gilbert 2005, Tripsas 2009) that could obstruct the organization and bring about its failure (see e.g. Tripsas and Gavetti 2000, Vuori and Huy 2015). In this perspective, the role of innovation in supporting the process of strategic renewal is key (Dougherty 1992b), being an activity that can probe into the future (Brown and Eisenhardt 1997) while developing novel products and business opportunities (Burgelman 1983b). Studies of both innovation in organizational settings and strategic renewal only hint at this innovation-to-organization relationship, focusing rather on exploring the organization-to-innovation one. These bodies of research have so far been inadequate in addressing such a relationship, yet both have recognized the need to explore it. Garud et al. (2013) have underlined the importance of further understanding the complexities emerging from the sub-processes of innovation, as with the transformational processes of the very own structures that support them. These authors are also aligned with Langley et al. (2013) on the necessity to further research how tensions and contradictions drive patterns of emergent change, and to show how dynamic interactions across levels – between different individuals as well as between individuals and organizations – contribute to it. Building on the previous bodies of work of both innovation and strategic renewal, I see emerging the opportunity for a fresh look at innovation as a multilevel process embedded in a challenged organizational context. This perspective can provide the necessary depth of understanding about how its practice can influence the very structures, processes and

identity that enable it. In this dissertation I thus aim to answer the following overarching research question:

How does innovation change an incumbent company?

By "innovation" I emphasize the process behind the collective effort in exploring, ideating and developing new products rather than the products themselves, and how this set of activities influences an emergent process of change with the aim of transitioning from an orchestra to a jam-session type of company. The case of B&O is the setting I chose to explore and understand such a phenomenon. By employing qualitative methods of data collection and analysis, I have been able to develop the rich and deep insights necessary to uncover patterns of change across the interfaces of multiple levels. I have developed three independent studies to explore the question and provide unique contributions. In study #1 I find how particular typologies of conflicts in innovation can become the trigger for a process of renewal at the organizational level by allowing either the reinforcement of best practices or the regeneration of malfunctioning ones. In study #2 I find how innovators promote change by using symbolic representations that address organizational ambiguity, enable the coordination of work and trigger the commitment to action. In study #3 I find how the variation of exploration activities allows for diverse opportunities of institutionalizing the learning necessary to realign organizational competencies to the developments in market and technology. In the next section I first review the existing theoretical background, discuss paradigmatic and methodological choices, and provide an outline for the studies in my dissertation. I conclude by discussing their joint implications through a composite framework of a multilevel process of emergent change from innovation and provide implications for practitioners.

THEORETICAL BACKGROUND

I review the literature on topics related to how innovation influences an emergent and multilevel process of change. After looking at strategic renewal as a particular type of change tightly connected to the process of organizational learning, I explore the extant literature that links the process of renewal to that of that of innovation. Finally, I consider project work as a valuable level of analysis to connect innovation to change, which prompts a wider consideration of the analytical and methodological implications of multilevel studies.

Strategic renewal as a process of change

Among the many types of organizational changes that a company can go through, the one that interests me most is strategic renewal. This type of change is different from what could include extensions, additions or deletions (Agarwal and Helfat 2009), for example through M&As or spin-outs. Agarwal and Helfat (2009), who took it upon themselves to re-establish the state-of-the-art of a decades-old discussion, went back to dictionary definitions to make sense of the variety of studies that had started diverging. With "strategic", we mean "that which relates to the long-term prospects of the company and has a critical influence on its success or failure", while "renewal" indicates "to refresh by restoring strength or to replace that which is damaged, old or worn out" (p. 282). Their complete definition of strategic renewal, which I use in this dissertation, is "the process, content and outcome of refreshment or replacement of attributes of an organization that have the potential to substantially affect its long-term prospects" (p.282). This definition applies tightly to the original interpretation used in the work of Robert A. Burgelman, who documented the internal dynamics at Intel that resulted in the creation of

new products and businesses outside of the scope of a somewhat inertial corporate strategy (Burgelman 1983b, 1991, 1994). Most of the studies agree that strategic renewal is a way to overcome inertial barriers and close the gap between existing competences and the basis of the competitive advantage in the industry (Floyd and Lane 2000). However, the mode of how the change should occur is still debated, especially between a continuous and discontinuous mode of change. Most of Burgelman's work focuses on a continuous and ongoing type of change, an anticipatory adaptation to new environmental demands and/or entering new niches (Burgelman 1991, 2002). A number of other studies points out how the continuous change is a crucial capability for survival in staying abreast of high-velocity industries (e.g. Dougherty 1992b, Brown and Eisenhardt 1997, Crossan and Berdrow 2003), while recognizing the existence of radical bursts of change. The alternative view considers a discontinuous mode of change characterized by a punctuated equilibrium (Tushman and Anderson 1986). In this perspective it is believed that a rising stress, which has been accumulating due to the inadequacies of the current inertial strategy vis-à-vis the dynamic environment (Van de Ven 1986), leads to a sudden burst of change aimed at transforming the fundamental properties of the system (Huff et al. 1992). Plowman et al. (2007) developed a useful typology based on Greenwood and Hinings (1996) reproduced in Table (1), which brings together the multiple perspectives into four typologies of change, combining its pace as either episodic (as the reaction to inertia from e.g. a crisis, change of top management) or continuous (as the reaction of instability e.g. ongoing medication of processes and practices) with its scope, either convergent (within and supporting the existing frame) or radical (bending the frame itself) (cf. p.518).

		Scope	
		Convergent	Radical
Pace	Continuous	Minor *system instability* leads to *small adaptation* that occur within the existing frame	Major *system instability* leads to a *pattern of adaptations* that is frame-bending
	Episodic	Minor *inertia* leads to *small replacement* that occurs within the existing frame	Major *inertia* leads to *dramatic replacement* that is frame-bending

Table 1 - Conceptualization of four types of change, adapted from Plowman et al. (2007)

I believe that "strategic renewal" falls into the "continuous and radical" type of change, yet many studies of punctuated equilibrium claim that small changes do not accumulate into a major radical one (Romanelli and Tushman 1994). In contrast, Plowman et al. (2007) showed nevertheless how a simple gesture like serving breakfast to homeless triggered a series of positive feedbacks that radically transformed a "silk-stocking church" into a diverse community-gathering hub advocating for the city "marginalized" (p.517). In a similar vein, Salvato (2009) described how renewal in product development at the individual level results in frame-bending transformations in organizational level capabilities. These studies support the consideration by Agarwal and Helfat (2009) about the need of more studies showing how interrelated and different types of change can occur at different levels of analysis.

When we consider the driving dynamics behind the process, most studies agree that the basis for both the promise and the struggle of strategic renewal lies in a series of paradoxes, tensions and contradictions. These tensions have been better reflected and highlighted in evolutionary

or dialectic models of change, as opposed to traditional life-cycles and teleological ones (Van de Ven and Poole 1995, Langley et al. 2013) .

The first of such tensions occurs at the intersection of the urge for change – emerging as cumulative stress due to the ineffectiveness of the current strategy in tackling the shifting environmental demands – and the forces for stability on the other – exemplified by the business-as-usual pursue of short-term goals necessary for the firm's survival (Huff et al. 1992). The root of this tension is to be found in the interdependent nature of activities in an organizational system (Albert et al. 2015). The pervasiveness of such interdependencies fosters the reinforcement of the current system and hinders the deviation from the status quo (Hannan and Freeman 1984, Leonard-Barton 1992). As such, the flexibility and adaptation to short-term challenges supports the continuation of the established system configuration (Burgelman 2002). On the other hand, the ubiquity of these interdependencies also increases the system sensitivity to environmental conditions and the variation of potential configurations for new business opportunities (Rivkin and Siggelkow 2003, Martin and Eisenhardt 2010). While the company could avoid such tensions and not change, for example by outsourcing new tasks, the challenge of strategic renewal is in internalizing such tension, either through an ongoing struggle at the "edge of chaos" (Brown and Eisenhardt 1997, p.29) or by separating change and stability spatially or temporally (Baden-Fuller and Volberda 1997).

The second tension can be described as procedural and structural, where groups being differently exposed to environmental dynamics behave directed by conflicting expectations. Strategic actions by middle managers start diverging from what had been mandated by corporate strategy through a charter definition process (Burgelman 1994, Zimmermann et al. 2015). They develop new competences rather than working within those already

institutionalized (Floyd and Lane 2000, Burgelman 2002) supported by a shift in salience towards new individual identities rather than enduring an ambiguous, inadequate organizational one (Fiol 2002, Tripsas 2009).

Finally, a third tension, which builds on the previous ones, is situated between exploratory and exploitative processes of organizational learning (March 1991, Levinthal and March 1993, Crossan and Berdrow 2003). Both are necessary to increase and decrease variations of strategic opportunity and thus balance the allocation of resources (Burgelman 1991, 2002).

Strategic renewal and learning

Strategic renewal has often been described as an evolutionary process (Albert et al. 2015) associated with a general notion of learning linked to different roles in an organizational hierarchy. While some studies still include a combination of top-down versus bottom-up approaches (cf. Volberda et al. 2001, Glaser et al. 2015), most regard it as a bottom-up process of variation, selection and retention that does not rely on superior top management foresight or specific firm-level traits (Salvato 2009). The benefits of a bottom-up process are given through its initiation by operative management, who are engaged with specific technology and market developments and more keen towards experimentation (Allen and Cohen 1969, Floyd and Lane 2000). At the same time, operative management and their champions throughout middle management are hampered by the lack of resources and the necessity of gaining attention by top management through their "successful persuasion" (Crossan and Berdrow 2003, p. 1100, see also Henderson and Clark 1990, Burgelman 1991, Floyd and Lane 2000). Such a process allows for a continuous and cumulative learning different from a mandated reorientation by

top management that by neglecting such accumulated learning risks eliminating it (Burgelman 1991). The tension between an "induced process" imposed by top management and the "autonomous process" championed by the middle (Wooldridge et al. 2008), also the basis of Burgelman's work (1983, 1991, 1994, 2002), is the departing point to understand the multilevel process of exploration and exploitation linking individual and organizational learning by Crossan and colleagues (1999, 2003, 2015). At the same time, it is not only the direction, but also the magnitude of change that matters.

For strategic renewal to matter, changes however small need to eventually trigger a double-loop type of learning (Argyris and Schon 1982). In this learning process, whole practices, even those so far considered good and legitimate, are put into question and potentially changed (Van de Ven 1986). The type of change could be: 1) shifting the learning mode from component-driven to architecture-driven and investing in organizational structure and processes accordingly (Henderson and Clark 1990); 2) a significant recombination of the power configuration across organizational actors (Dougherty and Hardy 1996); 3) the re-identification of the workforce into a new identity (Fiol 2002, Tripsas 2009); or 4) the recombination of old resources and competences with new ones (Siggelkow 2002, Salvato 2003). This dynamic has also inspired the research stream on dynamic capabilities, defined as the ability of a firm to "integrate, build and reconfigure internal and external competences to address rapidly changing environments" (Teece et al. 1997, p. 516, Zollo and Winter 2002). While this perspective of higher-order capabilities gained much momentum in the field, it has also lost part of the detailed insights from fine-grain accounts of organizational change that have led to it, so that a return to a more "micro-foundational" perspective is being advocated (Felin and Foss 2005, Felin et al. 2015). Salvato (2009), for example, showed how the timely intervention of senior

managers was key to encode successful experiments into higher-level capabilities, echoing the bottom-up evolutionary process of variation, selection, and retention mentioned above.

Innovation as the trigger for change

The role of innovation for strategic renewal is acknowledged as key (Dougherty 1992b), yet studies addressing the relationship between organization and innovation rarely go beyond explaining its role in creating new products. The question that is most often asked is "how can the organization provide a supporting environment to have innovation flourish", rather than "how the practice of innovation influences the organization" which is much more rarely addressed. The first is clearly a key question, as it has become clear how innovation occurs "in spite of" the organization, and not because of it (Dougherty and Hardy 1996, p.1134). Organizations struggle in managing their attention (Ocasio 1997) to good ideas and their translation into "good currency" for example by gaining traction for implementation (Van de Ven 1986, p.591), in pursuing a creative technology-market learning by working across departments and openly interacting with senior management (Dougherty 1992b) or in getting rid of lock-steps, bureaucratic processes and bad communication practices (Brown and Eisenhardt 1997). When "successful", however, innovation is also a fundamental means for renewing the organization by allowing members of the organization to "diversify, adapt and even reinvent their firms to match evolving markets and technology conditions" (Schoonhoven et al. 1990, in Brown and Eisenhardt, 1995, p. 344). Most of these studies inquire little on the "innovation-to-organization" relationship, and rather consider the success of the process as the introduction of new products (cf. Dougherty 1992b, Brown and Eisenhardt 1995a, Kim and Pennings 2009, Dalpiaz et al. 2016). As it is difficult to pin such or other performance measures

to strategic renewal (Agarwal and Helfat 2009), the contribution of innovation has got to lay elsewhere. An important assumption was made by Henderson and Clark (1990) in this regard, that could guide such an inquiry. They posit that because organizations are boundedly rational, their structure comes to mirror the internal structure of the product they are designing. Indeed, innovation does not exist in a vacuum (Van de Ven 1986), and the innovation-to-organization relationship is by necessity a two-way street. Some studies provide with fertile ground to explore this relationship more in depth. Brown and Eisenhardt (1997) pointed out how innovation allows to create connections to the future while growing the company towards it. A number of other studies show the necessity of a variation in new innovation initiatives to develop new business opportunities (Burgelman 1983b, 1991, 2002) or how successful experiments in new product development can eventually become the trigger for change at the organizational level (Salvato 2009).

Project work for change

What is common through the insights of these last studies is the particular nature of projects, especially exploratory ones. These projects have the potential to become experiments, i.e. a set of activities that embody the features the company ought to develop to realign itself with the evolving market. Development projects become the focal point for the tension between innovation and status quo, "microcosms of the paradoxical struggle to maintain, yet renew or replace core capabilities" (Leonard-Barton 1992, p. 111). One part of the literature does not associate projects with routine-behaviour, implying thus serious challenges in their contribution to routinized learning (Winch 1996, Hobday 2000) or systemic repetition (Gann and Salter 1998, 2000). However, another stream underscores the opportunity to achieve

organizational learning from projects (Prencipe and Tell 2001), especially because firms do undertake similar "categories" of projects involving repeatable and predictable patterns of activities (Davies and Brady 2000). Brady and Davies (2004) showed how "vanguard" projects allowed groups to operate at a distance from the core organization – a safe space granted by senior management – and thus engage in experimentation and deviating from established routines. When multiple projects started to follow a similar pattern, the organization could refine and institutionalize such new routines and thus to transfer the learning from the project level to the organizational level. Through such projects a company can explore different approaches to innovation (Abernathy and Clark 1985), or even explore new identities all-together while under an ambiguous transition phase (Fiol 2002). Moreover, they could potentially pave the way for organizational change by highlighting core rigidities (Leonard-Barton 1992).

While the benefits of projects seem multiple, their potential to radically change the whole organization is limited. It can be difficult for a single project to dramatically alter a capability at the organizational level, as projects are per nature vulnerable. Their political position can erode over the course of the project and could eventually be rejected by the existing power structure (Fast 1978, Dougherty and Hardy 1996). If too much political support is present, it can also hamper their exploratory nature, as the proactive involvement of the CEO could impose the logic of the successful core business in an area where it might not apply, leading to an ineffective escalation of commitment (Burgelman 2002). Thus, projects appear to be an analytical level of analysis that can support my understanding of how innovation is connected to strategic renewal.

Multilevel considerations

This last consideration prompted me to consider the multilevel implications and opportunities for my study. I understand innovation not as an individual activity, rather as a collective achievement (Van de Ven 1986). This assumes that individuals involved in innovation activities are embedded in a broader context that influences them, their actions and their relationship with groups and the organization. Understanding our research question in terms of multiple levels better reflects the true nature of an organization as a multilevel and integrated system (Rousseau 1985, Klein and Kozlowski 2000, Kozlowski et al. 2013). "Level" is understood in this case as a different unit of analysis, contraposed to "echelon" that could be referring to a hierarchical sub-grouping within a level (e.g. positions in an organizational chain of command) (Rousseau 1985). A prime example of multilevel analysis is how individuals as organizational members are subject to "nested" levels of identity, between which the salience shifts, depending on the different dynamics they are subject to (Ashforth et al. 2001). Also, the previous review on how projects – a social system at the micro-level – can create conflict with the macro-level of the organization (Leonard-Barton 1992) underscores the importance of a multilevel perspective when examining the relationship. One of the key challenges of a complex and interdependent activity like innovation is "managing the part-whole relationship" (Van de Ven (1986) as it occurs that "impeccable micro-logic often creates macro-nonsense" (p.598).

Despite the importance of a multilevel perspective on organization science, most scholars have been trained in taking either a micro or a macro perspective, and have been left without much guidance in applying micro-and-macro – i.e. multilevel – research designs (Klein and Kozlowski 2000). Klein and Kozlowski (2000) claim that neither perspective by itself can fully

account for organizational behaviour, as a purely macro perspective would neglect the means by which individual behaviour, perceptions, affect and interactions give rise to higher-level phenomena, incurring thus the risk of a superficiality through anthropomorphizing: organizations do not behave, individuals do. Similarly, a purely micro perspective neglects the contextual factors that can significantly constrain the effects of individual differences that lead to collective responses – like innovation, which ultimately constitutes a macro phenomenon (Rousseau 1985). Multilevel models have been conceptualized mainly on two lines: the first as a top-down process, in which higher-level units either have a direct effect on a lower unit, or moderate a relationship occurring at a lower level; the second, as bottom-up, in which individual cognition, behaviour and affect have properties that manifest at higher levels as an "emergent phenomenon" through social interactions, exchanges and amplification (Allport 1954, Katz and Kahn 1966, Klein and Kozlowski 2000). Emergence is shaped and constrained by higher-level contextual factors, like hierarchical structure that defines unit boundaries and as well varies in process and forms. The same higher-level phenomenon can emerge in various ways in the same organization due to interaction dynamics (Klein and Kozlowski 2000). Two principal models of cross-level emergence have been identified (Rousseau 1985, Klein and Kozlowski 2000, Kozlowski et al. 2013). The first is the model of "composition", based on isomorph phenomena subject to analogous antecedents and processes that emerge upwards across levels, as for example individual-level to organizational-level climate (Glick 1985, Rousseau 1988). This process tends towards the creation of a state of equilibrium, levelling out outliers by pressuring perceptions towards uniformity. The second model is "compilation", based on discontinuity, in which phenomena that share a common domain but are distinct in their contributions emerge through levels, as for example individual and organizational

performance (Kozlowski et al. 1999). This is an irregular process that follows a nonlinear pattern (as opposed to composition), and is suited to capture complex phenomena marked by differentiation, as for example conflicts, competition, coalition formation, common in organizations (Brown and Kozlowski 1999).

PARADIGMATIC AND METHODOLOGICAL CONSIDERATIONS

Paradigmatic considerations and quality criteria

A tradition of multilevel research focused on emergent phenomena has often relied on qualitative data and methods to answer their research question (e.g. Barley 1986, Orlikowski 2002, Corley and Gioia 2004). (Post)positivist-aligned quantitative studies are proven to advance theoretical precision, verification and extension and have therefore focused mainly on top-down studies (Kozlowski et al. 2013). Studying emergent phenomena requires to adopt a process orientation towards the dynamic interactions underlying such phenomena, for which the rich descriptive foundation of qualitative studies is better suited (Kozlowski et al. 2013). For this reason, in this dissertation I generally align to a *constructivist* paradigm, a choice that has gradually emerged from considerations about the theoretical nature of the research question and the setting I have decided to use. Constructivism is a break-away move from the ontological realism of (post)positivism and adopts relativism, in which realities are understood "in the form of multiple, intangible mental constructions, (…) local and specific in nature, (…) and dependent for their form and content on the individual persons or groups holding the construction" (Guba and Lincoln 1994, p.110-11). The aim of a researcher subscribing to such a paradigm is thus to *understand* such social constructions and advance an informed consensus

as a “passionate participant” that facilitates a multi-voice reconstruction. Epistemologically, because the “findings are literally created” (Guba and Lincoln 1994, p.111) through the interaction of the investigator with the object of the investigation, the use of hermeneutical and dialectical methodologies is advocated (Guba and Lincoln 1994). The value of qualitative data and methods is in providing contextual information, insights on the meaning and purposes of data, an insider perspective on the phenomenon, and supporting a process of discovery (Guba and Lincoln 1994). Throughout the process of designing, carrying out and concluding this constructivist-aligned research project, I had to ensure standards of quality parallel to those of validity and reliability of (post)positivist studies. Lincoln and Guba (1985) framed such criteria for quality in terms of “trustworthiness”, an aggregate degree of quality that is established by ensuring credibility, transferability, dependability and confirmability. The strength of a qualitative approach lays in the credibility it can achieve through a variated, persistent and iterative pursuit of a research account that can be “trusted”. Among measures to ensure credibility, I have employed a triangulation of various data methods and sources – necessary to consider a multiplicity of interpretations of the same events; a prolonged engagement with the case contextual reality – necessary to develop intimacy with dynamics of culture, power, and logics, as well as trust with the informants; and eventually an iterative inquiry on specific events – necessary to gain a solid grasp of temporality and clarity about multi-faceted stories. The pursuit of credibility through richness and depth of contextual factors comes at the expenses of transferability and dependability. Transferability is difficult to demonstrate at the same standards of the generalizability of positivist studies. The advice I have followed is to ensure enough description of the context and observed phenomenon to allow other researchers to infer a degree of similarity to their own situation (Shenton 2004). Similarly, Lincoln and

Guba (1985) claim dependability is very difficult to fully demonstrate given the contextual implication of a constructive approach. As Florio-Ruane (1991) mentions, any published description is static and frozen in an “ethnographic present”. Scholars thus propose very close ties between measures of credibility and dependability, which can be taken to attempt the replication of the work, not necessarily of the results. I present in Table (2) a compiled overview of my specific measures to ensure such trustworthiness, merging indications from Lincoln and Guba (1985), Shenton (2004), and Miles et al. (2014).

Quality criteria	Measures undertaken in this study
Credibility Confidence in the "truth" of findings	• Adoption of well-established research methods » Guidelines for process studies (Langley 1999, Langley et al. 2013), case studies (Eisenhardt 1989) • Prolonged engagement to ensure familiarity with culture and trust with participants » Multiple cross-functional *introductory* interviews, living on-site, "hanging out" at hubs • Triangulation of methods of data collection and data sources » Individual interviews, observations, extensive archival data (mail exchanges, NPD process minutes and gate-documents, documents mentioned in interviews) » Cross-functional (R&D, Product Mgmt., Creative centre, Marketing, Procurement) and cross-hierarchical interviews (operative managers, technology specialists, concept developers, top mgmt. team including CEO and COO) • Iterative questioning » Multiple interviews with same participant, probing with similar questions, follow-up mails for clarifications • Negative case analysis » Extensive inclusion of all cases uncovered during the data collection • Frequent debriefing with co-investigators » Multiple meetings and joint brain-storming sessions with co-investigators with senior faculty at Aarhus University (DK), ETH Zurich (CH) and Babson College (US) • Peer scrutiny of research processes and results » Multiple presentations to faculty members and at leading conferences (AoM, SMS, Druid) • Researcher's reflective commentary for the monitoring of own developing constructions » Daily template of notes and commentary on data collection and initial analysis, plus personal reflective diary after full-days on-site.
Transferability Applicability of the findings to other contexts	• Thick description » Extensive use of direct quotes and narrative in final articles, extensive description of Bang & Olufsen context with respect to the topic of the articles. » Book chapter on B&O's recent context to deepen such understanding (Cattaneo et al. 2015)
Dependability Confirmation of consistency of findings and their replication	• Extensive description of process » Each article extends on the process of data collection and analysis, enabling thus a researcher to repeat the work, and get as close as possible as replicating the results.
Confirmability Degree of neutrality, results are not shaped by researcher bias or interests	• Triangulation of data collection methods and sources » See credibility. • Acknowledgment of choices of method and researcher's own predispositions » Discussed in the methods section of each article.

Table 2 - Measures undertaken in the dissertation to ensure trustworthiness

Research setting and methods

I overview here the common features across the three studies in terms of the research setting and the methods of data collection and analysis, while discussing them more in detail in their respective study's method sections.

The case of B&O has been purposefully chosen because of the recent challenges it has been facing from a highly dynamic industry which have raised questions about both its opportunities for change and the risks of not embracing them. The company was founded in 1925 in Struer, a small town of approximately 10,000 inhabitants, many of whom are part of, or have ties with, the 2,000 or so current employees. After more than 90 years since its foundation, the company has grown to a total turnover of about $400m in 2015. The headquarters and most of the activities related to the core high-end brand are still located in Struer. In 2012, the new top management team initiated the sub-brand of B&O Play, a younger and more affordable line, and a new location in Lyngby, a hip suburb of Copenhagen, has been added with functions mainly related to such unit. B&O's core business is composed of three departments as the cornerstones of the new product development (NPD) process: R&D, the technology department that is responsible from both technology exploration and product development; the Creative Centre, home of the concept developers, who are also the connection to the external designers employed for each project; and Product Management, responsible for the products' portfolio and roadmaps as well as single product business plans. These three corners are represented in each NPD project by one individual "Lead" in the "NPD Core Team", each of them responsible for either concept, technology or business from its official inception through market launch. Such a Core Team is the foundation of the new innovation process that has been re-framed in 2012 as a stage-gate model (Cooper 2008). The NPD Core Team is meant to support the

“friendly-fighting” that has characterized B&O’s productive relationship between departments, yet also contain its excesses so to achieve a timely and budgeted market launch (Austin and Beyersdorfer 2007, Cattaneo et al. 2015).

This setting was the field of my qualitative inquiry. Interviews and observations were the main source of data, but both internal and external documents complement and corroborate my findings. The same process of data collection is at the base of all my three studies, which differ in terms of the subsets of data I focused on and the methods of analysis I employed. The data collection took place between June 2014 and September 2015, and occurred over three phases: a) an introduction to the company’s history, general dynamics and people to get a feel of what B&O “is all about”; b) the exploration of stories, processes and tensions to understand the hows and whys of the topics that started emerging; c) a focused inquiry on specific series of events, cause and effects relationships, leading to a detailed composition of timelines and case studies of projects and activities. The first contact with the company was made with a System Engineer and a Technology Specialist, with whom I collaborated to pilot-test an assessment model of technology intelligence during my Master Thesis in 2012. They granted me and my supervisors access by supporting in-kind a doctoral project with the internal championing of the Head of Research inquiring on the innovation activities of B&O in times of industry convergence, and provided me with a small studio close to one of the factories where I could stay while in Struer. They also helped me in setting up the first interviews, from which then I used a snowballing sampling, asking interviewees to identify additional individuals that held relevant and insightful roles across departments and hierarchical levels. To avoid being restricted by the network of the employees I first talked to (Flick 2009), I directly approached others through mail or personal contact to set up a meeting. All of the people I identified through such methods

agreed to a meeting. They also agreed to being recorded, which highly facilitated the write-up of notes the very same evening and the following process of analysis. The interview guidelines have been adapted between phases but remained consistent within them. I nevertheless maintained a degree of flexibility to inquire more specifically on particular dynamics the interviewee was most knowledgeable of, or to acknowledge the contributions of a different hierarchical level. Each day of observation was reported in a daily template that was divided between an objective summary of the data collected, as well as a subjective section in which I kept track of my own interpretations and potential leads to further inquire on in the following days (Nadin and Cassell 2006). Informal meetings occurred across the organization's hallways, offices or canteens and daily notes of these were also recorded in such a template. These encounters served to set up a formal interview or to clarify some details of a recent one. In total, over the course of 40 full days of observation, I conducted 56 interviews ranging from 45min to 4 hours, interacting with 35 different informants across functional roles and hierarchical levels, from technical engineers who had been with the company for 30 years to the newly appointed CEO. Having been all recorded, the conversations were fully transcribed into a total of 1,438 pages. To avoid unnecessary redundancies, I refer to Table (1) in study #1 for the complete list of informants. The data from interviews was complemented first by the attending and recording of 8 meetings related to product development and other innovation activities, and second by a wide array of archival data including: NPD documents for the 3 selected projects (including minutes of the innovation board at each gate of the NPD process, presentations by the NPD team and the official briefs summarizing the project's concept, technology and business), corporate presentations and official documentation about technology development and exploration efforts, a collection of "CEO's Tweets" as his personal

communications to the whole organization's employee base, further scholarly work on B&O (Ravasi and Schultz 2006, Austin and Beyersdorfer 2007, Krause-Jensen 2010, 2011, 2013a, b, Ravasi and Phillips 2011) and company biographies (Bang 2005). I refer to Table (1) in study #3 for the complete list of such data and their use for analysis. The first iteration with data analysis occurred already throughout data collection by identifying interesting patterns to be further inquired on or contrasting accounts to be further clarified, which were all recorded and kept track of in the reflective section of my daily templates. The core analysis processes differ from study to study, and are therefore explained in more detail in the respective sections, yet the overall approach will be explained here. Generally, the analysis followed an inductive process of coding, starting off very closely to the informants' interpretations, then aggregating them into higher-order themes, and finally converging into a theoretical model (Miles et al. 2014). To provide more detail, I started by using descriptive codes – as in labels, words or short sentences – to summarize the content of a specific passage. Staying true to the informant's account is of the highest importance, yet I acknowledge the bias of being guided by a research question that could have imparted a slight degree of deduction to some of the codes. Nevertheless, I strived for openness while coding, and thus welcomed unexpected emerging patterns or serendipitous discoveries. This iterative method of multiple rounds of coding, being continuously refined, led to the emergence of higher-order themes that highlighted commonalities and contrasts across the data. Such a process was the backbone of my analysis leading towards the creation of my theoretical models, but it was often complemented by other types of analysis. First is a temporal analysis of events through the creation of timelines, on which such themes could be juxtaposed to understand how they developed over time, and eventually converged into a process perspective (Langley 1999). Second is case analysis

(Eisenhardt 1989) by comparing and contrasting bundles of data referring for example to different NPD projects, or the specific units of analysis that we consider in each study. The value of case analysis was in contextualizing the emerging themes and further sharpening my understanding of cause-effect relationships. At later points of the late analysis process, I approached different literatures that could help me make sense of the emerging themes from a theoretical perspective, and which suggested further examination of my data analysis and codes through a particular theoretical lens.

DISSERTATION OUTLINE

The aim of this dissertation is to enhance our understanding of the practice of innovation as a collective effort of individuals nested in a multilevel organizational context. I present three complementary answers to the overarching research question. They all emerge from the data collected at Bang & Olufsen. I summarize the three studies' unique contributions here below and in Table (3). I will review their joint implications in the concluding remarks.

Study 1. Creative activities in new product development need multiple perspectives from diverse organizational members, that when synergistically integrated, foster innovation and are an avenue to strategic renewal. However, such perspectives can also diverge and clash, leading to tensions and conflicts among groups and individuals. While we know how moderate conflicts within groups can be beneficial, what of more divisive and broader inter-group conflicts, could they have beneficial effects for change?

Study	Research Question	Level of analysis	Contributions
#1	*How and under which conditions can managers make the best of such innovation conflicts in a renewing organization to improve their strategic fit?*	Group ↓ Organization	• Theoretical model for the mechanisms supporting the process from conflicts to strategic renewal through organizational learning, showing how best practices are reinforced into a system wide solution and malfunctioning elements are regenerated to improve the company's strategic fit. • Evidence for the misalignment between demands voiced with task and jurisdiction arguments to be the key in triggering renewal from conflict if properly managed.
#2	*How do product teams within a firm undergoing identity threats use representations to sustain innovation efforts under ambiguity?*	Organization ↓ Individual ↓ Group	• Theoretical model for the mechanisms supporting the resolution of organizational identity ambiguity through the use of symbolic representations. • Evidence for the role of representations in triggering the commitment to action and promoting emergent change in the face of inertial forces. • Micro-foundations of identity work at the individual and group level
#3	*How do inertial barriers to integration impact diverse processes of exploratory learning?*	Organization ↓ Individual ↓ Organization	• Extension of theory by showing how the perceived degree of success from an innovation perspective can both trigger or undermine the process of learning institutionalization and the reconsideration of barriers to integration. • Evidence for the variation in the structural autonomy of exploratory activities granting complementary learning for renewal in terms of the evolving market conditions and bottlenecks in the process of integration.

Table 3 - Research questions, level of analysis and contributions of dissertation's studies

We thus inquired on "*How and under which conditions can managers make the best of innovation conflicts in a renewing organization to improve its strategic fit?*" We find that a particular type of conflict, in which there is a misalignment between demands voiced with task and jurisdiction arguments, can be the triggering event for organization-wide renewal. We also find two distinct mechanisms for such a process, showing first how best practices are reinforced into a system wide solution, and secondly how malfunctioning elements are regenerated to improve the company's strategic fit.

Study 2. Changes in market logics create a permeating ambiguity at the organizational level, something innovating teams have to deal with on a day-to-day basis. While top management addresses protracted cycles of identity work, we know how symbols and metaphors could potentially be instrumental on a day-to-day basis. I address the research question "*How do product teams within a firm undergoing identity threats use representations to sustain innovation efforts under ambiguity?* By providing an account of the micro-foundations of identity-work at the individual and team level, we find different mechanisms used by innovators in creating symbolic representations that not only coordinate the daily work, but also support the commitment to action in an ambiguous context. While such commitment could be driven by a risky illusion of clarity, we find that the use of such representations is conducive to an emergent process of change by overcoming inertial forces.

Study 3. To secure the ongoing need for adaptation, organizations need to rely on exploration to avoid being disrupted by evolving conditions in market and technology. While

few questions the importance of exploratory learning, we lack adequate understanding of the micro-processes that enhance or restrict it. Especially around the integration of exploratory arguments within rigid systems, we need to explore how cognitive and behavioural barriers impact the process. I thus ask "*how do inertial barriers to integration impact diverse processes of exploratory learning?*". I first find how the perceived degree of success from an innovation perspective can both trigger or undermine the process of learning institutionalization and the reconsideration of barriers to integration. Secondly, I find how the variation in the structural autonomy of exploratory activities grants complementary learning for renewal in terms of the evolving market conditions and bottlenecks in the process of integration.

The phenomena I observed share contextual similarities, including the same organizational-level history, culture, identity, structure, processes and challenges. Many of the informants are also overlapping across studies. Yet, while inquiring on linked phenomena, they provide unique perspectives and contributions in terms of levels of analysis and theoretical arguments.

First, as I show in Figure (1), they address overlapping yet distinct levels of analysis. Such organizational level characteristics, like the threat of disruption and identity ambiguity, are the starting point of study #2 and #3. Study #2 focuses on the effects of organizational-level ambiguity on to the individual- and team-level's use of symbolic representations, while study #3 proceed to aggregate these individual contributions at the organizational level through a process of institutionalization of learning.

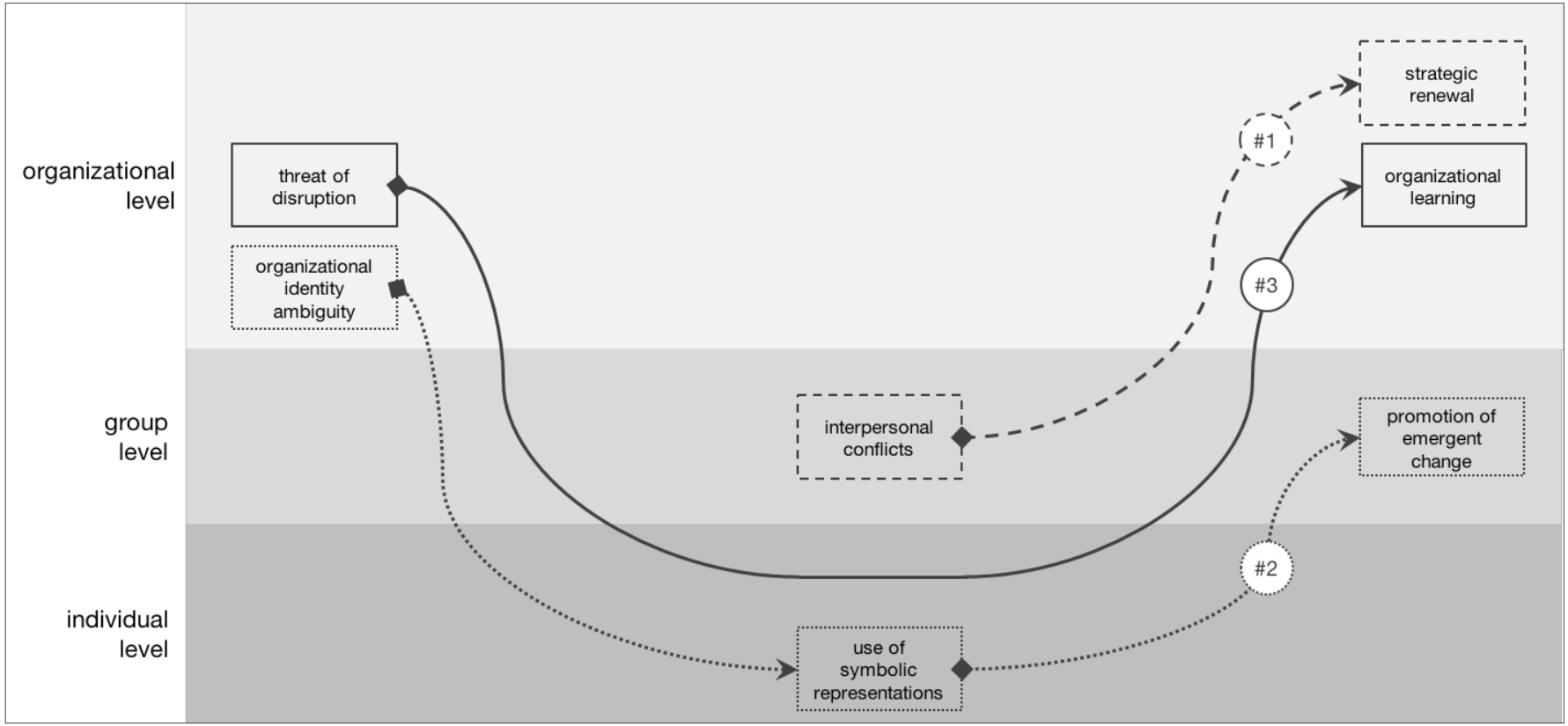

Figure 1 - Multilevel framework of dissertation studies

Study #1 has as a similar focal unit, namely strategic renewal as the outcome of an emergent process of learning, but the triggering event are conflicts between individuals and groups. From a multilevel methodology perspective as in Rousseau (1985), I use the top-down, cross-level approach for study #2, in which a higher-level construct influences a lower-level process. In study #1, I track instead a bottom-up emergence where individual behaviours are integrated upwards into a higher-level construct. Study #3, while departing from an organizational-level construct, is also primarily focused on the ensuing bottom-up process. Study #1 and #3 examples of a "compilation" process, a patterned emergence that relies on high variance of knowledge, roles and contributions, yet are part of the same emerged state (Klein and Kozlowski 2000, Kozlowski et al. 2013).

Second, the three studies focus on specific phenomena that are best explained through different theoretical perspectives, and thus address different literature and discussions. In study #3, the organizational need for variety to adapt to ongoing changes was best explained through a process of exploratory organizational learning. Such a perspective highlights the contributions and barriers *across* various projects, as well as the inertial barriers caused by different structural forms. Study #1, while also inquiring on the phenomenon of organizational-level renewal, looks deeper *within* projects and adopt a focused angle on how conflicts trigger mechanisms of change. Study #2 also looks within projects, yet it inquires on a different phase of the innovation process. Rather than aiming at explaining organizational renewal, it focuses on the antecedents of such a process at the individual and group level. Indeed, the mechanisms we propose in study #2 create the basis for the conflicts in study #1, as well as for arguments for and barriers to exploration in study #3

DISCUSSION OF JOINT RESULTS

Multilevel process of emergent change from innovation: a composite framework

This dissertation aims at answering the overarching research question "How does innovation change an incumbent company?". I find innovation to be at the core of an emergent process of change that develops through multilevel learning, in which identity and competences are explored and renewed to better fit the new demands of market and technology. I present the process model in Figure (2), based on the unique results from the three studies in this dissertation across the individual, group and organizational level. In the model, innovation is a process embedded in an organizational context, where activities related to the exploration, ideation and development of new products have effects on the very same structures and processes that enable them. Individuals are the first to struggle with an ambiguity emerging from a misalignment between established organizational competences and identity on one side, and evolving demands from market and technology on the other. Building on their intuition, they develop symbols that first help themselves to interpret a direction for change by addressing such a misalignment. By being involved in or initiating innovation activities, they use those symbolic representations to promote such a change to others and trigger their commitment to action, as well as manage the coordination of work. Engaging others demands an integration among different interpretations to occur, with diverse potential outcomes. The first is the "intended" outcome, where different interpretations are synergistically integrated and produce a superior product. In the second, inertial barriers will be so significant that the intended outcomes are jeopardized. This last, seemingly negative outcome can in fact be managed and offers an alternative opportunity in identifying the bottlenecks of integrating necessary for

change. Learnings from multiple attempted integration efforts can be institutionalized through the reinforcement of best practices or regeneration of malfunctions, and successfully renew identity and competences towards a better fit with the current market and technology.

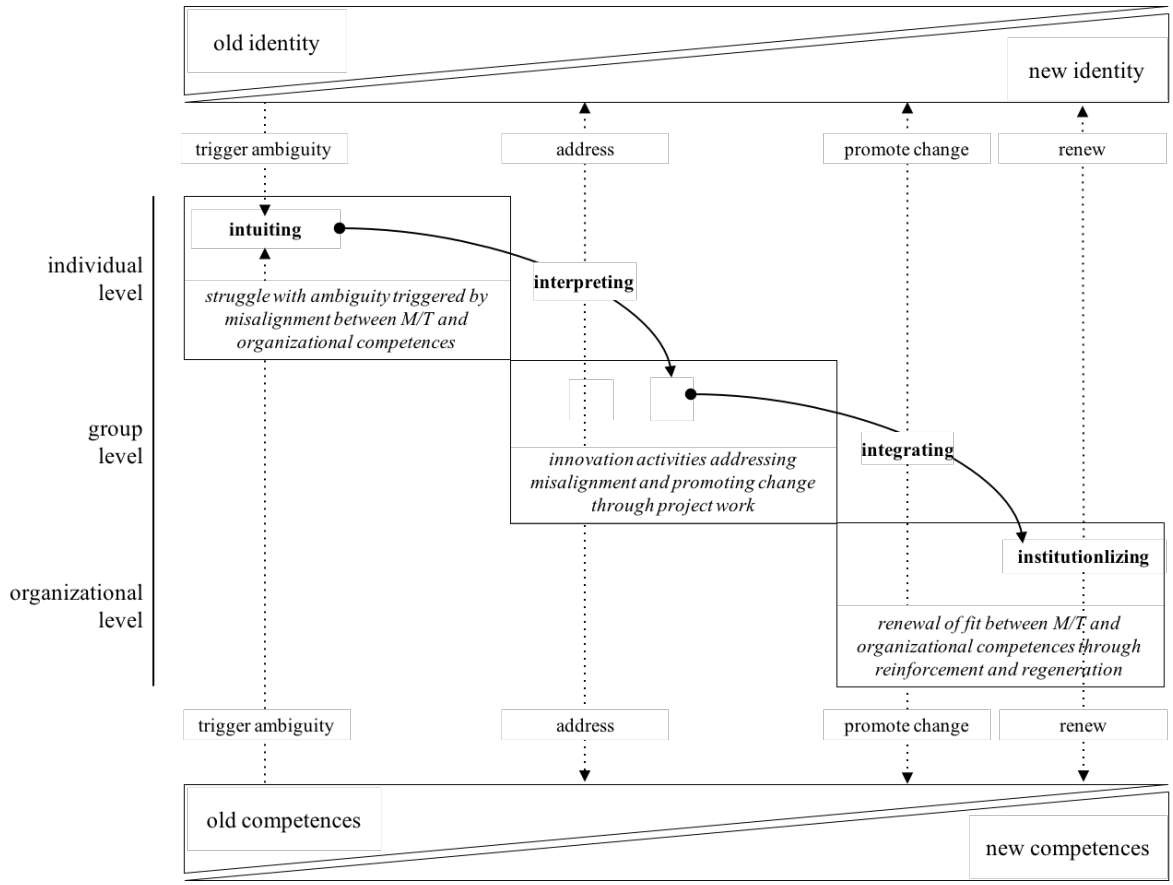

Figure 2 - emergent process of renewal as multilevel learning through the practice of innovation

The principal contribution of this model is its multilevel perspective on strategic renewal from innovation. Differently to most process models of strategic renewal that present primarily an echelon perspective of individual contributions across hierarchical levels (cf. Burgelman

1983b, Floyd and Lane 2000), I offer a multilevel perspective including individual, group and organizational levels. My perspective is aligned with the model proposed by Crossan et al. (1999), yet I provide different and more nuanced patterns than those presented in Crossan and Berdrow (2003) as well as direct evidence for the role of innovation (Dougherty 1992). Such learning occurs at different levels through different processes and antecedents, pointing at a compilation type of process (Klein and Kozlowski 2000, Kozlowski et al. 2013). In a field dominated by *either* individual- *or* organizational-level accounts of change, I find first support in the model proposed by Salvato (2009), who linked individual-level actions like "mindful interventions" to change at the capability-level. I then answer the call by Agarwal and Helfat (2009) of studying the phenomenon *across* levels. Considering a multilevel aspect also allows for a more nuanced answer to the debate on continuous or punctuated nature. The typology developed by Plowman et al. (2007) shows how the overcoming of inertial barriers points to an episodic change, occurring in my case at the resolution of conflicts emerging from a difficult integration, or the acceleration in learning through the insightful intuiting of individuals. At the same time, the general destabilization from ambiguity at the organizational-level is answered through a continuous process of patterned adaptations as the ongoing institutionalization of diversified learning processes.

The most interesting implications of a multilevel model are at the interfaces between levels, for which I discuss my contributions from an organization-to-individual, individual-to-group and group-to-organization perspective.

Organization-to-individual

I show how the misalignment between an organization's competences and identity versus those demanded by the new conditions in the market and technology creates a widespread ambiguity throughout the organization. The destabilization from such an ambiguity is necessary for change to occur, as it triggers an opportunity for individuals willing to resolve it. Individuals close to the process of innovation are more receptive to and informed on the developments in the market and technology. They are also the first to perceive a divergence with the current organizational competences. The process starts with individuals experiencing a lack of understanding and unclear motivation. The lack of a satisfying organizational identity in the face of environmental change will shift the salience on that of individuals (Ashforth et al. 2001, Kreiner et al. 2006), who will reconsider the stability of their identification with the organization in favour of a redefinition more aligned with the dynamic developments (Petriglieri 2011). This loose identification is thus a vehicle to imagine change "outside the bounds of the organization's current reality" (Fiol 2002), enabling the first phase of learning as a process of intuiting based on the individuals' own experiences and understanding of the environmental change.

At this interface, my main contributions are:

- Role of ambiguity at the organizational-level enables change by creating a space for individuals in which to develop alternative positions towards current identities and organizational competences (study #2).

- Individual-level and the intuiting process are impacted by the misalignment between the development of market and technology and the current organizational competences (study #3).

Individual-to-group

I show how individuals address such a misalignment and ambiguity by taking a stand towards the current identity and competences by interpreting, creating and engaging others through symbolic representations. Action occurs supported by ambiguity, rather than in spite of it, as is hinted at by both Nicolini et al. (2012) and Sillince et al. (2012). I show however that, rather than the "invitational incompleteness" of ambiguity proposed by Sillince et al. (2012), it is the illusion of a clear answer through a symbolic representation that triggers action and coordinate work. I confirm the role of such symbolism in not only being a product of identification, but also being a tool to shape such a process (Gioia et al. 1994, Fiol 2002). In such ambiguity, individuals try not only to make sense of their own identity, but also that of the organization itself by interpreting its direction of change. They shape alternative exploration activities that reflect such a stance on identity and competences on the team level (Pratt et al. 2006), coordinate the work through the creation of a shared understanding, and trigger the commitment to action by others through the illusion of clarity. The distance from the core identity and competences of some activities championed by some individuals might challenge the process of integration with other more conservative interpretations, and create the basis for future conflicts.

At this interface, my main contributions are:

- Multiple mechanisms through which symbolic representation at the individual- and group-level answer to resolve organizational-level ambiguity by interpreting a stand towards the current identity and organizational competences (study #2).
- Coordination of work through shared understanding and commitment to action through illusion of clarity as the outcomes of the use of symbolic representations and as a way to achieve integration by overcoming cognitive and behavioural inertia (study #2 and #3).
- Micro-foundations of identity work, yet still contextualized in the organizational setting, shows multiple interpretations for change through different symbolic representations in alternative exploration activities (study #2 and #3).
- Various interpretations of change from diverse individuals lead to potential conflicts in the integration phase of organizational learning at the group-level. Yet, they create the basis for testing the fit of organizational competences in tackling the new conditions in markets and technology through project work (study #1 and #3).

Group-to-organization

I show how different barriers in the phase of integration impact the intended outcomes, but can also trigger a double-loop learning as they are being highlighted as bottlenecks of change. The ideal model of operation to answer a threat of disruption and sustain the process of innovation in its contribution for strategic renewal is what I have identified as a "jam-session" in study #3. In a jam-session, cross-functional contributions are integrated synergistically and allow not

only to be aware of potentially disrupting architectural innovations (Henderson and Clark 1990), but also provide the highest opportunities to develop successful innovations internally (Dougherty 1992b, Luca and Atuahene-Gima 2007). Nevertheless, as the barriers to implement such a model are significant, and many strategies have pointed to structural autonomy from the core processes to overcome such difficulties. I show how, despite providing a separate learning about the market and additional resources, the knowledge developed at a distance from the core should eventually be integrated to matter. Integration is thus the key phase of an emergent process of change, and the struggle to do so leads to different outcomes than intended. If during the integration there is an alignment, the innovation goal will likely be achieved. If conflicts emerge and the management fails to cope with the tensions (e.g. Greenstein 2016), the innovation goals might fall short. Yet, I show how forgoing the success of a single product grants to the same management the opportunity to learn something just as valuable, namely how to improve the organization to the benefit of upcoming projects. I show a process of double-loop learning (Argyris and Schon 1982) emerge from projects, as unique spaces to explore alternatives of organizational identity and competences, echoing the works of Leonard-Barton (1992) and that of vanguard projects (e.g. Brady and Davies 2004). I found how projects have the potential in identifying where the bottlenecks for change are. The precondition is a misalignment between the demands of the parties involved voiced with task and jurisdictional arguments. The misalignment reflects the overall tension between awareness of market and technology developments and the inertia of established organizational competences, combined with a particular project performance as the outcome of the struggle. These two elements – the misalignment and the project performance – create the basis for what other scholars have called a "successful persuasion" of top management (Henderson and Clark 1990, Burgelman 1991,

Floyd and Lane 2000, Crossan and Berdrow 2003, p. 1100), so that the learning from the previous phases can be institutionalized. Mechanisms of regeneration and reinforcement lead to strategic renewal, in which established processes and structures are questioned and adapted.

At this interface, my main contributions are:

- Role of inter-group conflicts beyond short-term resolution and in triggering a process of strategic renewal (study #1).
- Mechanisms of reinforcement of best practices that have delivered a good project performance and of regeneration of malfunctioning elements that incurred in a bad project performance (study #1).
- Variation in the structural autonomy of exploratory activities grants complementary learning for renewal in terms of the evolving market conditions and bottlenecks in the process of integration. (study #3)
- Innovation as a process can benefit the company beyond the creation of new products, but also – and especially through project work – be a experimenting and testing field for organizational identity and competences (study #1 and #3).

Implications for practice

I address practitioners to the extent the context and boundary conditions of their settings resemble those of B&O. If this is the case, the main implication emerging from my study is that of considering the emergent process of change from innovation as a way to counteract the ambiguity that results from a misalignment between the established organizational competences and the evolving market's and technology's conditions. While I do not discard the role of a top-management driven renewal, I underscore the benefits of letting exploration activities experiment with different alternatives, and support a process of bottom-up organizational learning. As innovators are often closer and more aware of the evolving conditions of market and technology, their intuition could generate valuable answers to the aforementioned threat, especially when they have enough motivation to go against what is established in the company. Indeed, managers have to take into account that a certain degree of destabilization is necessary for change to occur. Taking this perspective, they can adopt two different roles. Firstly, managers should be proactive and supportive in overcoming inertial barriers in which they use the strategies of symbolic representation I have suggested to trigger the commitment to action and to coordinate work. I advocate caution though, as the illusion of clarity that triggers people's engagement ought not to be backed by false assurances, and thus risk incurring an escalation of commitment for the wrong causes. The other role is more reactive, and requires attention in recognizing emerging alternatives of identity and competences as they are promoted through different innovation activities. Different to studies of strategic renewal that have advocated the recognition of good ideas emerging bottom-up, and the studies of conflict management that advocate conflict-poor environments and their short-term resolution, I emphasize the valuable role that conflicting events in innovation have

from a learning perspective. Conflicts in innovation can be as important as good ideas in redefining the scope and direction of organizational change in their role of highlighters of change bottlenecks. While I do not advocate to promote change uniquely through conflicts, I believe that the more a company needs to remain aligned with an evolving market, the more different internal interpretations of change will clash. Therefore, by having conflicts ubiquitously throughout the organization, managers should make the best of them. My study points at the implications beyond their short-term resolution, which can be beneficial for the company provided there is managerial action in understanding the underlying tensions that generated them. Given determined conditions, conflicts can become a trigger and provide indication of best practices to be reinforced, as well as regeneration of malfunctioning organizational elements. Managers should remain open to be "persuaded" by the arguments of the parties, and use their practical evaluative agency to institutionalize what they have learned into strategic renewal. Openness to such a dynamic allows different learning processes to present alternatives to be institutionalized, thus covering the necessary learning to realign organizational competences with the new market's and technology's conditions.

Limitations of the study and opportunities for further research

Paradigmatic choices imply the choice of qualitative methods that thanks to their richness and depth of inquiry, deliver a highly credible account of organizational phenomena. At the same time, they are limited in their transferability and dependability, pointing to clear limitations of such a research approach. I fully acknowledged such limitations from the research's onset, and thus made efforts to guarantee the high rigor and standards of qualitative studies. I thus believe that the majority of my findings can be generalized to other contexts, assuming comparable

conditions. B&O's case is an example of an organization with inertial barriers that had more than 90 years to build up, facing the disruption threat of digitalization that in the last decade has severely challenged several companies and whole industries. Some of the dynamics I have studied, like conflicts and representations, might fall in the "extreme example of" category required to pursue a single case study approach. In Siggelkow (2007)'s terms, is then B&O a "talking pig" (p.20)? It might be an extreme case in the degree of severity of the observed phenomena, which has rendered them more visible to me as a researcher, but not so extreme that it loses any representativeness for other companies. Many are the companies that have managed to find a niche through the exploitation of specific capabilities, that over decades have increased their brand value and competitive position. Yet , they are also experiencing the tensions and struggles from the rise of new market dynamics and technological paradigms. I have thus attempted to elevate my theoretical contributions beyond idiosyncratic characteristics that are contradistinctive for B&O only, and believe they reflect concepts and processes occurring in other relevant contexts. I leave the final call of transferability of my findings to researchers and practitioners in assessing to which degree they reflect their own contexts.

Despite such methodological limitations, my research questions and the majority of my contributions address theoretical concerns that are independent from the case of B&O, and that have opened multiple avenues for further inquiry. I believe the main opportunity for further research is a contextualized view of innovation as a process and its role for organizational change. I have provided but one account of it with a limited focus on some specific dynamics like the use of representations and implications for conflicts beyond short-term resolution, yet many other dynamics related to innovation should be considered in terms of their contribution

to the process of change. Even more generally, the perspective I used to frame the dissertation calls for a more explicit multilevel consideration of constructs and activities so-far inquired only at one level. Rich accounts of case studies can provide such a perspective, and could not only further inquire on the same topics I have researched, but also open up questions about organizational-level implications of coalition formation, competition, creativity and other activities usually considered at the individual- and group-level. Such an emergent type of process has usually been a prerogative of qualitative studies rich in description and interpretation. Efforts are being made to enable quantitative studies to inquire on similar phenomena, especially through complexity theory-driven computational models and agent-based modelling (Kozlowski et al. 2013), so far mainly adapted in case study research (e.g. Brown and Eisenhardt 1997, Plowman et al. 2007). Such a multilevel perspective could deepen the discussion of continuous versus episodic change as it occurs at different levels. In terms of established literature, I see opportunities for multilevel and longitudinal implications in work related to conflicts, also advocated by De Dreu (2008), going thus beyond a short-resolution perspective and a wider look at potential benefits that can emerge at different levels. I would like to see more work on inter-group conflict in a field dominated by an interest in intra-group ones, as it better reflects the organizational dynamics of innovation where cross-functional and jurisdictional implications become relevant. Looking at the field on identity, I found comfort in those studies that approached the nested reality of such a construct, and the dynamic shifts across levels alongside processes. I can only subscribe to such a nested perspective, and wish to see more work performed in this direction.

CONCLUSIVE REMARKS

B&O has not mastered yet how to properly play jazz, as the orchestra model is still very much ingrained in the organization's structure, processes and identity. Nevertheless, it is learning. Innovators are learning. Top management is learning. With this dissertation I have contributed to theory by showing how innovation is a set of activities from which a multilevel process of learning is triggered, and from which alternative organizational competences and identity are explored and selected for the renewal of the company. These have been the first steps of the company in moving away from the orchestra model by overcoming its inertial forces, and testing where the bottlenecks for a jam-session model are so to achieve a better strategic fit with the environment. When I started my research project, I was not sure there would be a B&O at the end of it. Instead, I have seen the company renew itself, preparing the stage for the most expressive jazz players to jam.

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THE BRIGHT SIDE OF CONFLICT: ORGANIZATIONAL RENEWAL THROUGH NEW PRODUCT DEVELOPMENT FAILURE

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ABSTRACT

Through an inductive study, we explore how a company achieves organizational renewal through its innovation activities. We identify multilevel mechanisms that show how conflicts in new product development projects become the trigger for organization-wide renewal, thus contrasting with the assumption that conflicts are detrimental to the renewal process. We contribute to theory by showing how the characteristics of conflicts in innovation process are crucial to trigger a process of learning tuned to the purposeful alteration of organizational system processes. Second, we develop a process model in which we track how reinforcement and regeneration of organizational attributes through a conflict at the project level can lead to renewal at the organizational level. We inform managers of innovation-driven organizations on how their agency is key to influence such two mechanisms of change and to identify conflicts as signals for the need of organizational renewal.

INTRODUCTION

To sustain competitiveness and secure foothold in an industry, established firms face the ever-increasing challenge to continue to innovate. However, several prominent industry firms have recently found themselves in situations where traditional means of innovating, for example through products or processes, are no longer sufficient for remaining competitive or even relevant in the market. Consider companies like Polaroid, which were not able to successfully transition to a digital technology (Tripsas and Gavetti 2000) or more recently, Nokia, which did not succeed in innovating their product offering in the wake of smartphones (Vuori and Huy 2015). Moreover, failure to meet consumer demand, in combination with changing

dynamics in the environment, require organizations to re-evaluate their position in the industry and to reassess their strategic fit.

To cater for challenges of such nature, the concept of organizational renewal has been proposed as a specific type of organizational change that holds the promise of restoring strength and vigour if decayed elements are replaced following times of creative destruction (Agarwal and Helfat 2009). Organizational renewal refers to an incremental and bottom-up process of changing organizational practices through emphasizing unappreciated, or replacing malfunctioning, ones leading to long-term benefits and an improved strategic fit (Burgelman 1991, Floyd and Lane 2000).

One emerging source of organizational renewal lies in the promise of conflict which represents a regularly occurring 'asset' in innovative organizations (Song et al. 2006, De Clercq et al. 2009). Conflicts are particularly pertinent between individuals and groups that are struggling with multiple interpretations of the change dynamics (Floyd and Lane 2000, Glaser et al. 2015). While conflicts in their nature bear the well known element of detrimental effect, such as the inefficient use of resources, costs to other stakeholders, or individual frustration (De Dreu 2008), they establish at the same time a remarkable potential for learning and renewal. Indeed, it is well-established that a conflict-free organizational environment is not only unrealistic, but also unadvisable (Pondy 1992). For example, the underlying process of change in organizations is constructed over the tension between exploration and exploitation necessary to create windows of learning (Crossan and Berdrow 2003). These windows of learning are, in turn, created through a destabilization of the system (Plowman et al. 2007).

While the conflict management literature has worked to advance our understanding on the positive sides of conflict, the general debate is regarded as far from settled (De Dreu 2008, Tjosvold 2008). Specifically, the prevailing view on value to be derived from conflicts rests on

a rather pragmatic perspective, such as questions on how to elevate the "good ideas" immediately emerging from destabilization in the system (Burgelman 1983b, Salvato 2009), instead of further capitalizing on the conflict per se. Indeed, as argued by De Dreu (2008), to understand the relationship between conflicts and their beneficial consequences, it is necessary to move beyond short-term performance measures and short-term resolution of the conflict, which currently is common to most studies.

Against this background, we unpack the relationship between conflicts and organizational renewal to shed light on the mechanisms operating behind. To do so we present an inductive process study of organizational renewal from conflict in new product development projects, and explore the micro-level processes that underlie such dynamic of change. We collected data from the Danish company Bang & Olufsen following their innovation activities related to three of their most strategically relevant product development projects. By adopting an extended focus to the multilevel mechanisms that conflicts generated from such projects, we develop a process model that shows how conflict characteristics (task, jurisdiction and relationship arguments), influence how the company is able to use project-level conflicts as a learning opportunity for organization-wide change and how change through renewal is associated with them.

In the next section, we review the literature on the organizational renewal process and conflict management as well as their overlapping arguments. We then present our model and two mechanisms supported by detailed narratives about two acute conflicts, and finally, we discuss the implications of our findings for theory and practice.

THEORY

Through numerous perspectives over the last decades starting with the seminal study of Burgelman (1983b) the organizational renewal literature has addressed the phenomenon of failure and success in the face of environmental dynamics. Yet the literature has remained fairly fragmented in its perspectives. While the dynamic of change is at the core of the literature, the triggers and objects of change vary. Most studies reflect the original claim that such change should lead to an improved strategic fit with a dynamic environment (Burgelman 1991, Huff et al. 1992). Nevertheless, while many agree strategic renewal ought to lead to improved performance, Agarwal and Helfat (2009) caution that such implication is not necessarily linked to its conceptualization, as it is beyond the fact that renewal has occurred. The strategic fit of the organization vis-à-vis dynamic shifts in the market and technological landscape is expressed externally by introducing new product offerings that reflect considerations of such shifts (Dougherty 1992b, Kim and Pennings 2009), or internally through changes in competences, routines, and organizational structures (Chakravarthy and Doz 1992, Mezias and Glynn 1993, Baden-Fuller and Volberda 1997, Floyd and Lane 2000) and a revised organizational identity (Tripsas 2009).

Renewal as a *process* of change has been one of the core interests of scholars interested in understanding how companies achieve a better strategic fit and different models about the nature of the change have been proposed (see e.g. Greenwood and Hinings 1996, Plowman et al. 2007, Albert et al. 2015). The first view sees the renewal process as a periodic, punctuated and system-wide change that elevates the company to a better fit (Tushman et al. 1986, Huff et al. 1992), in which self-reinforcing dynamics of inertial stability, comparable to the core rigidities proposed by Leonard-Barton (1992), are disrupted by the burst of stress driven by an accumulated dissatisfaction with how the company's status quo is failing to hold up with a

dynamic environment. A second model is of renewal being a continuous process in which companies follow an ongoing "journey" of incremental and evolutionary change triggered by a constant instability (Brown and Eisenhardt 1997, Volberda et al. 2001). This can get chaotic and complex because of simultaneous sub-processes of competence exploitation and redefinition (Floyd and Lane 2000). In this conceptualization Plowman et al. (2007) offer an insightful account on how even small and destabilizing changes, when amplified through positive or negative feedback loops, can lead to radical change in the system. Most scholars identify the studies by Burgelman at Intel as the original contribution to the phenomena (1983b, a, 1991, 1994) and it has come to be associated with a bottom-up process characterized by the autonomous entrepreneurial drive of skilled employees pushing pioneering ideas to be recognized and selected out by top management. Over time, others have indicated how it is also typical to have more top-down directed types of renewal efforts (Baden-Fuller and Volberda 1997). As an organization-wide type of change, there is acknowledgment about contributions to the process from multiple managerial levels (Glaser et al. 2015) supporting an "evolutionary process associated with promoting, accommodating, and utilizing new knowledge and innovative behaviour" to achieve an improved strategic fit (Floyd and Lane 2000, p.155). Floyd and Lane (2000) addressed contributions from multiple organizational levels, and showed how middle managers' roles revolve around championing, facilitating, synthesizing and implementing activities, while top managers rather focus on ratifying, directing and recognizing ones. Salvato (2009) confirmed how timely managerial interventions encode successful experiments into higher-order organizational capabilities. Because of this, the accomplishment of renewal occurs during the social exchanges and communication between organizational levels (Floyd and Lane 2000, Tripsas 2009), in which knowledge is shared so that top management eventually recognize that change is both feasible and necessary (Burgelman 1991). The majority of the studies recognize that such process is sustained by a

multilevel dynamic of organizational learning that guides the process of adaptation and proactive action towards changing environments (Burgelman 1991, Mezias and Glynn 1993, Crossan et al. 1999, Crossan and Berdrow 2003). Indeed, while the changes and decay of the system occur at the organizational level, it is individuals that are mostly said to trigger and drive the bottom-up process.

The underlying tension that often drives the process of renewal is between the exploitation of the current competences and the exploration of new ones to achieve or maintain the strategic fit (Floyd and Lane 2000, Crossan and Berdrow 2003, Flier et al. 2003). Such tension causes conflicts among individuals and groups across departments and organizational levels, as people hold different interpretations and expectations with regard to the deployment of existing competences and the experimentation of new ones (Floyd and Lane 2000, Glaser et al. 2015). Frequently, conflicts emerge bottom-up as individuals driven by autonomous initiatives find themselves obstructed by the current 'administrative' system, and by trying to neglect this standardized processes – for example through skunkworks – they will incur in even more risks of confrontations (Burgelman 1991), eventually struggling to integrate their ideas at an organizational level (Crossan and Berdrow 2003). Because innovation is one of the organizational activities to be impacted first by such critical dynamics of technological change (Tripsas 2009), novel market demand-pull (Kim and Pennings 2009) or shifts in the broader competitive market (Floyd and Lane 2000), it is also the domain where these conflicts might emerge first and strongest as a result of the struggle to create and exploit knowledge to achieve a better strategic fit (Dougherty 1992b). Entrepreneurial minded employees across departments will be first triggered to use their skills and knowledge to experiment with new market opportunities (Burgelman 1991), and thus initiate a process of bottom-up renewal challenging the status quo through exploratory innovation (Jansen et al. 2009, Birkinshaw and Gupta 2013, Glaser et al. 2015).

Conflicts in innovation and their role for change

As pointed out by De Dreu (2008) "conflict and organizations belong together" (p. 13). Given the various disciplines addressing conflict from micro to macro levels of organization (Bar-Tal 2011), many definitions are proposed – for this study we apply the one provided by Rahim (2002) who defines organizational conflict as: "an interactive process manifested in incompatibility, disagreement, or dissonance within or between social entities (i.e. individual, group, organization, etc.)" (p. 207). That conflicts are a normal occurrence in organizational life is now assumed at large, with scholars going as far as claiming that conflicts are "the very essence of what an organization is" (Pondy 1992, p.259). Conflicts are generally considered adversely because of the related negative behaviours and emotions (Eisenhardt and Zbaracki 1992), but recent claims have been made about how extant conflict research has itself contributed to the view that conflict is "negative, a nuisance to be rid of" (Song et al. 2006, p.341, Tjosvold 2008). The opposite might be true: a conflict-free environment is not only unrealistic, but has been pointed out as also undesirable (Pondy 1992, Tjosvold 2008). This is especially the case for innovation, a domain of activities that thrives because of competing perspectives and contributions from different organizational actors (Kahn 1996) in a high-pressure environment (Song et al. 2000). Their diverse "thought worlds", emerging from different trainings and professional backgrounds, are the seed for conflicts - constructive and destructive - because of diverging goals and interpretive schemas, struggling to be synthesized into a shared solution (Dougherty 1992a, Griffin and Hauser 1996, Luca and Atuahene-Gima 2007). One of the typical cases is the R&D versus the marketing department: while one might strive for technological sophistication and product functionalities, the other will do so for market share and the satisfaction of customer needs (Song and Parry 1993, Griffin and Hauser 1996), ideally converging on a product that satisfies both demands.

Despite the interdepartmental nature of innovation, most studies address the issue at the *intra*group level of conflict and how it influences team-level measures of performance like creativity and innovation output (e.g. Jehn 1995, Chen 2006). Only a few studies do so at the *inter*group level, looking for example at how social capital and trust (De Clercq et al. 2009) or conflict-handling strategies (Song et al. 2006) affect organizational-level measures of innovation performance. Irrespective of the level of analysis, scholars have converged on distinct, yet interrelated, categories of conflict, such as, task, relationship and process (Jehn 1995, Amason 1996, Jehn and Mannix 2001). Task conflict is driven by different viewpoints on the content of the task being performed, thus revolving around fact-centred discussions without the generation of strong negative emotions, characteristic of the relationship conflict emerging because of interpersonal incompatibilities, manifested through tensions and animosity (Amason and Sapienza 1997, Jehn and Mannix 2001). Studies claim such strict compartmentalization ought to be fuzzier, as genuine task conflict is "often misattributed as being personal in nature or motive, and thus leads to relationship conflict" (Simons and Peterson 2000, p.108). Jehn (1997) introduced a third type, process conflict, emerging because of disagreements about assignments of duties and resources. This conflict type, too often neglected from studies that favour a pure cognitive versus emotive analysis (Behfar et al. 2011), is concerned with the coordination – the "how to" – of the tasks at hand (Jehn and Bendersky 2003). What is agreed upon, is that they might occur simultaneously or at different phases of the same episode, thus providing a dynamic view of the conflict nature (Jehn and Mannix 2001).

So far a question that has driven the discussion on conflict management research is the existence of a "positive" conflict, a tension and disagreement between parties that is mostly functional to the achievement of the desired outcome (Menon et al. 1996). Studies explicitly answering the question propose both sides of the coin, with Tjosvold (2008) supporting the

idea that overall, "conflict can be highly constructive, indeed, essential to team work and organizational effectiveness" (p. 19), while De Dreu (2008) claiming it does *not* exist, and "on the whole" (p. 15), it is detrimental. The latter view says that studies that propose the existence of positive conflicts are limited by their consideration of a narrow set of circumstances like high-level of trust as found in innovation teams (De Dreu 2008). The former view points out how it is the management of the conflict that determines how functional it can be, rather than its characteristics, as the majority of the extant research implies, thus critiquing how it has so far failed to address the real drivers of performance (Behfar et al. 2008, Tjosvold 2008). Indeed, a bulk of studies including Jehn (1995), Amason (1996), Pelled et al. (1999), Jehn and Mannix (2001), De Dreu (2006) and Chen (2006) have all collectively demonstrated how moderate task conflict plays a positive role in team innovation and creativity by stimulating original and divergent perspectives. On the other hand, a relationship conflict would negatively affect it because of its unconstructive emotions and distraction from high-grade knowledge exchanges and decision-making. Nevertheless, as pointed out, few studies address the role of conflict beyond performance measures at team level, and addressed it instead as a trigger for change. Walton and Dutton (1969) assume that such is the case, showing the necessity of top management to adapt responsively to the emergence of conflicts and thus consequently change the organizational context. Indeed, already Strauss (1964) showed how the competitive orientation of conflicts could contribute to the availability of new ideas and challenging established ones, echoed by Leonard-Barton (1995), in which content-driven disagreements of task conflict could be an antidote to core rigidities, forcing the continuous re-assessment of the existing dominant perspectives.

Scholars have started to suggest that what underlies such process is the potential opportunity of learning about the malfunctioning of organizational systems (Chaudhry and Asif 2015), given the rising doubts by organizational actors about their present ideas and the search for

more adequate perspectives (Tjosvold et al. 2005, Johnson et al. 2006, Tjosvold 2008). The study by Plowman et al. (2007) showed how interacting yet conflicting activities, through the destabilization of the system, encourage the mutual exploration of compromising alternatives, so that through positive or negative feedback loops such small changes are amplified into radical changes. In this light Rahim (2002) has proposed strategies aimed to minimize the dysfunctional conflict while managing the functional one: "organizational conflicts must not necessarily be reduced, suppressed or eliminated, but managed to enhance organizational learning and effectiveness" (p. 230). Supported by prior findings and the concepts outlined above we set out to better understand the underlying process between organizational levels in order to complement and reinforce such strategies and observations.

DATA AND METHODS

We entered the Danish company Bang & Olufsen (B&O), a high-end consumer electronics producer, with the aim to inductively investigate a single case (Siggelkow 2007) regarding the relationship between strategy and innovation in situations of major industry shifts with a disruption potential. The messy and complex nature of a strategic renewal process (Floyd and Lane 2000), and the fact that it occurs in a context of social interactions between organizational actors and integrates different levels of analysis (Crossan and Berdrow 2003), make a study following qualitative methods of data collection and analysis ideal to answer our research question (Kozlowski et al. 2013, Miles et al. 2014). We align with Kaplan (2008) in attempting to understand the company bottom-up starting from the day-to-day activities.

We approached B&O with an open mind but were particularly interested in the dynamics related to innovation in situations of industry convergence (Hacklin et al. 2010). We entered the organization slightly biased by the idea that B&O struggled with its absorptive capacity

(Cohen and Levinthal 1990, Zahra and George 2002). Initially, this made us inquire about the in- and outflow of knowledge for innovation of the organization. Yet, in an early interview with the Tonmeister, the person responsible for the tuning of B&O's products towards excellent sound design, we asked about the use of external sources of knowledge. His answer: "Whether [knowledge] is coming from external or internal [sources] is irrelevant". Thus, instead of applying a lens focused at barriers for open innovation (Chesbrough and Appleyard 2007) we rapidly shifted our attention to zoom in on the interactions of knowledge sharing between groups involved in new product development (NPD) projects within the organization. As we became more acquainted with the company and its employees, we gradually deepened our investigation into the micro-dynamics that compose the inter-group relationships behind product innovation. The access to the company's project portfolio and the many conversations showed us how the company, during the last 3 years, had been betting its future on three specific NPD projects. We decided to focus on these projects, as they were described to us by most of our respondents as the most active and revelatory of underlying tensions not only between departments in B&O, but also between past and future and thus relevant for a study on renewal. Getting more insights on these projects better positioned us in making sense of how the role of conflicts, initially interpreted as obstacles at the project level, could be understood in terms of their role in renewal at the organizational level.

Research Setting

The company

B&O, a Danish manufacturer of high-end consumer electronics based in the North of Denmark in Struer, is a company that has grown successful through the continuous creation of iconic products that paired quality design with advanced technology. Yet, internal strategy documents

at B&O have recognized how the last decade of digital dynamics has led both consumer and employees to question its position and competences. Top-down processes of organizational change to answer such challenges occurred at every strategic turn under the guidance of a new CEO (Cattaneo et al. 2015). In 2011, the arrival of the new CEO Tue Mantoni and a new top management team triggered another series of organizational and strategic changes aimed at moving a too product-centric B&O towards an international lifestyle brand, supported by a stronger customer orientation and focus on the core capabilities of sound, design and craftsmanship. The major top-down organizational change in the capability of creating new products occurred in the restructuring of the innovation process, now to follow a stage-gate model with structured and timely interactions between product teams and top management to sustain and control the development of new products. At the time of our study underlying organizational movements and argument were forming to establish a bottom-up pressure for the renewal of decayed organizational elements that were not successfully addressed by top-down changes. It was these dynamics we set out to better uncover with our study. Among them, is a drive to refocus a product-centric offering back to the longstanding system-centric offer of the whole brand, now scattered between different lines of products and incompatible product categories; we also observed a strong push towards a redefinition of the software capabilities within the company, so far delivering sub-par experiences if compared to B&O's outstanding hardware craftsmanship.

The company is strongly geared towards product creation, with three departments that interact on a daily basis throughout the process: R&D, Product management and the Creative department, the latter in charge of design and concept development. They are located in buildings close to each other in the 90-years-old factory premises, yet separated by a walkway. Despite a flat hierarchical structure, the "over the fence" model has permeated the company for decades (Austin and Beyersdorfer 2007), in which a project is passed on sequentially

between concept and product developers without much integration. In 2012, to resolve such division of labour, a new "NPD team" was introduced as the cornerstone of the new innovation framework, where senior managers converge as "Leads" from the technology, business and creative departments into a temporary project unit and are held responsible for its development (Cattaneo et al. 2015).

The projects

Using projects as our unit of analysis simplifies identifying the people involved in such activities rather than relying on our prejudgment of who could be central (Czarniawska 2004). We chose three projects that in the annual report were called "boulder" - the biggest in terms of investment, potential revenue and brand relevance. These projects had different reasons for initiation, and followed distinct processes of development while still being comparable as they occurred almost concurrently under the supervision of the same management team and strategic incentives. They also all had to conform, for the most part, to the newly restructured innovation process. The "TV" project has been the largest in terms of initial investment, the "Speaker" project the most advanced technologically and the "Audio" project the most explorative. In Figure (1) we show their process timeline with the key time of approval for the gates, where after a first idealization phase (I), Gate 0 (G0) is the time an idea becomes a formal project with budget number, Gate 3 (G3) is the time where concept development ends, and the specifications are frozen so to enter a production phase leading up to market launch (L). We also provide a brief summary of their overall process, that we believe is necessary so to contextualize the rest of our data on conflict and provide background on why they emerged.

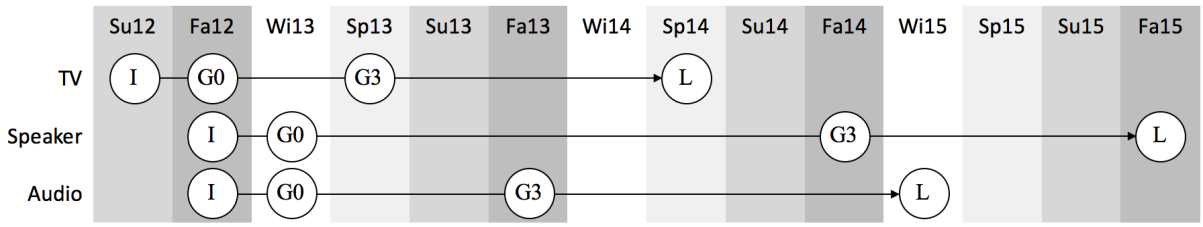

Figure 1 - Projects timelines (I - Initiation, G - Gate, L - Launch), years divided in quarters

The TV project. The NPD process followed a mostly standard way of operating at B&O. Its NPD team was very experienced so it initially progressed smoothly. Also, because the degree of innovation for TV was only incremental, they did not have to deal with major uncertainties in terms of market, technology or design. As such there occurred no major disruption until it got to Gate 3, and the product specifications had to be frozen for production. The size of the project proved to be the biggest hurdle, which expressed itself as a gap in the maturity between multiple screens sizes and the stand program, which could not develop at the same pace. Prototypes showed more red flags than expected calling for an emergency "employment" of extra resources (from other projects) to deal with ramp up complexities at the manufacturing plant. The product got launched under pressure so to fit within the fiscal year and to live up to the many events being set up for it in advance, but with the partial knowledge that the product was still partially flawed. It would take a month after its launch to achieve a stable version.

The Speaker project. The need for a speaker converged from many directions, some external to the company like the need to re-establish the brand value with consumers and partners, some internal such as living up to the strategy "acoustics as hero" or the desire of acoustics engineers to prove their value. Despite having turned the normal process upside down – i.e. the engineers having priority in defining the specifications of the speaker, as opposed to the designers – the initial phases ran smoothly. The drive to achieve an amazing speaker got most of the company

behind it, also in terms of resources and budget. Nevertheless, some tough questions remained unanswered, like the real "role" of the speaker in a room and the concepts behind the technologies. The first challenge emerged by underestimating how multiple technologies – so far only applied at the lab level - could be integrated into a single workable product. Multiple iterations with prototypes were necessary, raising doubts in top management about its viability. At a later stage, troubles emerged when TV was incurring in an emergency production issue, so it drew many resources away considerably slowing Speaker's development. System integration issues created the highest tensions, and showed how too focused on the stand-alone product the process had progressed, partially neglecting its integration into the wider portfolio of B&O. As production was started in Struer, the implementation phase went fairly as planned, and the product was launched for the company's 90th birthday in November 2015.

The Audio project. The project was started with a skunk work-like set-up in which the CEO mandated an ambitious concept developer and a fresh product manager to initiate a "top secret" audio product with a strict and ambitious deadline. The initial opportunity to connect to their desired selection of external partners was exploited and led the concept development phase to run at fast pace with great promise. However, the need to substantiate the concept with B&O technology led the project to be slowly re-introduced in the company. Part of the R&D organization rejected to commit to the project, mainly because of being asked so late in the process to contribute to a product geared for a new generation of customers, and thus disconnected from what they had been used to developing so far. Clashes were triggered, the most critical related to the choice of the software developer: while the NPD team aimed at collaborating with a young and agile UK-based company, R&D (and thus the one with the mandate over technology procurement) selected a long-standing partner of B&O based in India based on high-capacity for good value. Prototypes were returned from the Indian software developer with more flaws than expected, triggering a domino effect on the other process steps,

now stuck frozen. The product started incurring a “technological debt” as it was never reformatted to fully address the root of this issue and allocated enough time and resources. As projected sales numbers were low (as with every B&O product, being a niche player), it led the supplier of tablet screens to enforce a bulk-sale. As net working capital was being tied up by a large inventory of products not ready for the market because of software shortcomings, it was either launch or risk going bankrupt. Audio was launched with enough confidence, but both dealers and customers criticized it because of the faulty software as soon as it hits the market, despite great appreciation for the concept behind the product.

Data Collection

When entering the company and starting our fieldwork, we set out to both follow the standards for data collection and analysis as pointed out by Gibbert and Ruigrok (2010) and ethnographic techniques (Van Maanen 1988). The principal observer lived close to the factory in Struer, Denmark, for a total of 40 days in a flat provided by the company, and was allocated an office in the patent office within the R&D department. The days were spent wandering around the company from department to department, engaging in both formal interviews and informally talking with employees through the hallways or by having lunch in the canteen. The feeling of “being in the field” (Van Maanen, 1988) was without any doubt achieved. The researcher was welcomed by any employee to be interviewed about any topic, could observe meetings about innovation activities and NPD projects, and was allowed to walk around the premises unrestricted. Daily field notes were recorded in reporting templates compiled every evening, and analysed throughout the process to keep track of emerging themes and opportunities to extend our inquiry. Besides formal and informal interviews, we collected secondary documents

like stage-gate reports for each projects, minutes of management board's gate decisions, plus several presentations and mail exchanges.

Interviews started in June 2014 to get a grasp of the major dynamics in the company, its structure and processes, and to create a network of informants throughout the company through a snowballing effect. Through 9 first interviews arranged by our internal champion (Senior manager in System Engineering, heavily involved in innovation activities), we secured a solid foothold in the company and reflected for the first time on our initial assumptions. In this first round we inquired generally about the recent market developments, the challenges they posed, what were B&O's role and reactions, what other activities related to innovation would be significant to observe, as well as the interviewee's role in the company and in the informal knowledge flows. A second phase of interviewing started in September 2014 through December 2014, in which more semi-structured interview guidelines were followed. We covered people across functions and organizational levels through internal referral and by proactively approaching the person. Through these 31 interviews we asked about the mechanisms related to B&O's innovation activities and formal NPD processes, became informed with the running NPD projects and their different complexities. We also learned about conflicts and their role for renewal, which emerged especially from questions linked to the tension between different department's logics. The tensions, often described as a "friendly fighting" between the Creative department and R&D, had shaped the most iconic products of the company, but was now creating more challenges as the speed to market did not grant enough time for a synergistic work between the departments. During this time, we could attend meetings about specific NPD projects to highlight and experience some of these inter-group dynamics, albeit not of the projects we later on focused our study on. An additional data collection in Spring 2015 through June 2015 consisted of additional 15 interviews with all members of the NPD teams and top management. These provided detailed information about

the process timelines and specific turning points, bottlenecks and major conflicting events. We interviewed some people for the second time with more emphasis on tracing challenges and turning points and to deepen our understanding on topics that emerged in our first interactions. Overall, a total of 56 interviews have been conducted with 35 informants across NPD departments, spanning from operative management, senior management and including the whole top management involved with NPD as shown in Table (1).

Organizational members interviewed

Managerial level	Organization	Position	Specific role for NPD project	Number of interviews
Top management				
		CEO		1x
		COO		2x
	R&D	Head of R&D		1x
	Product mgmt.	Head of Product mgmt.		2x
	Creative	Head of Creative		1x
			Total	**7**
Middle management				
	R&D	Category Manager Procurement		1x
	R&D	Head of System and Cloud Architecture		1x
	R&D	Head of Research		2x
	R&D	Purchasing manager		1x
	R&D	Senior Project Development Manager	Technology Lead for Audio (late)	1x
	R&D	Senior Manager Design and Technology		1x
	R&D	Senior Manager Screens & Displays		1x
	R&D	Senior Manager R&D #1	Technology Lead for Speaker	2x
	R&D	Senior Manager R&D #2	Technology Lead for TV	1x
	R&D	Senior Manager System Engineering		5x
	Product mgmt.	Directors, Category Audio	Business Lead for Audio	1x
	Product mgmt.	Director, Category Speaker	Business Lead for Speaker	1x
	Product mgmt.	Global Product manager	Technology Lead for Audio (early)	2x
	Product mgmt.	Head of Program Management Office		2x
	Product mgmt.	Senior Manager Custom Installations		1x
	Creative	Concept developer	Creative Lead for TV	1x
	Creative	Director, Global Consumer Marketing		1x
	Creative	Senior Manager, Sound Concept	Creative Lead for Speaker	2x
	Creative	Senior Manager, UX Concept	Creative Lead for Audio	2x
	Creative	Senior Scoping Manager		4x
	Creative	Senior Manager, Brand & Consumer Insights		1x
			Total	**34**
Operative management				
	R&D	Corporate Patent manager		1x
	R&D	Technology Specialist #1		4x
	R&D	Technology Specialist #2		1x
	R&D	Technology Specialist #3		1x
	R&D	Tonmeister		2x
	Product mgmt.	Senior Marketing Project Manager		1x
	Product mgmt.	Product manager	Business Lead for TV	1x
	Creative	PR & Event Consultant		1x
	Creative	UX Specialist		1x
			Total	**13**
			Total of interviews	**56**

Table 1 - Informants report

Data analysis

We initiated data analysis throughout the data collection by reviewing daily templates to identify emerging dynamics related to the renewal-innovation relationship. After our second round of interviews, a brief iteration with literature on renewal and innovation showed how extant research was not clear enough to make sense of the observations at B&O. The analysis of data made key role of conflicts in NPD projects explicit, so that we could subsequently inquire more specifically on these inter-group tensions when approaching the last rounds of data collection and thus confirm our initial insights. When data collection concluded we initiated an inductive process of understanding, starting by creating NPD projects' chronologies on an ideation - development - implementation process timeline (Garud et al. 2013). We used Gate 0 to separate ideation and development, when a project number and a budget are assigned and the initial concept ideation enters its development. Between development and implementation is Gate 3, which correspond to the selection of design and the closing of specifics. The product enters its production phase, make-or-buy decisions are taken, suppliers are contracted, and the investment budget is used to its full extent. We reviewed the chronologies looking for conflicting activities within the project-space, while at the same time scanning interview transcripts from people outside the three NPD teams for additional mention of the same conflict or for hinting at organizational renewal. Through an iterative process, we moved forward in time from events of conflict, as well as backward from those of organizational renewal, and by triangulating between accounts we aimed to generate the basic dynamics that connected the two types of events. Overall we documented 10 cases of conflict. Each conflict was specified in a short case study, in which the roles of the different agents, their motivations and their activities were interpreted through triangulation across interviews, personal field notes and secondary data. We then performed two types of analysis: first we aimed to inductively code the characteristics of conflicts themselves by identifying the

reasons for the conflict to emerge as well as how it got resolved at the project level and drawn upon at the organizational level. Through several iterations among the cases, and only eventually with what the literature on conflict proposed, we converged on three characteristics we found could explain each case. Second, we used a process of case comparison between the 10 cases to identify the components of a process model spanning a project and organizational level. We focused broadly on the consequences and antecedents of each event, so to create clear steps of what became a model of renewal from conflict. We then re-applied our model to the two most dynamic accounts of conflicts – one about system integration in Speaker, one about software development in Audio – to reconfirm the soundness of our model, which we also propose in this study.

FINDINGS

Below we present our results in two sections: first, we introduce our results about the types of conflict that emerged throughout the innovation process, and how these conflicts had consequences beyond their resolution. We then present our process model of conflict leading to organizational renewal, and support the model through two detailed narratives of mechanisms of renewal.

Conflicts in NPD

We discovered quickly that the cross-functional nature of NPD, as well as the involvement of multiple levels of authority, easily generate different interpretations of past events, present concerns, and future direction. Moreover, financial struggles and the necessity to re-establish the brand for the long-term through the short-term launch of a new generation of innovative products increased the pressure on a process that by nature deals with high uncertainties. This

heightened tension leads the NPD process to be a locus of change for the company, where the initial spark for a successful future may ignite, if it finds its way among multiple conflicting dynamics. In Table (2) we present 10 conflicts that emerged from our analysis of the three core projects and their consequences. We first explore the nature of the conflicts and hereafter track the mechanisms that were triggered, generating renewal or failing to do so.

With *conflict context* we understand a specific relationship between two parties that can be identified as the root of disagreement or incompatibility, and that disrupted the normal flow of operations and decision-making. We find that each of these conflicts has a different degree of severity to the underlying reasons why it emerges in the first place. While the literature has presented different typologies of conflicts as different events, we find how each conflict displays a different composition of three conflict components – task, jurisdiction, and relationship – that we inductively redefine below in such a perspective. With *conflict resolution,* we understand the means through which a situation of conflict is brought back to stability in which all the parties have accepted one alternative, yet not necessarily the one diverging from the status quo. We find in this case two drivers for the resolution, which we call "levers", intended as the arguments used to achieve such resolved stability. Furthermore, we investigate the subsequent consequences at two levels, namely project and organizational.

	Project	Who vs. who	Conflict context	Severity of conflict components	Conflict resolution	Project consequences	Organizational consequences
#1	TV	Heads of Product Mgmt. and R&D Vs. R&D organization	Top mgmt. decides UHD technology will be used instead of current HD. R&D organization is upset and feels mistreated, as previous weeks of work became worthless. Complaints reach CEO about mistreatment from employee's representative	Task: HIGH Jurisdiction: LOW Relationship: HIGH	*Task-lever* Feasibility study shows the benefits of switching to UHD, NPD's Tech Lead motivates R&D organization to work on the new technology	Performance: *positive* People eventually align and commit to work	-
#2	Speaker & TV	System engineers Vs. NPD Teams and Head of R&D	System engineers believe the integration of the two products is poor in light of a brand's system promise, yet lack the mandate to enforce any decision. Respective NPD teams are less concerned because of perceived different target customers, and lack the mandate to enforce anything on other product categories. Head of R&D does not intend to add additional complexities to the two projects, so decides not to act on the improved integration.	Task: HIGH Jurisdiction: HIGH Relationship: MEDIUM	*Task-lever* System engineers voice their concerns to COO. He pushes for a system-offering, key for the core customers. He forces the integration improvements despite the additional delay and costs.	Performance: *positive* Improvements in both products are implemented, and despite not being quantifiable, the benefits of a system offer are perceived.	COO creates the position of NPD System Lead for future NPD projects *so to bridge across product categories*, with the people who first expressed their concerns and a newly appointed Head of System Architecture reporting directly to the COO
#3	Speaker	Acoustics engineers Vs. NPT Business Lead	Acoustics engineers are given more legitimacy for the tech-first speaker and vocally debate with NPD Business Lead in charge of developing the first product brief about the speaker's features	Task: HIGH Jurisdiction: MEDIUM Relationship: LOW	*Task-lever* "Idea clash" results in enough alignment, and a product brief is created by integrating the perspectives of both parties	Performance: *positive* The product brief is approved and acoustics engineers are further engaged in the project development much earlier as compared to the standard approach	-
#4	Speaker	Top mgmt. Vs. Acoustics Engineers & NPD team	Top mgmt. stops product development as it is exceeding the envisioned investment while under-delivering in the acoustics engineers' promises about technological advancements. Wave of disappointment and frustration spreads among the people involved	Task: MEDIUM Jurisdiction: LOW Relationship: MEDIUM	*Task-lever* New Head of Product Management believes in the product potential and restart it with more control while supporting the push of technology's boundaries	Performance: *positive* NPD teams refocus and push acoustics team to leave up to their promises, eventually achieving the expected quality	-
#5	Speaker	NPD's Tech Lead Vs. Head of Product Development	As Procurement decided for a "make" rather than a "buy", NPD's Tech Lead pushes to produce in the former Struer factory – as opposed to the strategically repositioned one in Czech Republic. It would be more efficient and cheaper, but his boss takes this as a "joke"	Task: HIGH Jurisdiction: MEDIUM Relationship: LOW	*Task-lever* NPD's Tech Lead is given clearance by the Head of Product Development to initiate the production in Struer's former facilities as he proved the validity of his case, in terms of components sourcing and necessary interactions between engineers and manufacturers.	Performance: *positive* Production starts in Struer, components are sourced within 100km of Denmark's facilities and the complex technicalities make the proximity of engineers valuable.	

#6	Audio	NPD Team Vs. R&D organization	NPD team involves Tech Specialist (1) to improve the product's architecture, and so slowly re-introduces it in the standard development process. People so-far not involved mistrust and almost oppose it as an "outsider" project.	Task: LOW Jurisdiction: MEDIUM Relationship: HIGH	Never resolved	Performance: *negative* The product is developed amidst an unsupportive and distrustful environment, especially from R&D	-
#7	Audio	NPD's Team Vs. Top Mgmt.	NPD Team asks top mgmt. for extensions in time & budget, but often masks real issues through over-confidence – at the same time, only partial information is shared from top mgmt. members to others, resulting in tensions and confusion	Task: LOW Jurisdiction: LOW Relationship: MEDIUM	Never resolved	Performance: *negative* Lack of awareness about underlying issues results in "technology debt", i.e. granted resources are never enough to solve the problem so that new ones are continuously requested	-
#8	Audio	System engineers Vs. NPD's Technical Lead	System engineers create a tool to evaluate the maturity of project's elements, so far developed without a proper assessment of its feasibility. NPD Team sees this as an intrusion without a mandate	Task: HIGH Jurisdiction: HIGH Relationship: MEDIUM	*Jurisdiction-lever* Head of R&D listens to the concerns and pushes NPD's Tech Lead to embrace such tool, be he resists the pressure, (over)confident in the NPD's Team capability to fix the issue.	Performance: *negative* Issues of maturity that had been pointed out will not be resolved and stay immature throughout most of the development.	COO creates the position of NPD System Lead for future NPD projects *so to bridge concept development and product architecture*, with the people who first expressed their concerns and a newly appointed Head of System Architecture reporting directly to the COO
#9	Audio	NPD's Creative Lead Vs. Classification Committee	The project is assessed by the Classification Committee with several errors, many of which are "ridiculous" in the eyes of NPD's Creative Lead, who also believes the current status of the Committee is not of the highest standard. There is tensions and misunderstandings.	Task: HIGH Jurisdiction: MEDIUM Relationship: MEDIUM	*Task-lever* Through various interactions and negotiations, the parties point out the faults in the assessment and reach partial alignment	Performance: *positive* Some of the errors are re-assessed, or re-worked on the project's side, leading to a fairer error-assessment for the project ready for market launch	Following the creation of his own UX development group, NPD's Creative Lead suggests to the Head of the Classification Committee to replace one member soon to retire with 2 new people to support a functional dialogue: one of his UX members, plus one from the Software department
#10	Audio	NPD's Creative Lead & Head of Creative Centre Vs. Head of R&D and SW organization	NPD's Creative Lead believes a different external company in the UK can provide a higher quality and swifter software development than the long-standing partner in India, preferred by the Head of R&D and his Software organization for its size and costs. Head of Creative Centre and NPD Creative Lead try to sneak in the UK company through procurement, but by so acting they anger the Head of R&D who threatens to withdraw all of his resources from the project.	Task: HIGH Jurisdiction: HIGH Relationship: HIGH	*Jurisdiction-lever* NPD's Creative Lead and the Head of Creative Centre agree to the claims of Head of R&D that it is not their mandate to select the software development partner, and reluctantly agree to collaborate with the partners in India.	Performance: *negative* The achieved quality is sub-optimal, and the product is released with clear software-related flaws.	Recognizing the flaws of such approach and outcome, the newly appointed COO re-defines how software is developed internally by closing the principal software organization, establishing a new and smaller group headed by a newly appointed person with experience in a more agile software development, and new partnerships with dynamic software development companies are set up

Table 2 – Inter-group conflicts in innovation projects

Typologies of conflict components

Task-based conflicts. Different experiences in a particular knowledge domain and professional backgrounds lead to different interpretations of framing the problem and envisioning solutions that might be in conflict with each other. Simply put, people will debate on *what* is to be done. This is the often-described "clash of ideas" that is functional to a synthesis of perspectives, and thus celebrated for its contribution to innovation. In the case of #3 acoustics engineers are granted active participation in the development of Speaker's "brief 0", the document created by the NPD Business Lead and ratified by the Innovation Management Board for the allocation of a project number and budget. This was the first time in a decade that they had done so, but their enthusiasm still has to fit into NPD Business Lead's framing:

> *I had already some ideas about [Speaker], what it should be - some of the acoustic guys had some different ideas. The ideas were not completely consolidated between us [...] so when someone said something, it was very much challenged. There was a very hectic debate in the beginning (...) about what exactly the speaker is like.*

Another example between hierarchical levels is case #5, when Speaker's NPD Technology Lead points out how Struer, B&O's headquarters in Denmark, would be the ideal production location as opposed to the current plants in Czech Republic. Suppliers for many components are less than 100km away from Struer, and the project's complexity calls for frequent interactions between R&D and the production facility, making Struer the better candidate. However, his boss never doubts the company strategy that envisioned the relocation of all production activities to the Czech plant:

> *"I made a proposal saying okay, this is the cost in Denmark, this is the cost in Czech Republic [...] I sent it and then they thought it was a kind of provocative e-mail to*

send. I was called by my boss and he said, "Why did you do it? Can we agree it was just a joke?"

Eventually, financial and complexity arguments showed that the production in Struer made sense for the development of Speaker. Contrary to the corporate-wide relocation strategy, a new production facility was re-opened in Struer only for Speaker.

Jurisdiction-based conflict. Different roles in the organizational structure mean different authority levels and group affiliations, characterized by an agenda and a mandate. As these spans of influence end up overlapping with someone else's, conflict will emerge. Simply put, people disagree on *who* should and can *decide* on the matter. In #8, System engineers were concerned that the product Brief, the basic document to be approved at Gate 0 and to be passed on to R&D's development teams, was not crafted with this transition in mind. The product elements defined in early phases of the process were fine in terms of conceptualization, but not in terms of maturity for development's feasibility. System engineers thus created a tool to assess such maturity, and point out what was not ideal, to enable a smoother transition. Yet, NPD teams saw this as an intrusion in their domain of influence and thus resisted, as explained by Technology Specialist #2:

The maturity matrix is, in my view, a reaction to a disabled process. Concept and Business, they have to mandate to accommodate what they want. [They think] there is a Brief, [R&D]'ll execute. Okay, put that Brief into a [R&D]'s development team and everybody gets confused, right? A lot of energy is being used for nothing. Because the development team is very good at development, they are highly professional, and they can do that, but they can't do concept development. Things are divergent, so the maturity assessment is a reaction to that. (...) People were reluctant to let us do that, because they thought that some of their responsibilities were taken away from them.

Relationship-based conflict. Emotive responses cause conflicts in which two parties disagree or challenge each other to escalate beyond those of jurisdiction or task. A clear example is case #6, where the re-introduction of a skunk work project into the company's processes causes the emotional rejection of a larger group in R&D. They mistrust a concept they believed has been developed outside the regular process because of lack of trust in the company's capabilities, as "they even changed the locks for some rooms in Lyngby because it should be kept very secret" as Audio's NPD Technology Lead remembers right before he joined the NPD team himself. The company becomes aware of the product partly because Technology Specialist #1 is asked by the NPD team to support the project with his knowledge of product architecture. As one of the most qualified and connected people in the company, he prioritizes involving people within B&O. The result is a project being developed through an increasingly more standard NPD set-up, rather than through many new external partnerships as originally intended by NPD Creative Lead. Audio's NPD Technology Lead remembers some of the strongest reactions:

> *"One very strong guy in the hardware's team, he was very negative. He came to me several times saying he wanted to get off this crazy project, he cannot back it up. For that guy, I have even received complaints from creative managers that he has been insulting them - it's just a lot of personal distrust and lack of motivation basically. Even if it's good B&O guys who have been willing to fight for B&O, this was just too much."*

Conflict resolution

Resolution occurred when the parties involved in a conflict settled on a solution, may it be a compromise or the choice of one of the alternatives. Resolution does not necessarily occur however, and a conflict can extend itself throughout the end of the project to the

launch of the project onto the market. Where the resolution occurred, we found two drivers that players used to settle the conflict, which we call *levers*, and are characterized by a stronger task or jurisdiction component. With levers we define a set of arguments, negotiations and key decisions that manage to bring the parties to a settlement. With a *task-lever*, it is arguments about the superior value of a proposed product feature (i.e. the promise of UHD technology for TV in #1, the synergistic value of multiple insights in the development of Speaker's first Brief in #3) or process alternative (i.e. the effectiveness potential of relocating Speaker production to Denmark in #5 or its underlying promise after it was stopped out of a disappointing progress in #4) that prove more convincing to the other course of action. On the other hand, a *jurisdiction-lever* focuses on who has the right to decide because of an official mandate or is able to convince the other party it ought to be so (i.e. the overconfidence in the role of Speaker NPD's Tech Leader when refusing the pressure of his boss and system engineers in #8 or the threat of removing all resources from the Audio project by the Head of R&D if Audio's NPD Creative Lead questioned his mandate in #10).

Project-level consequences

The conflict resolution resonates throughout the project, leading to consequences that are *perceived* as either positive or negative. We emphasize the perception of such performance as such consequences have influence before and beyond any measurable performance of product success after the market launch, even though it might contribute to it. When *negative*, process delays as extensions of stage-gate approval, rising costs of development, misuse of resources, disappointing quality or simply the feeling of having missed out on an opportunity, are all part of such perception. On the other hand, a

positive performance sees the commitment to work rise after the resolution of the conflict, as energized through a successful resolution that has left the parties satisfied. Improved product quality, increased engagement and the meeting of deadlines and budgets all contribute to the perception of being on the correct path of action, despite no clear measurable performance from an upcoming market launch.

Organizational-level consequences

We found that the consequences of the conflict resolution, combined with the subsequent performance, led in certain cases to changes at the organizational level. Such changes have an influence on all the upcoming projects by affecting the organizational system and processes. Moreover, they represent an underlying strategic vision of the company that is more or less incremental with respect to the current one, depending on the magnitude of the change. As we will see in the narratives used to support our theoretical model, we have examples of changes that represent a shift towards a more dynamic and agile software strategy, while at the same time also sustaining a shift in regaining recognition for a system offering of products. Following the definition by Agarwal and Helfat (2009), a type of change that restore strength and vigour by replacing decayed elements, we consider such changes at the organizational level as instances of organizational renewal. Not all conflicts led to organizational renewal though, and we found that the majority of the conflict resolutions had consequences that remained at the project level. We found three key reasons for why this is the case. The first is the emphasis on one conflict component, be it task, jurisdiction, or relationship, that had however few implications for the others. An example is the case in which the whole R&D organization opposed emotionally the re-introduction of Audio into the normal

innovation process (#6), thus driving the conflict mainly on relationship-based arguments. Another example is the "clash of ideas" in the development of the first Audio Brief, in which acoustics engineers convened with NPD's Business Lead to synthesize their insights into the document ready for approval (#3). The conflict was primarily driven via functional task-based arguments as the jurisdictional roles within the parties were accepted. This example is also valid for our second point, namely the fact that some conflict and related resolution are idiosyncratic with the project itself, and would thus not re-emerge if not for its unique context. The involvement of the acoustic engineers was functional to a technology-driven speaker, of which the core feature was the advanced technology developed by them over multiple years for the new hero product. The third cause for a project not to develop into a potential organizational-level change is the lack of awareness of said detrimental dynamic. As with case #7, no party was clearly aware of the causes leading to such tension and the recurring "technical debt", so that it could not be resolved in the first place. Lack of openness, passing on doubtful information, and over-confidence, masks the dysfunctional dynamic and hinder its resolution. However, when certain characteristics on the other end of the spectrum to the ones described so far are in place, the conflict can generate organizational renewal, and these are the dynamics on which we base our theoretical model.

A model of organizational renewal through conflicts in NPD

We present a model of organizational renewal triggered by instances of conflicts in NPD projects, as shown in Figure (2). We find conflict characteristics that are necessary for such multi-level process to happen, as well as two mechanisms through which an initial

conflict can lead to such renewal. These two we explore in detail in the following section of this paper.

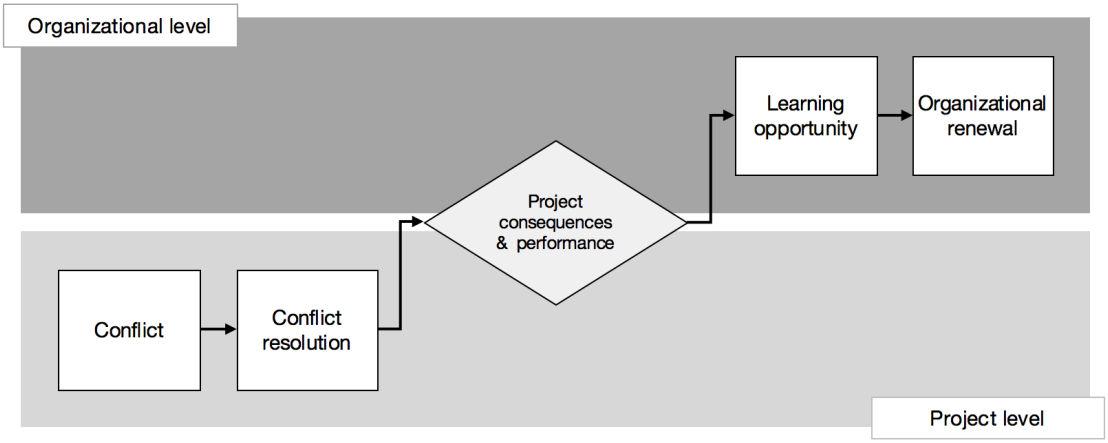

Figure 2 - A model of organizational renewal triggered by conflicts in innovation

We found that the key characteristic for conflict which leads to organizational renewal is a strong misalignment between demands voiced with task and jurisdiction arguments. In our cases both conflict components had severe implications, and the proposed task-driven solution was at odds with that in the name of jurisdiction, leading therefore to a tension that escalated often in the most acute conflicts we could observe. Simply put it is a situation that, with hindsight, could be described as "those who knew better had no power to take the decision". Despite involving both task and jurisdiction arguments, the conflict is resolved only through either a task lever or jurisdiction lever. The conflict resolution has consequences at the project level, which are associated with either a positive or negative perceived performance. This outcome opens a window for learning about a systemic or procedural malfunctioning that would have implications for future projects if left unrepaired. Also, the parties first involved in the conflict dynamics become vocal and bold in their request to reconsider what happened in light of the perceived performance, so that top management becomes aware of the dynamics that led

to such (un)satisfying performance and can take action in that regard. The learning from this process creates the basis for an organization-wide type of renewal, in which what the conflict exposed at the project level is resolved at a higher level and with future implications that go beyond the scope of the project in which it originated. The changes that we observed were in the form of re-aligned task and jurisdiction demands, so that those who had the functional knowledge and better insights in the conflict, proven by the subsequent performance, received jurisdictional power to influence upcoming and comparable decisions. Such incremental changes were part of a sustained and broader strategic agenda of renewal that gained momentum as a bottom-up process. Such changes at the organizational level gained broad support as they emerged from objective fallacies or best practices that people in the organization had themselves experienced. Through the analysis of our cases, we identified two different mechanisms of organizational renewal triggered by conflicts in innovation, which we explore through a detailed account of cases #2 and #10.

The Reinforcing Mechanism

The *reinforcing* mechanism is based on the elevation of a best practice that occurred at the project level to the organizational level. First, the misalignment between task and jurisdiction's arguments is resolved through a task-lever and through the intervention of top management to override the jurisdiction of one of the parties. Because such paths of action led to a positive perceived performance, the learning process indicates the benefits in reinforcing the project-level solution to the system's malfunctioning that led to the conflict in the first place. The renewal of processes and systems occurs then in allocating official jurisdiction to the parties that first provided the task-driven arguments that led

to the positive performance. The model with the reinforcing mechanism is presented in Figure (3). We use the case of #2 to illustrate such process through all the different phases.

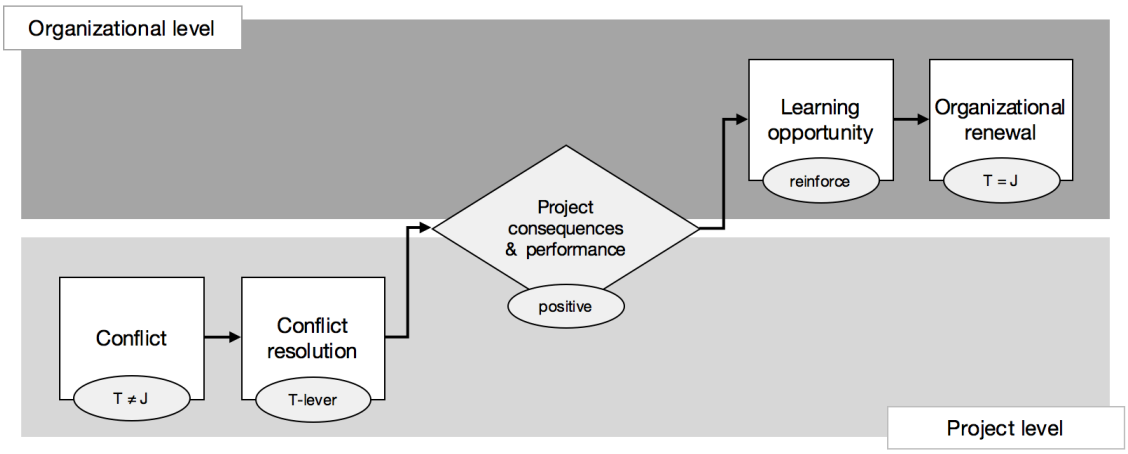

Figure 3 - Reinforcing mechanism of renewal. Circles represent the mechanism's unique features.

Narrative #1 - Reinforcing mechanism in Speaker: system integration with TV

The conflict. The three parties involved in the conflict had three different agendas and mandates, which ended up colliding when brought together around the issue of system integration. The first was the NPD project team, who had the mandate on the process from the creation of the project's business plan up to the launch on the market, and thus was accountable for its failure or success in terms of time and budget hit rate, business impact and offered uniqueness. Their success was measured on the project only, and in this case more than others, the members were proud to be working on such a lighthouse project. It is the first time they worked together as a team, but having each been around B&O for more than 15 years, they knew each other well, and made it easier to stick together as a unit with "one voice only". The second party was the System Engineers,

external to the NPD teams and project, and reporting directly to the Head of R&D. They consisted of Senior Manager in System Engineering and the most experienced Technology Specialist #1, also serving as system engineer, who was by many defined as one of the hubs of the informal network of knowledge and influence in the company. Their goal was to ensure the connectivity and integration across products. The last party involved was Head of R&D, who had come on board with the new management 2 years before as an experienced executive in production from a large global company in consumer electronics. Aware of his clash with the Nordic culture of B&O, he had a clear focus on time-to-market and costs, an agenda to turn the portfolio of the company around in 3 years, and to drastically change the efficiency and effectiveness of the NPD process.

The conflict presented a lock-in situation: System Engineers, legitimized based on their knowledge and role to suggest improvements on the integration across products, could not enforce anything due to a lacking mandate on the project-spaces. On the other side, NPD teams and Head of R&D found no value in using their mandate to improve on such integration.

Task-related reasons for conflict emerged because of different perceptions of the value in better integration between two products into a system, driven by the fact that NPD project team thought and assessed their operations project-wise, while System Engineers portfolio-wise. System engineers raised concerns about the system integration between the Speaker product and a TV product. They claimed that such integration was key to provide a system offering for the whole brand, and the so-far specified features in the Speaker project were not enough. However, NPD project team had already frozen such features in the initial Brief 0 – albeit at a different standard - so that to them this level of integration was now out of scope. Additionally, the pressure to create a "hero" product

led them to associate Speaker with a type of customer that would make the strategy "acoustics as hero" resonate, i.e. the audiophiles, who would only care about the speaker, less about an extended system including a TV. Such view was also shared by top management at the time, and by the Head of R&D, who believed the current set up - already incurring in delays in the time-to-market and costs - was enough. Additional complexities should not be added to either product. One of the two System Engineers (Technology Specialist #1) explained his view:

> *"We were talking about "We need to ensure that it works with the TV customers, so you have that one remote experience, the scene that's integrated, the experience. You can see it all as one product." "No way" they said, and then forced that all the way through. Compliance and compatibility across the portfolio was totally out of scope."*

The conflict emerged especially because of jurisdiction-related causes, in which those with the system knowledge had no authority over the decisions related to systems, and the parties with authority had no interest in committing resources. Despite having the functional knowledge to claim that the system integration was not at the required standards, their lack of authority in enforcing anything led the system engineers' claims to be only "suggestions" not accepted by the NPD team. In addition, even if they complied with such requests, the Speaker's project team could only implement changes in their own project, as their mandate does not span into that of TV - the other side of the system. The only person who is above the two projects - the Head of R&D - did not commit to the issue and did not recognize the necessity to invest resources in such changes. In the perspective of Speaker's NPD Business Lead:

> *"We as the Speaker team were not able to tell someone from TV "you need to do this". These were different projects, from different economy and different timelines. With [Head of R&D] nothing happened because he didn't want to impose extra risks on the TV project and spend extra money for something he didn't really see as a big*

value. Personally, I didn't push either because I was doing this loudspeaker; same goes for [NPD Technology Lead]. (...) We were not pushing for this integration because we didn't think it was that important for the success of the speaker."

The conflict was also exacerbated on the emotive level, as the lack of consideration frustrated the system engineers, who seriously doubted the value of their roles. It appeared to them that NPD project team and Head of R&D did not yet recognize that the "hero" product was still part of a system, and that the brand value of B&O was *in the system*. It was for this reason difficult to understand the perspective of the other parties, as it came across blinded by the potential prospects of a single product. They doubted what their role as system engineers was if they could not contribute with anything related to system integration.

Conflict resolution. The solution proposed by the System Engineers was initially not selected, and the project carried on as if their intervention never happened. Despite their calls to the Head of R&D, he chose that the allocation of additional resources for system integration was not a priority. This meant that Speaker and TV would have two different systems controlled in two different ways - you would need to use the remote for the TV, and the smartphone, to control the Speaker. As System engineers became more vocal about the issue, they directly approached the new COO, who listened to their remarks. The new COO overstepped the previous decision of the Head of R&D of not investing in the better integration between the products, resolving conclusively the conflict by implementing the previously discarded alternative proposed by the System engineers.

The *task-lever* became the necessary handle as previous assumptions were shaken by new information, leading top management to move from a product-narrow perspective to a portfolio-wide one. Technology Specialist #1 remembers, a bit frustrated, how the executives and NPD project team shifted towards such view:

> *"[Top management and NPD team] sort of realized, very very late in the process, "Oh, those audiophiles, they do not have the money to buy Speaker. They are not our core customers. They're not even in our target group. It doesn't resonate with them. They've got preferences for all kinds of other brands. And hey! Now it's suddenly important that everything works, everything is operable [at the system level]. (...) Some of the executives were trying to teach me, "When this is in the shop, it's so important that everything works together."*

The new envisioned target group would be placing such speaker in a living room with furniture *and a TV*, rather than a dedicated one with a single chair in the middle for "somebody with no friends", like B&O's Tonmeister liked to describe himself. Smooth connectivity between Speaker and TV was then suddenly on the top of the list, and made the previous arguments invalid.

The key reason for the change to happen was the insistence of the System Engineers that they hold their ground. They failed with the previous Head of R&D, and made then their case with the new COO, with whom their arguments resonated differently. His own experience in previous jobs offers granted the System Engineers fertile ground for their concerns and reception to their suggestions, so much that they triggered his action on the issue. His authority across product categories and above the Head of R&D enabled the enforcement of such decision.

Project-level consequences and performance. The perception of such move at the project level was positive. The new set-up, despite having consumed resources and pushed the planned market launch horizon ahead, presented more benefits than harm – even more than that, once the value of such improved integration became apparent, the previous alternative stopped making any sense. In the words of NPD's Creative Lead, despite the high frustration experiences through such conflict resolution, the advantages are clear:

"There was a lot of frustration. Really, that's the most frustrating part of this project, the system integration. In the end it was so obvious that it wasn't right. When you connect our best speakers to our best TV and the two systems would not work together, it just... it was decided that of course it should be amended, and worked out on the TV so it could work."

Moreover, the growth potential represented by a better integration had the promise of having product sales in Speaker more directly influence product sales in TV, and vice versa. The fact that TV was then being launched freed some resources in such project-space, so that most of the tasks related to integration between the two products could be allocated to such budget. Speaker's NPD Technology Lead remembered how the alignment across product categories, System Engineers and NPD project teams happened in a simple yet effective manner:

"When it has been said a lot of times and even to [new COO], the newcomer, then he said "Okay, I need to put the project and system engineering and UX management in the same room, then I want to look around at everybody, and they shall say "We are aligned." He put us all in and then, we had the decision on this."

Learning opportunity & consequences at the organizational-level. The successful practice at the project-level justified top management redefining system engineering at the organization-level. To avoid the issues that led to the initial conflict, a first change was the creation of a new "System Lead" in every NPD project team, who would complement the Technology, Business and Creative leads with a more system-wide and portfolio perspective. If the process remained as it was, upcoming projects might have incurred the same problems in which the mandates of System Engineers would not allow their contribution to matter more than as a suggestion, and would thus be detrimental. As the COO explained:

"We don't have a good system understanding in the company. We have people that understand the system but no one really listen to them. (...) The Speaker project was running like crazy and no one cared about all the other products. (...) If you

break the system, it can create a lot of problems and that we have seen here in many, many cases. (...) I don't want what I call the "Muppet show", where you have the people sitting on a balcony and just pointing to what is right and wrong. Therefore, we introduce the System Lead in the NPD team because they need to take the responsibility. You sit on the balcony and decide the overall strategy for the company but you make sure it's also implemented in the project. Otherwise if you are not part of the concept, the concept will go in a new direction, and guy on the balcony will say, "I told them not to do it." Now you need to make sure it's implemented as well."

By letting System Engineers lead the changes on the integration of products the creation of an NPD System Lead builds directly on the project-level solution that was primarily concerned with a better integration between Speaker and TV. This change was aimed at *reinforcing* the parts of the solution that were considered beneficial. The realignment of task and jurisdiction arguments is achieved by increasing the legitimacy of the System Engineers, who up to then had insufficient authority. In terms of their position in the organizational structure, they have been elevated to now report directly to the COO, instead of relying on a lower status in the R&D's hierarchy. In terms of their position in the innovation system, their official role as System Leads has greatly increased their legitimacy in each NPD project. Another action by the decision-maker was to *complement* this change by adding a new person embodying a new set of skills and knowledge: Head of System Architecture, reporting directly to the COO and heading System Engineers. In his words:

"We're going to change the [NPD process] now and the idea is that the System Lead - one from my team - will be part of every [NPD] team if necessary and we will follow the project from inception to final release. Every time [Technology Specialist #1] and [Senior Manager in System Engineering] hear something on the corridor like "Hey, we're going this way," they have to have meetings with such people, who are running in another direction. It was really hard to intercept some of these wrong ways of doing it. But now, we're going to be part of the [NPD] team, so we will be sitting in there and have equally mandate to change things."

Such change impacted mostly those that fought for the alternative solution in the original conflict: the System Engineers. During the conflict they saw their task-driven arguments overridden by jurisdictional ones, and by having the COO on their side, believed they would be rewarded to the full extent. Instead, the appointment of an external Head of System Architecture left a hint of disappointment in Senior Manager in System Engineering, who expressed the following with regard to their efforts to make the System Architecture team happen:

> *"We pitched the idea [a system architecture team], but with a little bit broader scope and also looking at the system and so on. In that sense, we have also pitched this function that they hired a new guy for. Of course, I was personally a little bit disappointed that they hired a new guy for that. Not that I don't like [Head of System Architecture]. I think he's a good guy. But I think that was the role I pitched for myself."*

Also concerned was Technology Specialist #1, who despite recognizing the good decision to implement the role of NPD System Lead, was still unsure who should take up such role. Within the company there were no more than a couple people with the necessary knowledge about the B&O system, which took years to develop:

> *"I think we have one success, because we managed to ensure that in every [NPD] team from now on there is a System Lead represented. What we haven't succeeded with is developing the power within such team, because the Business Lead is the one who takes the final decisions. (...) Those System Leads, who are they? We haven't grown them. They're very important because on the operational level they have to do what top management would need to do, and that is balance things so we have innovation, we have something we can build, and all that kind of stuff. No, not many of those."*

The Regenerating Mechanism

The regenerating mechanism is based on the recovery at the organizational level from a disappointing practice that occurred at the project level. First, the misalignment between task and jurisdiction arguments is resolved through a jurisdiction-lever before an intervention of top management could override the jurisdiction of one of the parties. As the path of action undertaken leads to a negative performance, the learning process indicates the poor choice in the solution adopted as part of the conflict resolution, so that to fix such malfunctioning the old system or process ought to be regenerated through new elements. The renewal of processes and system occurs by allocating official jurisdiction to the parties that could not enforce the task-driven arguments, or to new organizational players that could support similar arguments. The model with the regeneration mechanism is presented in Figure (4). We use the case of #10 to illustrate such process.

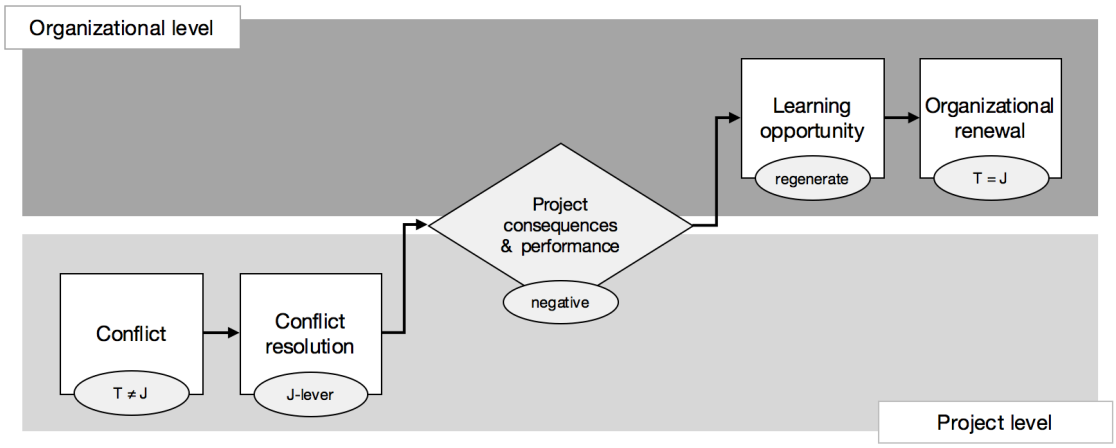

Figure 4 - Regenerating mechanism of renewal

Narrative #2 - Regenerating mechanism in Audio: software development

The conflict. In the awakening of the conflict, two parties represented the two sides of NPD that had historically clashed the strongest in B&O, namely R&D and the Creative Centre. Their interpretations collided about how is best to achieve the desired product quality. The concept developer in question was Audio's NPD Creative Lead, the champion of the product who was the first being contacted by the CEO. He was enticed by the idea of changing the meaning of what an audio product "is" through Audio, even though he had several reservations about how it was created. As NPD Creative Lead, he was responsible for its concept development and accountable for external partners in User Experience (UX) and User Interface (UI). His goal was to create the best concept possible and ensure that the final product would seduce customers with a great story. Hence, he was responsible and accountable for the "what" of the product. On the other side, R&D was responsible for the whole production of technical elements both in hardware and software, which were as specified by the Creative Centre through their concept development. R&D had the mandate on make or buy decisions through the procurement department and thus on technology partners. Their goal was to produce such product, and identify "how" to do so. The agenda of the Head of R&D was, as mentioned in the first narrative, to decrease time-to-market and costs overall as a strategy.

The conflict involved two parties whose interpretations of how best to achieve the desired product quality collided, and the overstepping into one another's authority domain exacerbated the tension. Task-driven arguments for conflict were related to a different understanding of the necessary software development's quality. The Creative Centre pushed for a smaller and higher-end UK-based company while R&D for an

established India-based partner that promised the same quality at a lower cost. As Audio's NPD Creative Lead explained, they reached out to such UK-based software house at the suggestion of their selected UI partner – a great company in everybody's eyes, which was expecting to work with someone of their own calibre:

> *"We were going to work with high-end software developers, work with high-end designers, creating magic on this standard platform that would be worthy of Bang & Olufsen in record time."*

On the other hand, the resources needed to create such new and additional partnership, and the inherent higher costs of such software house made the Head of R&D and his software organization put their foot down. They would instead go with a partner that had collaborated with B&O on several products already, and with whom starting a new collaboration would be smoother. Moreover, the Head of R&D's strategy was also of pushing back on the usual way of working at B&O, in which costs considerations took the least priority:

> *"[Creative Centre] just keep on inventing and doing nice things around this and that and at the end of the day if you go bankrupt who cares. That is what is my concern, and that has partly to do with the fact the company has been working for the last twenty years, or maybe fifty years, and no one in management has ever asked questions on cost, and time-to-market. (...) We have a Creative Center, which is doing fantastic things, but it is absolutely not interested in the manufacturability, is not interested in the cost. They just do because it's nice, which is an interesting mission in life, but at the end of the day you also need to get the products out of the factory, and you need to get the products out in a way that you can make some margin because you have to pay all the bills and all the people here."*

In this regard, the Indian-based software house was a better fit into such a line of thinking, and had confirmed they could find developers of the requested quality, thus ensuring the expectations in the software development without jeopardizing the project.

The conflict escalated as one group went beyond the limits of its jurisdiction and tried to enforce its favourite partner, despite a different selection by the group who had the mandate over such decision. As the R&D unit was planning to move forward on its own with the Indian-based company, fear for the resulting quality started to rise in Audio's NPD Creative Lead's mind. He had worked with them already, and was bringing discussions forward with the UK-based company since the initial design kick-off:

> *"The [UI company] needed to have people that could work with animation, work with design, of graphic user interface at this high level. [R&D] couldn't find these people and the [Indian-based company] - pretty mid-range to low end sort of outsource software house - they promised they're going to find these people and they'd have the right skills, but it didn't have it."*

So, with the help of the Head of Creative Centre, Audio's NPD Creative Lead tried to sneak into procurement an offer made by the UK-based company. The involvement of the procurement department was necessary as the "technology" partners were within their authority domain and thus the Head of R&D's jurisdiction, not the Creative Centre's.

Some of such manoeuvres triggered strong emotive responses, leading to threats that went beyond the usual daily business of "friendly fighting". They ticked off the Head of R&D, who threatened to completely withdraw the R&D organization from the project, leaving it without a production capability, as Audio's NPD Creative Lead explained:

> *"[He] gave an ultimatum. He said that if we use [UK-based company] under the table, if we try to use our sneaky, sneaky this and that, he would pull every single resource off the project and [Head of Creative Centre] and [Audio's NPD Creative Lead] can bring the whole Goddamn thing to market themselves because there would be no resources."*

Conflict resolution. The Head of R&D, together with his organization, used a *jurisdiction-lever* to bring the conflict back to stability by conclusively selecting their

India-based company. The variation proposed by the Creative Centre was not selected, and the project carried on as if their intervention never happened. The Head of Creative Centre and Audio's NPD Creative Lead gave up on their effort of making the UK-based company become the selected partner, "because [Head of Creative Centre] and I thought that we have no business building up an R&D organization". At this point it was clearly a question of mandate over the decision, despite R&D providing only partially convincing task-driven arguments for not going with the alternative as explained by Audio's NPD Technology Lead:

> *"We assessed the [UK-based] company, and it turned out that maybe they would do the initial phase, but the following phase to fix all the errors to work with us, they were not ... We didn't think they could do it. That's something that will haunt us for the rest of the project. We were advised from our own software management to take the company, which we had the relation with, and then try to build with that. That's why we had to choose [Indian-based company] as a partner for this project."*

Project-level consequences and performance. The perceived performance of the project was negative. As the NPD process carried on with the selected software developer, it incurred serious problems, but could not be reverted back to an alternative. Audio proved to be the most software-intensive product B&O had developed so far, and seriously questioned the viability of the internal "waterfall"-like NPD process that up to then worked for hardware-intensive projects. Issues emerged when, after months of parallel developing specifications for the software and hardware components, the first prototypes got back from the Indian-based company and contained more flaws than previously anticipated. A new round of specifications had to be carried out as Audio's NPD Technology Lead explained:

> *"We actually thought we had maybe 90% of the specifications ready at the time. We thought we we're good to go. The software was going as planned, the mechanics and hardware as planned, so for the first 6 to 8 months there were only a few updates*

to the specifications. It was when we got the prototypes and got to test them in real life and figured out where the shortcoming was, we had to do a lot of updates."

Even during the update round, the selected company did not live up to the expectations, and could not deliver software either in time or at the requested quality, so the overall NPD process started to crumble with recurring time delays and rising costs. Having to change continuously within the 300-pages long software specification package and sending it back and forth was turning out to be extremely troublesome. Audio's NPD Technology Lead explained the issue:

"You had two programmers, who were working on the jukebox, sitting in India. You had an external company also in Austria, who's [developing] the sound heart. Then some people in Tallin in Estonia (B&O's software team). And all of these needed to work together, and that has proven a challenge (...) especially the competence of [Indian-based company]. That means we have a major parts [of the product] that are totally out of our control."

This led to a complex, delayed and ineffective NPD process. In the words of Head of Product Management, "in terms of delivery and timing, we didn't succeed".

The product had to be launched on the market mainly as a response to an internal working capital emergency, despite acknowledged shortcomings in the software. As the COO explained, it was either that or risking the whole company:

"We had 2,000 Audios [in our inventory], it nearly killed the company. Here is the dilemma in this industry then: you know it's not the perfect product. You know that if you launch it, you will get some negative feedback. If you don't launch it [however], you kill the company."

The frustration internally was high, as nobody perceived the internal development of Audio as a success story. Even the CEO claimed that despite the main reason being a financial one, the product had been worked on for too long compared to what it was meant to be, and needed to get on the market:

> *"Let's get it out. That's been very tough, because the product was not ready and we should not have released it. (...) Would that had been better if we had waited? Would we be as far? I'm not sure. Now, at least, we have hands-on feedback from the market."*

Troubles with the outsourcing in the software had been indeed a prime reason for such an outcome. Additionally, the fear of a product that was too sleek led to the continuous addition of new features so to appeal to a wider target of customers. This ended up making Audio too complex. In the words of Audio's NPD Creative Lead, who started with the simple concept:

> *"If we actually had have delivered what the CEO said at the start, (...) a tight, to the segment, (...) deliver it with a... not with our crazy outsourcing system back down in the stone age but actually work with high [developers]... If we did like we had recommended, we would have shipped crazy fast because we wouldn't have had all these things slowing us down. Yes, it wouldn't have been as connected but it would've been there, let's just say, one year earlier, working its arse off in the market. It's a relevant concept."*

And indeed the market reacted positively to the concept, both from the press and B&O dealers. Yet, despite praises for the concept, they reacted negatively to the quality, especially software-wise of the concept. The product failed to deliver on its original high expectations.

Learning opportunity and consequences at the organizational-level. The disappointing practices at the project-level justified top management to redefine software development at organization-level. To avoid the issues that led to the initial conflict, a key step was a reflection on the causes that led to it, and the opportunity for learning that emerged from it. First of all, people involved recognized that the chance provided by the original conflict was not appreciated enough as a trigger for change. Audio's NPD Creative Lead explained how having given in to the threats of the Head of R&D to withdraw his organization and related resources was a mistake, as it would have

caused so much of a disturbance that a strong executive decision would have been unavoidable, and for sure better than the actual course of action:

> *"That was our opportunity to realign to the original organizational change intent, you know, but we didn't. (...) That would have given [CEO] the ability to say, "Actually, I'm doing an organizational change project right now, and I'm forcing you to do X." Or he might have said, "Well, okay, in that case, we're going to buy in our R&D organization somewhere else." But we didn't give him that opportunity because we were chickens. (...) We ended up having a half-arsed messy, messy, messy crazy set-up we never wanted. (...) That was the turning point. We would be two years ahead of ourselves right now if we had have done that. I stole however many people's homes in Struer by not having the balls to do that, you know. That was a huge mistake in retrospect, by [Head of Creative Centre], by myself, by everybody that chickened out and, yes, you never get that back."*

The strategic implications behind such choices for R&D were then re-evaluated, also because "that" choice came to carry more political weight than it usually did, as the Head of Product Management explains:

> *"Bang & Olufsen is, in general, not a very political organization but there were massive politics in Audio. Partly based on how it was started, the shifting of software to India, and reorganizing the software organization here internally. R&D wanted to shift and it was important for them that we'd go for some of the areas where the cost was lower, obviously a strategic direction for them that was important but you could virtually say that... Let me think if I want to say this but yes, I think I will. Audio became in many way, the hostage of that way of changing the organization."*

Nevertheless, the issue was not only limited to the wrong choice of action. People recognized the objective lack of knowledge in the software domain and their failure in assessing the internal competences in such regard. The CEO remarked how being drawn in by creative and innovative ideas out of sync with the objective ability of B&O to deliver was a faux-pas by Product Management:

> *"Product management is responsible for coordinating what is our vision and our dream, and what can we actually deliver. It's easy to design and come up with a beautiful concept, but if you cannot build it and deliver it, it's no good. (...) That product management task was not, I think, managed well enough. Obviously, what*

it does is exposing issues on our side, in terms of software development, in terms of running software projects, but at the end of the day, product management always have to take a starting point in our current situation, our current skills, our current resources. Therefore, I think there was an imbalance between the vision and the dream and what was actually the reality of our capabilities."

Despite a few attempts to find a constructive distribution of the blame, the discussion quickly moved on to focus on which part of the system, be it structure or process, led to such path. It became even more apparent to the new wave of hires that had a much stronger software development background, as with the new COO:

"We didn't have enough skills in the software area to handle it actually, with this totally crazy outsourcing type of strategy. (...) I'm surprised that we have been able to launch it to be honest, because it was more or less a mission impossible, that project."

And the new Head of System Architecture & Cloud:

"Software, I think we are not too seasoned in that, to be blunt. And it's not the people's fault, it's more or less the setup that has failed."

In parallel, the quality of the India-based company was assessed by comparing it with a smaller and more agile and recently discovered Copenhagen-based company, which led to a confirmation about their contribution to a disappointing performance. Their over-promises for development skills stood out when compared to their under-delivery. Some of the updates for the software – with the product on the market already – were carried out in collaboration with this small Copenhagen-based software development company of 4-5 people. In three weeks they delivered something the Indian-based company with more than 20 developers said it was impossible to begin with, as the Head of Product Management pondered:

"3 weeks is crazy. It is really, really crazy that we ended up in a situation where we were sitting with a partner that could not do that."

The key step was recognizing and appreciating the opportunity to learn from past mistakes – as if looking into a "mirror" and recognizing that change is necessary. The champion on the product, Audio's NPD Creative Lead, has been through such a reflective stage and said that going through this process, despite it being painful and costly, has been a great chance to see the shortcomings the company needed to face:

> *"[Audio]'s been a catalyst that is renewing the company. (...) It's really shown us how unfit we are. It's exposed us for being not as good as we say we are. It's made us face truths. It's made us face organizational issues. It's been a mirror where no fancy industrial design can hide behind, you know, no raising the price up can hide behind. It's been a mirror and we will come out, we are coming out as a better company for it, if we come out, sort of thing."*

All of these considerations served the purpose of preparing the organization for change better than if Audio and its negative performance had not occurred. The first step was assessing the current situation, as the COO explained:

> *"Today we have too much waterfall development. People are talking about Agile, but it's only on paper. (...) Today we have a situation where the [Creative] team talks with the [R&D] guys. They try to specify what we want, then the Technology Project Manager from the software take it over and send it to our suppliers somewhere in the world, in India, in China or in Europe. Then they're coming back with a proposal on how to solve it, then the cost and then the debate starts. That's very old fashion way of working."*

The system itself was recognized as malfunctioning, and so most of the changes involved *regenerating* parts of the system anew. The COO was the main initiator of such changes, as he had recently taken up the role of Head of R&D as well so to oversee all operations related to product development. Changes related to software encompassed a wide range of procedural and structural elements that he described in such a way:

> *"We decided to change the total software setup. We need to reduce the number of interfaces and the first step there is actually to close Tallinn. Not due to the fact that Tallinn people or the Tallinn education is poor because it's good. They understand the software. But we should avoid too many interfaces. We should bring home what*

we called the ASE platform. This ASE platform will be the core platform for all products that will be based in all our TVs and speakers. That is the core, the heart of Bang & Olufsen. It doesn't mean that we bring home everything because that's also stupid. What we do is we let [company name] continue to develop the SDK (software development kit) for which they are really good into but after that we develop our own stuff on top of it and then we do the integration and the testing internally. Here we have, I want to say, revolution, it is a huge change in the way of how we work."

Such strategy with the SDK meant the company would keep on outsourcing the general software basics yet take control of what comes on top of it. By doing so, it took back the ownership of the clear differentiator between B&O and other companies. The major strategic implication was that so far B&O did, as the Head of System Architecture & Cloud explained, "outsource (…) the core of the company", while the new set-up allowed it to get closer to being the "software company" it was supposed to become.

The realignment of the task and jurisdiction arguments primarily addressed how the software would be developed, with changes that went beyond recognizing the need to get better at software, but had rather to encompass a more systematic change within the organization. The COO created the position of Head of System Architecture & Cloud for which he hired an experienced software developer with strong connections with the "right" network, as for example, the small Copenhagen-based company that fixed a major software issue in three weeks. Moreover, he was supporting the COO in the restructuring of the internal software competences, for example, by creating a small and agile team of software developers in Lyngby, the Copenhagen-branch of B&O, in charge of implementing a cloud-system for B&O's software system. This should in time replace the software organization that was based in Tallinn, Estonia and that would then be shut down to be relocated closer to the headquarters within an existing department. This way, the task-driven and jurisdiction-driven arguments for a more agile software development

should overlap through the new positions and divisions, rather than become a contentious debate between two departments.

Changes that addressed the relationship-driven conflict were also implemented, so to remove some complexity from the equation that led to selecting the wrong software developer in the first place. The takeover of the new COO as Head of R&D, and the fact that the former Head got mandated with an audit task for the TV division, had strong consequences on the R&D environment. The former Head of R&D was known for his vocal personality, put in his words "maybe I'm too brutal." His agenda, supported at the time by the whole executive board, of turning around an inefficient and ineffective NPD process through a shockwave was partially accomplished and did indeed succeed in structuring a leaner and faster innovation process. Yet, the ground was now shaken up enough to reconnect the pieces in the right order with a different Head of R&D. He was not the only "victim" of such process, as the costs of going through this process had been great. Besides the financial loss in opportunity sales for the product, the marks internally to the company were also evident as "scars on the back" of the NPD team as Audio's NPD Technology Lead expressed it, or as feeling of an unaccomplished project as Audio's NPD Creative Lead explained:

> *"I park as far away as I can with the goal of saying "I will reward myself with a parking place closer when I've made a difference that wouldn't have happened unless I had been here". And I still haven't made that difference."*

Also, closing Tallinn could indeed bring a positive spin on the software development competences of B&O, but also left people dubious about the lack of a longer-term vision, as the Senior Manager of System Engineering pointed out:

> *We fired some people and (...) did an expensive knowledge transfer to Tallinn. Now, two years later, we are pulling everything back and closing up there. We have*

invested in new buildings and so on up there. In that way, it's a little bit of a fuss. It's a little bit controversial.

DISCUSSION AND CONCLUSION

Theoretical contributions

In our study we address the problem of conflicts emerging throughout the innovation process, further heightened by a context of dynamic environment and pressure for the company to remain relevant in the industry by striving for an improved strategic fit. We found that these conflicts, despite known short-term negative consequences related to damaging emotions and inefficiencies, have the potential, under certain circumstances, to become the trigger for organizational renewal towards fit, either by making explicit processes or identifying parts of the system that need to be altered. We discuss our contribution to theory by addressing the distinct literature of conflict management and organizational renewal, as well as their overlapping arguments. We first show how conflicts caused by a strong misalignment between demands, voiced with task and jurisdiction arguments, can have implications beyond their resolution or short term performance, and in this way become the trigger for renewal if properly managed. Second, we propose two incremental and multilevel mechanisms of renewal from conflicts that rely on organizational learning, in which best practices are reinforced into a system wide solution and malfunctioning elements are regenerated to improve the company's strategic fit. We discuss the implications for the respective literature of conflict management and strategic renewal, and then discuss our result for a joint domain of inquiry.

Implications for conflict management

We align with studies in conflict management literature that advocate an approach to conflict driven by the potential of learning, aiming to minimize its destructive consequences while benefitting from the constructive ones (Rahim 2002, Tjosvold 2008). In our study this potential became apparent by considering consequences that go beyond the immediate conflict resolution, and tracked its influence for months beyond the point at which we considered there to be a settlement between parties, thus providing a more longitudinal perspective as called for by De Dreu (2008). We noted that the benefits were not always directly apparent at the project level where the conflict originated, but occurred rather indirectly once the organization renewed to improve the structure and processes around such project level as in narrative #2. We believe that the context of innovation proved to be crucial for the exploration of such dynamic. First, activities in innovation have a natural occurrence of conflicting events because of its inter-departmental nature. Second, the high pressure individuals are exposed to deliver novel solutions to the market often leads to escalations in the individual reactions. Third, individuals close to innovation are the first to be aware of evolving dynamics in the market and in technology, yet are still embedded in a rigid organizational system, creating a permeating sense of ambiguity. This ambiguity triggers a high degree of variation in interpretation about how such uncertainty should be dealt with, leading to tensions across innovation players. Also, we confirmed the importance of the process conflict, defined by Jehn (1997) as "how task accomplishment should proceed in the work unit, who's responsible for what, and how things should be delegated" (p. 540), albeit as a specific facet focusing on its jurisdictional component. While the original definition generally identifies dynamics related to the *how to* of accomplishing a task

(Behfar et al. 2011), what emerged to be crucial in our case was *who decides*, as this could be contraposed to *who knows best* in terms of task-related knowledge. This relationship, when skewed, became the key event that started the process of renewal. Behfar et al. (2008), even though addressing intragroup dynamics, pointed out how the management of conflict is more critical than identifying the type of conflict, and that assigning work to members with the relevant task expertise rather than by default for affiliation or convenience is a valuable way to think about it. We believe that the context of inter-group dynamics, rather than intra-group, is even more revelatory to why this relationship is as relevant as we found it. Studies involving people with multiple affiliations and professions have hinted at similar tensions questioning the status quo, for example the one created by the introduction of a new technology that altered the authority of institutionalized roles (Barley 1986) or the daily use of shared artefacts by different groups challenging the formal jurisdiction of engineers (Bechky 2003). As a counter-example, the case of Zbaracki and Bergen (2010) shows how the conflicting dynamic threatened the stability of the routine, yet it did not eventually renew it as the major component of conflict was about the content of the decision, rather than how the decision was made.

Implications for organizational renewal process

The change we identified with organizational renewal is for the organization to gradually shift towards becoming a more system-driven (narrative #1) and software-driven (narrative #2) one, both directions justified by the recent industry dynamics as an improved strategic fit. We do not claim B&O is now fully driven by such values and competences, or that these patterns would grant a complete transition to other

companies, but the processes we have identified point to them as first clear steps in such a direction. The changes we observed at the organizational level (e.g. the creation of a NPD System Lead, or the regeneration of the whole software development competence) are steps on the incremental "journey" described by Baden-Fuller and Volberda (1997), and emerging from a situation of permanent instability at the organizational level. At the same time, such changes emerged from episodic events – conflicts – that were triggered by an accumulated amount of stress in the organization struggling with an inertial system of core rigidities (Huff et al. 1992, Leonard-Barton 1992). Considering the categorization of renewal's different perspectives by Albert et al. (2015) (inertial versus adaptive) and Plowman et al. (2007) (continuous versus episodic, converging versus radical), we find no conclusive answer to such a paradox. Indeed, such a paradox between views including periods of necessary stability or the other claiming continuous instability is not only at the theoretical level, but also pragmatic, as Baden-Fuller and Volberda (1997) point out: "stability is necessary for internal cohesion and to prevent self-destruction. Renewal is necessary because most organizations cannot innovate as fast as the market requires" (p. 115). We suggest that the multiple levels represented in our model might indeed create an overlap of different renewal natures where episodic renewal processes at lowers levels (i.e. projects) sustain a continuous one at the organizational level. The organizational level is connected to the project level through a perception of performance that reaches out beyond the project scope to other organizational actors, among which are the top management, who are presented thus with a learning opportunity, as expressed by Crossan and Berdrow (2003). Top management uses the antecedent dynamics as both a signal and a justification for agency at the organizational level, a phenomena that is aligned with the "mindful interventions" to elevate successful experiments into new capabilities by Salvato (2009), the

competence definition process by Floyd and Lane (2000), making a specific routine more widespread in its use (Baden-Fuller and Volberda 1997) and the original autonomous strategic process by Burgelman (1983a, 1991). Similar dynamics have been observed in the routine change literature as well, as with the retention of performative aspects into the ostensive aspects of a routine (Feldman and Pentland 2003), albeit not in terms of a process that spans multiple levels. To explain the general process of renewal from "small changes", we find the work by Plowman et al. (2007) insightful: the authors present an account of how a small activity triggered the unintentional escalation to radical organizational change through the amplification effect of feedback actions. They define positive feedback activities that amplify deviations, while negative feedback ones highlight the need for replacement and act as a force to re-stabilize the system. While producing a different type of change and having been triggered by different activities, we find alignment between these findings and our mechanisms of reinforcing and regenerating, and are confident in the mutual reinforcement.

Implications for understanding conflicts as triggers for renewal

The role of conflict as a trigger for renewal is different from the "successful experiments" by Salvato (2009). This is a highly complementary perspective on the antecedents to strategic renewal, which have so far centred around how to elevate good ideas to the organizational level (Burgelman 1983b, Salvato 2009). The dynamics we have identified have the purpose of not only fixing a problem at the project level, but of preventing it from happening again for upcoming projects. Thus, it is less about adding and extending new capabilities; rather it is about reinforcing what is good already within the company and regenerating what is malfunctioning. We do not claim that the more

traditional sort of corporate entrepreneurship and autonomous strategic processes were not occurring at B&O, in fact we did encounter them in multiple forms. Yet the current identity threat and overall uncertainty about the company's direction perceived by B&O's employees made a renewal through conflicts more relevant by heightening the underlying tensions and transforming conflicts in the innovation domain into strong signals for change. Similarly, Kaplan and Orlikowski (2013) showed how "breakdowns" – caused by conflicting interpretations due to uncertainties related to business, market and environment – can on one hand impede progress, but at the same time trigger the different creative interpretations necessary for change. Also Plowman et al. (2007) indicated how conflicts between interacting activities could lead to the necessary destabilization of the system, and thus encourage a mutual exploration of alternatives and compromises to resolve the disrupted information and resource flows. In our case, the necessary condition for conflict to become a trigger was, besides for the object of the conflict to have implications for future projects, a clear misalignment between the demands voiced with task and jurisdiction arguments by two opposing parties. We found that conflicts that were as acute as others but lacked this tension did not lead to a change at the organizational level. The reason is that through this misalignment, confirmed by the following performance, a sign of a structural problem emerges that does not allow the best problem-solving and decision-making, and can thus be changed through managerial action. Conflicts like the one mentioned by Zbaracki and Bergen (2010), when resolved, led to a major price adjustment, yet "to look at the organization before and after, nothing would seem different" (p. 967). Task-related issues are also easier to resolve within the existing system, and thus within the project-space, by negotiating and reaching a compromise. Jurisdiction-related issues imply a confrontation on the power level that could easily escalate beyond a fact-based negotiation like the idea-clash

between acoustic engineers and Speaker's NPD Business lead was. In the case of Audio, the conflict escalated so much that the jurisdiction issue got close to involving top management and thus reaching out of the project space, but it ultimately did not. Audio's NPD Creative Lead said that by giving in to R&D and not pursuing their claims to the highest hierarchical level, they did not "give [the CEO] that opportunity (for organizational change) because we were chickens". In summary, the combination of a misalignment between task and jurisdiction-based arguments and specific consequences at the project-level are necessary to trigger the mechanism of renewal.

Implications for practice

With our study we do not advocate for a process of change through conflicts. Rather, as they are omnipresent in the organizations, managers should use them as an opportunity to drive and justify organizational renewal. Even though we know of the benefits of constructive conflicts, like increased intragroup performance as the result of moderate task conflict, we showed how even more acute and fairly destructive ones – consider the software development conflict in narrative #2 had strong components of all task, jurisdiction and relationship – can become powerful signals for change. Top managers should provide an environment where conflicts can emerge, but then also monitor them as signals of a rising stress because of an organizational system that is not exploiting the shifts in the industry. Indeed, we have confirmed that the innovation process is a key domain for such dynamic as people that are forced to take changes in the environment as an input for the development of a new product, will also be the ones that more likely will clash with a system that has not yet adapted to such new landscape. For this reason, top managers should maintain a degree of openness in considering that insights emerging

from the innovation process might go beyond the content of new technology-market combination – a knowledge of the task – but also consider the emerging insights on organizational practices in terms of where responsibility and resources are allocated – the placement of jurisdiction – and revise the processes and structure of the innovation capabilities accordingly.

CONCLUSION

Understanding organizational renewal means understanding the practices that produce it (Dougherty 1992b). As "the need for renewal is never ending" (Huff et al. 1992, p.55), being able to achieve and maintain a strategic fit with a changing environment is a matter of survival for the majority of established companies. We showed how inter-group conflicts, common to the practice of innovation, can become the trigger for a renewal process if the misalignment between task and jurisdictional demands is properly managed through a learning process. Because of its multilevel nature, an episodic bottom-up process of renewal became part of, and sustained, the continuous process at the organizational level. We propose two mechanisms of renewal that occur with both a positive and negative perception of project performance, in a way that best practices are reinforced at the organizational level or a malfunctioning system is regenerated.

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RESOLVING IDENTITY AMBIGUITY THROUGH SYMBOLIC REPRESENTATIONS: HOW INNOVATION TEAMS RESPOND TO ORGANIZATIONAL IDENTITY THREATS

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ABSTRACT

Organizations experience internal tensions when market logics shift and make organizational members experience threats to organizational identity, creating significant ambiguity about how to respond and coordinate their efforts. The resulting ambiguous context may be addressed by long-cycle identity work by organizational leaders, but what remains unexplored is how organizational members resolve such ambiguity on a day-to-day basis. We answer such question through an inductive study at the consumer electronics company Bang & Olufsen, investigating how innovative teams used symbolic representations to resolve ambiguity to guide their innovation activities during a time of considerable organizational identity threat. We find three strategies employed by teams; *locating* where, with respect to the company boundaries, innovative teams localize the original opportunity; *temporal anchoring* on the timeline of the company to stabilize an ambiguous situation; *bridging* the relationship between multiple identities and competences. We build a theoretical model of ambiguity resolution through the use of symbolic representations, and we show how in addition to the improved coordination of work, representations trigger commitment to action through an illusion of clarity.

INTRODUCTION

Critical market dynamics and shifts in market logics cause companies to question their role in the industry. A body of research has pointed out how shifts in technology (Tripsas 2009), business models (Gawer and Phillips 2013) or competition (Ravasi and Schultz 2006) can be so severe to threaten an organization's identity, questioning organizational actors' beliefs about the viability of its core and distinctive features. Even particularly

successful firms will as a consequence of such shifts face internal challenges and tensions (Gawer and Phillips 2013). There are many exemplar cases of organizations that have failed as they succumb to forms of cognitive inertia, such as with shifts in the photography market with Polaroid (Tripsas and Gavetti 2000), the struggle to build new competences and resources with Smith Corona (Danneels 2011) or fear-driven miscommunication and misplaced attention in Nokia (Vuori and Huy 2015). From an identity perspective, such an ambiguous context becomes the necessary destabilization phase in advance of pursuing the risky process of identity change (Corley and Gioia 2004, Tripsas 2009). The alternative is to see the company's identity that made the company successful turn into a liability in the face of necessary change (Fiol 2002). Even though such process can lead to failure because of a complex interrelationship between identity, knowledge and practices (Nag et al. 2007), others have shown how recombining identity elements with new logics can become a purposeful strategy, especially through product innovation (Dalpiaz et al. 2016).

Studies have shown organizational leaders coping with such ambiguity through the use of organizational-level identity work to redefine organizational identity into a new desired one, yet few have demonstrated a successful identity change process (e.g. Kjærgaard et al. 2011). For such reason, Ravasi and Phillips (2011) have called to further deepen our understanding of what Albert and Whetten (1985) termed an organizational identity drift. Studies addressing the issue from an organizational level show top-down process often spanning long cycles (Ravasi and Schultz 2006, Tripsas 2009, Gawer and Phillips 2013).

In contrast, we believe that a deeper look at the process of addressing identity drift is to be looked at in shorter timeframes, as dealt with by organizational actors on their day-

to-day activities, for example in the work of product teams. Dalpiaz et al. (2016) show how the recombination of logics into new identities often happens through product innovation, which is a process characterized by an ambiguity of its own (Clark 1985). The ambiguity triggered by identity threats is cumulative to such process, yet has to the best of our knowledge not been explored yet from such a perspective. By adopting a social constructionist perspective and moving from organizational level identity claims to meanings and understanding as advocated by recent work (Corley and Gioia 2004, Ravasi and Schultz 2006), we are better positioned to appreciate the micro-dynamisms at different levels of the company that make up a longer term identity change, including innovation. From such a standpoint, Gioia et al. (1994) underscored the role of symbols: "in the midst of the uncertainty, ambiguity, and political tension […] key metaphors and symbols emerged that simultaneously heralded, represented, and facilitated the change" (p.377). Drawing on Pondy (1983), the authors point out how because of providing a connection between the familiar and the strange, the multiple interpretations of symbols can foster continuity while at the same time being instrumental for change. As a potential avenue to understand multiple levels at which identity drift occurs (cf. the role of rhetoric by Fiol (2002)), further research has been called for the tools used in implementing identity change Tripsas (2009).

The creative and innovation literature proposes the use of representations, both material (e.g. prototypes) and linguistic (e.g. metaphors), as a way to resolve and navigate ambiguity (Seidel and O'Mahony 2014). Many studies have recognized the benefits stemming from the use of representations (Okhuysen and Bechky 2009, Nicolini et al. 2012), however few show how also they can be wrongly managed (Seidel and O'Mahony 2014). We identify two opportunities based on the current state of theory on

representations: First, theory on representations starts by assuming the existence of representations, thus neglecting the mechanisms through which representations are created and address the ambiguity they are meant to resolve. Second, in prior studies the ambiguity representations claim to resolve is the one inherent to the creative innovation process, rather than the one stemming from an identity threat, thus failing to explain how representations can be instrumental in navigating such organizational context. This results in studies that focus mainly on how representations are used within practice, rather than what they symbolically imply beyond that. Yet, this is the type of micro identity work that product teams have to do in an organization undergoing identity threat, and this type of work is what we set out to understand.

We address the following research question: *How do product teams within a firm undergoing organizational identity threats use representations to sustain innovation efforts under ambiguity?* We made use of an inductive case study method, where through qualitative methods we collected data on the representations used throughout the three key innovation projects of a major consumer electronics company undergoing organizational identity threat. Through a grounded methodology, we identified six mechanisms by which representations were used, and we describe three strategies that resolve ambiguity within teams. After first reviewing the literature on organizational ambiguity triggered by identity threats and how representations may be employed, we propose a theoretical model of ambiguity resolution, discuss our findings, and offer implications for both theory and practice.

THEORETICAL BACKGROUND

In our theory section we review the key contributions about how an identity threat and the resulting ambiguity are addressed by organizational members through identity work, and how, based on a different stream of literature, we know product teams deal with innovation-related ambiguity through the use of representations.

The emergence of organizational identity ambiguity

Shifts in market logics can generate an internal questioning of the validity of a current organizational identity. Logics are understood as "socially constructed, historical patterns of cultural symbols and material practices" (Thornton et al. 2012, p.2), so that when there is a change, it generates a partial loss of those rules of actions that usually support individuals in problem-solving during ambiguous and unfamiliar situations (Thornton 2002). Changes in social referents, temporal identity discrepancies, and construed external image discrepancies have been pointed out as triggers of ambiguity (Corley and Gioia 2004, Ravasi and Phillips 2011), expressed as the availability of multiple meanings and interpretations at the disposal of organizational actors (Weick 1995). This ambiguous context contributes to internal tensions because of an increased questioning of the validity of the organizational identity (Gawer and Phillips 2013), defined as those characteristics of an organization that are collectively believed and understood to be central, distinctive and enduring (Albert and Whetten 1985, Gioia et al. 2000).

This brings organizational leaders to engage in strategic moves to keep up with the new market demands, yet by so doing it also increases the misalignment between the official

unaltered identity claims and such exploratory activities (Ravasi and Phillips 2011). Tripsas (2009) shows in this regard how the emergence of an identity-threatening technology is much more challenging than a competence-destroying one. Her model exposes organizational identity as a cognitive filter that undervalues such a new technology and thus sustains a widespread systemic inertia among organizational members. Managers try to break such inertia by pursuing the identity-challenging technology through communication and strategic investments. However, the lack of a clear reframing of the identity embracing such new technology versus the existing one may undermine their efforts, as it ambiguously portrays two conflicting directions. Addressing ambiguity may require different strategies, which we outline next.

Addressing identity ambiguity through organizational level identity work

Recent studies on identity work show "long-cycle" processes composed by at least two phases: first, making sense of the current misalignment between identity claims and initial actions in light of new opportunities; second, giving the company a new sense of identity (Ravasi and Schultz 2006, Ravasi and Phillips 2011). By long-cycle we identify those top-down organizational processes aimed at rewriting the organizational identity, and because they are so comprehensive in their reach throughout the organization, they necessitate a long amount of time to be impactful and pragmatically useful for organizational members. Identity work begins with noticing that the labels people use to describe their organization are not necessarily what they continue to mean (Corley and Gioia 2004). Subsequent strategic investments based on such alternative identities widen the original identity schism, which could come to be expressed structurally. Tripsas (2009) mentions the creation of a separate business unit, as do Gawer and Phillips (2013)

in explaining how the newly-created Intel Architecture Lab should experiment and promote a platform-driven business model rather than their customary supply-driven one. This process of sensemaking sees a company working to re-discover what it believes ought to be central, enduring, and distinctive about the company, aiming nevertheless to maintain a sense of continuity by relying on the company's cultural heritage (Ravasi and Schultz 2006).

Having refined what is it that is still valid in the current company's identity and what should be extended, most models focus on how the firm sets off to give sense of and instil the beliefs and model behaviors based on the new identity throughout the company (Corley and Gioia 2004, Ravasi and Schultz 2006, Ravasi and Phillips 2011). The goal is for the strategic moves that might have triggered the process of identity drift to be further reinforced by having the new practices not only tolerated, but also supported by the new revised identity (Gawer and Phillips 2013). The rhetoric used by organizational leaders to support such transition is vital (Fiol 2002), as the example by Gawer and Phillips (2013) shows in which the executives at Intel signalled a transition to a platform-driven company by aiming for Intel to become the "architect of the new industry". While the role of management teams in shaping responses to organizational identity threat is well-established, practices at the team level have been less explored and can also be ripe for identity-work, which we turn to next.

Representations and their role in resolving innovation ambiguity

Research on representations has extensively covered both the linguistic (e.g. Dahl and Moreau 2002, Bartel and Garud 2009) and material variants (e.g. Carlile 2002, Bechky 2003, Nicolini et al. 2012), especially in an innovation context. Seidel and O'Mahony

(2014) provide good examples of both: a linguistic representation is a written or verbal form of communication with the aim to guide individual or collective action. It often takes the form of a metaphor or a narrative—as for example the metaphor of a "sports car and an SUV in a blender" for a crossover vehicle. Material representations are physical objects, as in prototypes or boundary objects, used by an individual or group to communicate a concept or idea to another group—as for example a wooden mock-up of a smartphone to enable first-hand experience of a novel mobile phone concept. Most of the literature on representations tend to be selective by addressing one or the other, while it has been shown how projects often engage in using a variety of representations (Hargadon and Sutton 1997). Recent studies considered how a portfolio of representations evolve over the course of a project and how different practices can both improve or hamper the coordination of work (Seidel and O'Mahony 2014), or how both linguistic and material practices contribute to the transition from individual to collective sense-making (Stigliani and Ravasi 2012).

The current view on representations primarily promotes their use for the coordination of work achieved through a shared understanding among those involved (Okhuysen and Bechky 2009), but only if proactively and coherently managed throughout the process. The value of representations is especially underscored in their guidance for individuals in situations characterized by ambiguous, changing, or conflicting information, where such representations act as tools to process complex information and direct their attention (Walsh 1995, Ocasio 1997). Ambiguity in this context has been defined by Weick (1995) as "an ongoing stream that supports several different meanings at the same time" when "multiple… explanations are plausible" (p. 91, 134). Ambiguity provides abundant opportunities for creativity and novelty, but individuals face the need to narrow

down such options to achieve coordination of work (Weick 1995, Lingo and O'Mahony 2010), a dynamic typical of the innovation process (Van de Ven 1999, Lingo and O'Mahony 2010, O'Connor and Rice 2013). Ambiguity inherent in creative processes can be addressed through mechanisms and tools to support the final goal of market launch alongside the use of representations. Detailed accounts have been provided for the co-construction of a space for problem-solving emerging in feedback sessions in product design and modern dance (Harrison and Rouse 2015), nexus work by producers in the country music industry by varying the integration of multiple stakeholder (Lingo and O'Mahony 2010), or the contributions of multiple parties in brainstorming sessions in product design (Sutton and Hargadon 1996).

Literature on the symbolic and instrumental value of representation points at their potential for guiding innovation efforts under organizational ambiguity threats. Insights are beginning to converge from different streams of literature to support this thrust, with Nicolini et al. (2012), making the case by integrating perspectives on material representations from literature encompassing boundary objects, epistemic objects, and activity objects. The authors provide a useful hierarchy to show how material representations (1) motivate collaboration, (2) allow participants to work across different types of boundaries, and (3) constitute the fundamental infrastructure of the activity. What they term "secondary objects" reflect mostly the insights from the boundary objects literature, which "facilitate collaboration yet seldom trigger it, fuel it, or provides motivation that sustains it" (p. 625). "Primary objects" on the other hand, based on the work about epistemic objects by Rheinberger (1997) and Cetina (1997), have the "capacity to explain what motivates and fuels the collaboration in the first place" (p.625). This work on material representations can be bridged to what research on symbols has

proposed, in which they become promoters of change. Symbols, understood as objects, acts or events that represent a wider or more abstract concept or meaning (Morgan et al. 1983), have been shown to have a much more instrumental potential than a pure expressive one through their promotion of prospective sense-making (Gioia et al. 1994, Ravasi and Schultz 2006).

In summary, the literature on addressing organizational identity and the use of representations by innovation teams both point to the opportunity to investigate how teams might use representations not merely to coordinate and sustain their work under steady-state circumstances but how this takes place under organizational identity threats. With this focus, we now turn to our empirical setting for understanding the mechanisms by which teams might use representations in this context.

METHODS & DATA

We conducted our study on the Danish company Bang & Olufsen (B&O), a high-end consumer electronics producer, with the aim to investigate the unfolding of innovation activities in situations of industry convergence (Hacklin et al. 2013) and logic shifts (Dalpiaz et al. 2016). We followed past examples of inductive single case study research (Siggelkow 2007), and approached our case drawing upon ethnographic methods that helped us understand the context innovation teams were facing. In this sense, we were able to focus on the day-to-day practices and interactions of actors as advocated by Kaplan (2008) and others, in a tradition that is aligned with the work by Goffman (1974).

We enjoyed access to teams from across the company's project portfolio, and initial conversations with senior management led us to focus on three new product

development projects that were initiated in 2012, close to the start of our study. The projects were chosen based on how the company was "betting its future" on their success and how they were described as the most relevant in highlighting underlying challenges at B&O, which we later determined were grounded in issues of ambiguity and identity. Getting detailed insights on these projects positioned us well in making sense of how the role of representations could be understood in terms of their resolving ambiguity triggered by identity threats.

Research setting

B&O is a company that has been well-regarded for luxurious and design-driven electronic products that stand out to the black-boxes of plastics by competitors (Ravasi and Schultz 2006). Yet, many of the products the company is recognized for were launched years if not decades ago, which has led to some questioning the firm's relevance and identity as a leading firm in today's market. The company was founded in 1926 in Struer, a small city in the North of Denmark where it is still headquartered. B&O has been the subject of multiple studies because of its long-standing history, it's reputation for design-driven innovation, and survival through tough times, making it an insightful setting for studies inquiring on identity and strategic change (Ravasi and Schultz 2006, Ravasi and Phillips 2011), anthropological ethnographic work (Krause-Jensen 2010, 2011, 2013a, b) and corporate biographies (Bang 2005). The studies on identity by Ravasi and Schultz (2006) show how the company went through several identity threats from the 1970s through the 1990s, starting with the increasing competition from Japanese firms. This challenge was followed by a general loss of appeal and image drift in the early 1990s and the enhancement of design content by their

competitors at the end of the same decade. A summary of the first three eras of organizational identity threat are included in Table 1.

In the 2010-2015 era B&O went through another such era of identity crisis, not covered by the Ravasi & Schultz work. The rise of the digital content as the technology being used by all B&O's products – be them audio or video – has led to several industry shifts that B&O has struggled to make fully sense of. For example, the older generation of "Baby Boomer" customers that made B&O successful 20 years ago had masked the arrival of Generation X, so that B&O found its product offering had been reflecting more of an older paradigm than a new one; the new conceptualization of user experiences (UXs) and ways of consuming media had been embraced by few in the company. Our initial interviews found that promoting structural and strategic changes led to clashes with the established culture and a feeling of overall inertia. While studying the company at different levels and in different departments, our informants led us to clearly perceive that such industry shifts went beyond the case of a simple market threat. The challenges reached deeper in what B&O's employees considered the company to "be" and its role in this dynamic market, making this a 4th identity crisis in extending the Ravasi and Schultz (2006)'s timeline, as shown in Table (1).

In our study we focused on three projects, defined by our informants as the most relevant within the company at the time of our study in terms of potential revenue, brand recognition and resource intensity. These three projects are from three product categories: TV (Beovision Avant), Speaker (Beolab 90) and Audio (Beosound Moment). All three were developed concurrently between 2012 and 2015 and were successfully launched on the market, and the timing of development and introduction is shown in Figure (1).

Era of identity threat	*Years*	*Market characteristics*
1st	early 1970s	• Increasing competition from large-scale Japanese competitors • Pressures from dealers to adopt Japanese format
2nd	early 1990s	• General recession and loss of market appeal • Drifting organizational images (industry analysts, retailers, customers)
3rd	late 1990s	• Competitors enhance the design content of their products • Open threat of imitation by competitors like Thomson and Sony
4th	early 2010s	• Rise of digital technology & content, including radical change in UXs • Industry convergence • Consumer generational skip

Table 1 - B&O's identity threats 1970-2015 (adapted from Ravasi & Schulz (2006), p. 442)

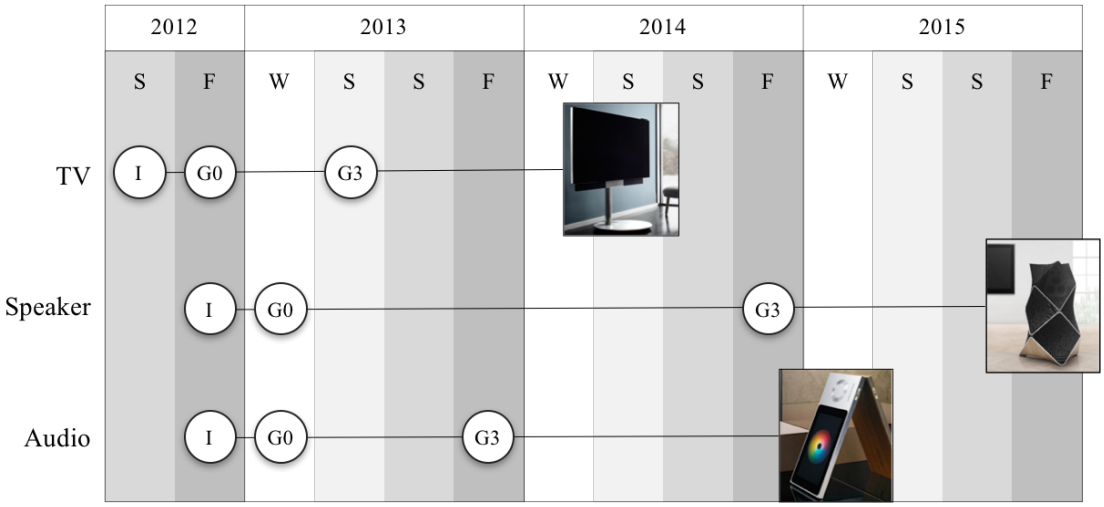


Figure 1 - Project timelines for TV, Speaker and Audio products. W, S, S, F denote seasons within each year. I, G0, G3, denote project checkpoints as described in the text. The picture denotes the launch on the market.

The innovation process followed by B&O was partitioned in three phases, reflecting common process as outlined in the review by Garud et al. (2013). At B&O the first phase is "ideation" (denoted "I" in our figures), where an idea is developed primarily by the Creative department. The project is then brought to Gate 0 (G0), where it becomes a budgeted project if approved by the innovation management board, an entity which includes most of the top managers. Second is the "development" phase, which sees the concept turn into a product design, whose specifications will be closed and readied for production at the time of Gate 3[1] (G3). From here, an "implementation" phase brings the product design into production and eventually to its market launch. The process is led by a product team, composed by three "leads" representing the three core departments in charge of product development: the Creative Lead, responsible for the concept development and serving as intermediary with the external designers; the Technology Lead, responsible for the technology architecture, production and procurement; the Business Lead, responsible for the business case and go-to-market model. Below is a short summary of the three projects studied:

The TV project. This was described as a "TV that moves you" – a reference to the "magical" mechanics designed to have the TV to physically move when switched on and off. It retreated against the wall when off, and it created a staged opening with moving speaker boxes while the screen moves in the desired position. Its major selling points were both picture and sound quality, at a price multiple versus the average competitor much lower with respect to previous models, combined with the emotional staging of physical presence. An image of all of the final products is given in Figure (1).

[1] Gate 1 and 2 are more like check-points and are less relevant in the overview of the innovation process.

The Speaker project. This project led to a new flagship loudspeaker designed to give the customer a great level of control of acoustic behavior and performance. Aimed at making a statement of quality and capabilities, it was to embody the best of the acoustics technologies B&O had been researching for almost a decade, combined with a strong design statement for a large 120 Kg product. Its main intended selling points were its advanced technologies in terms of room compensation, beam width control, and beam direction control. All combined, they offered great flexibility to the user, who could choose from a dedicated sweet spot as if in front of an orchestra stage or select have complete involvement of the whole house in a powerful sound experience.

The Audio project. This project was focused on developing a wireless music system integrating online music services with access to a personal music collection. The main features were a double-sided interface (a wooden touch-panel for one-touch experience and a tablet with access to the full music collection), a pattern-recognition algorithm (recording the listener's music habits to then reproduce them through the one-touch experience), access to both online and stored music collection, and a wireless high-performance uncompressed sound reproduction.

Data collection

Data collection was inspired by the works of Gibbert and Ruigrok (2010) for case study rigor, where full research case studies were developed based on interview, archival, and observation data (Eisenhardt, 1989). The data collection also drew on inspiration from Van Maanen (2011) on how one can draw from and relate the experience of "being in the field". The process of data collection took place over a year from 2014 to 2015. The principal field researcher lived nearby the factory in Struer and stayed at the company

for a total of 40 full days, with visits ranging from 1 to 5 days. During these visits he extended the network of informants from an initial research champion to eventually covering relevant informants for all three projects. Welcomed by the employees as a curious and non-threatening researcher, the field researcher could wander across departments and offices engaging in informal conversations, enjoyed lunch in the canteen with other employees, attended eight meetings lasting between 1 and 4 hours, and eventually set up an interview schedule with project informants. At the same time, the field researcher kept a journal of observations, refined and completed every evening in a template so to have a consistent record of events and emerging insights.

In terms of archival data, we collected several Powerpoint presentations at both the organizational level and department level, minutes and presentations for the innovation management board's Gates decisions, as well as all the stage-gate documents the team presented to the management's board for gate approval. Interviews started open-ended with the aim of being introduced to the company's history, recent dynamics, and future outlook. A second round of interviews dug more deeply into selected dynamics connecting innovation activities with organizational strategy and identity, getting to know more about innovation projects, ongoing tensions and complexities, while at the same time broadening the scope of interviewees to new departments and hierarchical levels. An additional round of data collection involved interviewing all of the product team members for the three selected projects in which we gathered detailed and consistent timelines of events. People were interviewed multiple times to either deepen our understanding of a turning-point event, or to follow-up an unfolding process. As shown in Table (2), we interviewed 35 informants for a total of 56 interviews, spanning organizational levels from operations managers and engineers to top management, as

well as including the range of departments across R&D, Product Management, and the Creative Centre. All of the interviews and meetings were recorded and transcribed, for a total of 1,438 pages.

Data analysis

Our analytical approach was open ended and inductive (Strauss and Corbin 1998), yet driven by an interest to uncover how innovation activities unfolded in an ambiguous environment. For this reason, we did not limit our level of analysis to either individual or organization, rather remained open to include in our analysis who and what had relevance in the innovation process throughout the projects, with a focus on the product team. The first step was to create event timelines for the three projects out of our interviews, daily observations and archival data. This served as the backbone for the creation of three project case studies, which totalled 72 pages of narrative imbued with relevant quotes from our interviews. The case studies gave us first indications that the role of representations throughout the projects could be relevant in understanding the ambiguity that the innovation teams were dealing with, within a context of organizational identity threat. Inductively we coded 29 representations, the ambiguity they addressed, and the consequences to the team. Basing ourselves on the work by Eisenhardt (1989) and Yin (1994), we moved to a case study design of analysis and started contrasting and comparing such representations as a first step in the creation of our theoretical model. A first comparison made first contrasts emerge, in which we found representations addressing both products and processes, as well as being either retrospective or prospective in their nature.

Organizational members interviewed

Managerial level	Organization	Position	Specific role for NPD project	Number of interviews
Top management[2]				
		CEO		1x
		COO		2x
	R&D	Head of R&D		1x
	Product mgmt.	Head of Product mgmt.		2x
	Creative	Head of Creative		1x
			Total	**7**
Middle management				
	R&D	Category Manager Procurement		1x
	R&D	Head of System and Cloud Architecture		1x
	R&D	Head of Research		2x
	R&D	Purchasing manager		1x
	R&D	Senior Project Development Manager	Technology Lead for Audio (late)	1x
	R&D	Senior Manager Design and Technology		1x
	R&D	Senior Manager Screens & Displays		1x
	R&D	Senior Manager R&D #1	Technology Lead for Speaker	2x
	R&D	Senior Manager R&D #2	Technology Lead for TV	1x
	R&D	Senior Manager System Engineering		5x
	Product mgmt.	Directors, Category Audio	Business Lead for Audio	1x
	Product mgmt.	Director, Category Speaker	Business Lead for Speaker	1x
	Product mgmt.	Global Product manager	Technology Lead for Audio (early)	2x
	Product mgmt.	Head of Program Management Office		2x
	Product mgmt.	Senior Manager Custom Installations		1x
	Creative	Concept developer	Creative Lead for TV	1x
	Creative	Director, Global Consumer Marketing		1x
	Creative	Senior Manager, Sound Concept	Creative Lead for Speaker	2x
	Creative	Senior Manager, UX Concept	Creative Lead for Audio	2x
	Creative	Senior Scoping Manager		4x
	Creative	Senior Manager, Brand & Consumer Insights		1x
			Total	**34**
Operative management				
	R&D	Corporate Patent manager		1x
	R&D	Technology Specialist #1		4x
	R&D	Technology Specialist #2		1x
	R&D	Technology Specialist #3		1x
	R&D	Tonmeister		2x
			Total	9
	Product mgmt.	Senior Marketing Project Manager		1x
	Product mgmt.	Product manager	Business Lead for TV	1x
			Total	2
	Creative	PR & Event Consultant		1x
	Creative	UX Specialist		1x
			Total	**13**
			Total of interviews	**55**

Table 2 - Informants report

[2] Top mgmt. is considered as reporting directly to the CEO. Middle management is considered as 2-3 positions from CEO, while Operative management 4+.

While the first variation made sense, the second showed that only a certain type of representations had the potential to guide activities, while the other was only used to make sense of past events and dynamics. We thus refined our set of representations to 22 prospective representations that had been used in that form during the innovation process. These 22 representations are listed in Table 3, and we discuss our coding of these representations in the next section. By placing such representations on the process timeline of ideation-development-implementation, we could understand how much of a different role they played at different times of the project, so that we re-coded the set of representations to explore how they addressed ambiguity and what their purpose was. The first coding iteration made the role of identity and competences emerge as key constructs to explain the mechanisms of ambiguity resolution, so that we started considering research literature in such areas and considered how representations addressed them. We eventually developed an understanding of a total of six mechanisms of ambiguity resolution through representations, which we will present in our findings section, and which formed the base for our theoretical model.

The creation and use of representations to resolve ambiguity

The first phase of data analysis led us to see ambiguity arise when multiple and competing paths of actions are open yet cannot be resolved by accumulating more information as with uncertainty. By analysing the full set of representations as illustrated in Table (3a-c), we developed our first indications on the differences between how different symbolic representations aimed at strategically resolving ambiguity. First and foremost, the ambiguity provided multiple interpretations about two main decisions, namely products – *what* will we do – or to processes – *how* will we do it. As seen in

Table (3), all three projects employed both of these distinctive types of representations, which served as reference points for the team at different points in the development process.

Project	*Representation*	Address which ambiguity	Type of representation	Symbolic representation of identity	Symbolic representation of competences	Effect
TV	*Magical elements*	product	metaphor	Magic is a distinctive feature of our successful identity	Magic is grounded in our existing mechanics competences	(+) Common understanding of success drivers for current project, leap of faith that past successes could be replicated (-) False assurance that former rule of thumbs would work for a project much bigger, and that looking at the past could deliver a breakthrough innovation
	I^2 is the same framework	process	story	A new framework does not change our underlying identity	A new framework does not change our underlying competences	(+) Common understanding of and leap of faith based on what an experienced innovation can achieve (-) False assurance that the former framework could live up to the biggest innovation project so far, so that the adopted principles (i.e. "tougher gates") are not met
	Yet another TV	process	story	Building a beautiful TV is a distinctive feature of our successful identity	Building a beautiful TV is grounded in our existing all-round competences	(+) Common understanding of process templates and leap of faith that replicating yet another beautiful product was within grasp (-) False assurance that this TV could be developed with the same routines and processes, while the size of the project, the sudden changes in technology and the move of production from DK to CZ impacted it greatly.

Table 3a - Symbolic representations in the TV project and their effects

Project	*Representation*	Address which ambiguity	Type of representation	Symbolic representation of identity	Symbolic representation of competences	Effect
SPEAKER	*Remove handcuffs*	process	metaphor	Acoustics is a distinctive feature of our successful identity	Acoustics need to show its potential by giving freedom to operate	(+) Common understanding that so far tech competences have been limited, and something great can emerge if we release them. Leap of faith that tech could be translated into product through a tech-driven process.
	Oversell maturity	process	story	Acoustics' new technology builds on the current identity	Acoustics' new technology enhances competences and is ready for use	(+) Leap of faith that tech could be translated into product through a tech-driven process. (-) False assurance that the technologies were ready to be integrated into a single product.
	Tech prototypes	product	prototype	Acoustics' new technology builds on the current identity	Acoustics' new technology enhances competences and is ready for use	(+) Common understanding that our years of research have produced a technology now at our disposal, leap of faith that existing technology was solid (-) False assurance that technologies that worked well singularly could easily be integrated into one single prototype
	Tech-driven process	process	story	Building Beolab 5 through a tech-driven process was a distinctive feature of our successful identity	Building Beolab 5 through a tech-driven process was a competence we created and succeeded with	(+) Common understanding of prioritizing technology decisions over design ones, leap of faith that what worked 10y before could work, and that people knew how to pull off such process (-) False assurance that it would be a linear process that fit the new innovation framework, and that postponing the development of technology concept and UX would be completely justified
	Hero	product	metaphor	The current identity needs to be further spearheaded by a hero product	Enhancing our competences will make a hero emerge	(+) Leap of faith that the company, if set onto it, would create a new flagship product (-) False assurances that attention would not turn into pressure and expectations, and that the product could be a standalone rather than as part of a wider and integrated B&O portfolio
	Lousy model	product	prototype	Our identity includes design despite core focus on tech	Our technology competences are our focus, but we are ready to use the design ones	(+) Leap of faith that design expertise of the team would ready when needed (-) False assurance that strong technology and minimal design define a new UX

SPEAKER (continuation)	*Cucumber in the exhaust pipes*	product	metaphor	Designers need the message translated to develop with tech-aligned priorities	Design competences need to consequently add to tech and not detract	(+) Common understanding for design to be developed based on technologists guidelines (shape & cover of speaker)
	Cardboard boxes	product	prototype	Designers need the message translated to develop with tech-aligned priorities	Design competences need to consequently add to tech and not detract	(+) Common understanding for design to be developed based on technologists guidelines (volumes), leap of faith that the existence of working prototypes for the technologies meant sizes were set (-) False assurance that the first prototype would be the last
	Guy with no friends	product	metaphor	Different identities needs the message translated to develop with aligned priorities	The competences need to consequently add to each other and not detract	(+) Common understanding of a new UX proposition
	Mommy & daddy say no	process	metaphor	Different identities need a shared and aligned space for contribution	The competences need to concurrently add to each other and not detract	(+) Common understanding of the importance of alignment in a tense environment, leap of faith that previous collaborations would be indication of good collaboration (-) False assurance that impermeability from tensions would let key insights through

Table 4b - Symbolic representations in the Speaker project and their effects

Project	*Representation*	Address which ambiguity	Type of representation	Symbolic representation of identity	Symbolic representation of competences	Effect
AUDIO	*Concinnity*	product	story	Different identities need to converge in a unique and synergistic entity	Different competences need to converge in a unique and synergistic entity	(+) Common understanding that meaning-driven innovation comes from integrating technology and design, leap of faith that bridging *everything* would tackle the high complexity of the audio landscape (-) False assurance that the company had the competences and resources to pull it off
	Social Jukebox	product	story	Our current identity needs to reach out to new UX and customers	Our current competences might not be enough to tackle new innovation opportunities	(+) Common understanding of a new UX to be pursued, leap of faith that the exploratory would successfully push beyond the boundaries of the company (-) False assurance that the UX could be dismantled in competences available in the company (or that they could be carried through)
	Pirates	process	metaphor	We sidestep the current identity to develop something new and not contemplated	We sidestep the current competences to develop something new and not contemplated	(+) Common understanding about how going beyond the company is necessary (-) False assurance about easily being able to re-insert the project the normal innovation process without alienating the organization
	Festmaker	product	story	Different identities need to converge in a unique and synergistic entity (as we have done in the past)	Different competences need to converge in a unique and synergistic entity (as we have done in the past)	(+) Common understanding and leap of faith that technology and design can be integrated into a successful meaning-driven innovation (-) False assurance that the integration of design and technology product-wise could be mirrored process-wise despite structural tensions
	Jazz jam-session	process	metaphor	Different identities need a shared and aligned space for contribution	The competences need to concurrently add to each other and not detract	(+) Common understanding of the importance of alignment in a tense environment, leap of faith that a flowing environment could bring about the necessary synergy among different contributions
	Tech godfather	process	metaphor	Technology needs to enter a shared and aligned space for contribution	Technology need to concurrently add to the existing design competences	(+) Common understanding of the important of having technology integrated early on, leap of faith that this integration could be sustained also when opening up the whole company from a skunk work operation

AUDIO (continuation)	*Secret-secret-1*	process	story	The identity proposed through Audio does not represent the core of the company	Project is developed with many competences outsourced and thus not belonging to us	(+) Common understanding of unity against a foreign concept
	Sonos-killer	product	story	Different identities needs the message translated to develop with aligned priorities	The competences need to consequently add to each other and not detract	(+) Common understanding of a common threat, and thus necessity to align the commitment despite internal tensions
	User guide	product	boundary object	Different identities needs the message translated to develop with aligned priorities	The competences need to consequently add to each other and not detract	(+) Common understanding of the final UX and how everybody should contribute to it

Table 3c - Symbolic representations in the Audio project and their effects

By further contextualizing the resolution of ambiguity through the use of representations we developed our first indications regarding the connection with organizational identity and competences, which would become the basis for our theoretical model. Organizational identity can be generalized into what the people believe the organization *is*, while organizational competences into what the people believe the organization *can do*. Such relationship with organizational identity and competences got highlighted in phases of the innovation process when they were put into question, primarily due to a perceived misalignment between market dynamics and how suited the company was to make sense and take advantage of them.

In the context of B&O, the convergence of the software industry with that of hardware – historically the core competence of B&O – put into question the value of B&O's identity and competences in such a new scenario, and consequently its role as a player in the consumer electronics industry. Additionally, the change of how music and videos are consumed has deeply impacted the relationship between design and technology, both merging into new user-interface, creating an ambiguity related to the processes and products to make sense and make the best of such new innovation opportunities. Symbolic representations thus supported innovation teams as they navigated such ambiguity, by taking a stance with regard to identity and competence and thus creating a frame for the development of the products and the process they were to follow. In Table (3), we summarize how each representation addressed both identity and competencies, and whether the net effect of this representation appeared to be positive, negative, or mixed.

Dynamic use of representations over the course of a project

While it is possible to compare representations with each other to uncover the underlying strategies of addressing ambiguity, it should not be forgotten that they are created and used dynamically over the course of the innovation process, from its ideation phase, through development, and eventually implemented for market launch. We provide background on the contextualized and dynamic use of representation in this section for each of the three projects, as they created the analytical basis of our findings of the representation strategies and mechanisms, of which we refer to in the upcoming findings section.

In the following sections, we provide illustrations of the use of representations over the innovation process. As given in our key in Figure 6, the three strategies for resolving ambiguity are labelled as (L) locating, (T) temporal anchoring, and (B) bridging. Each of these broader strategies have two associated types, as developed in our coding and as will be described further in the findings section.

Dynamic use of representations in the TV project

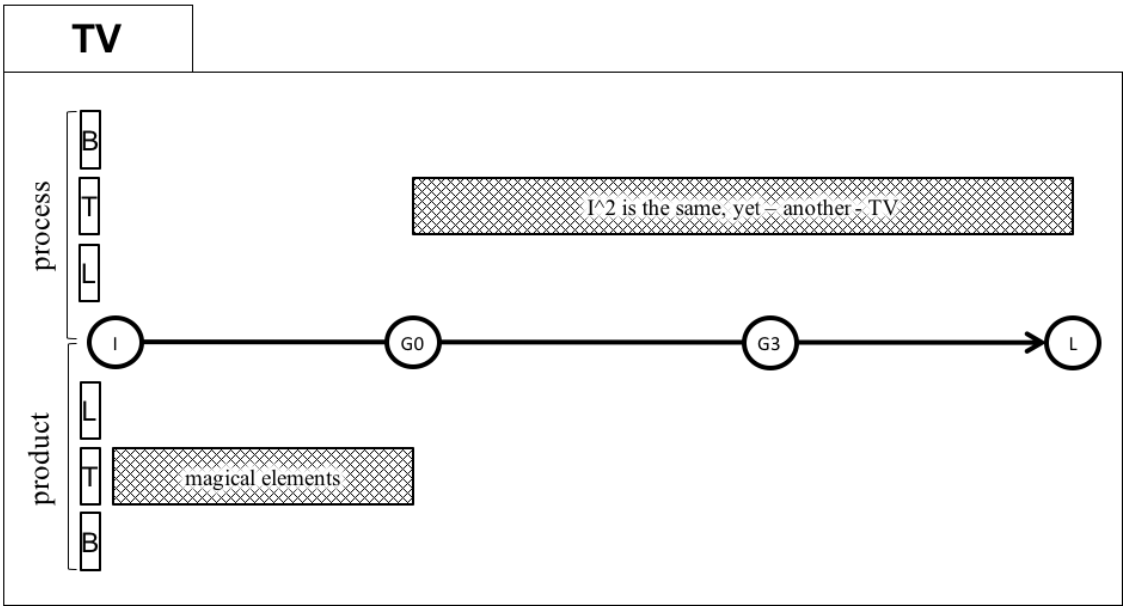


Figure 2 - Dynamic use of representations in the TV project. Key to figure is given in Figure (6)

Overall, the variety in kind and use of representations in the TV project was quite limited when compared with the other two projects, and the representations are depicted in Figure (2). One of the reasons for the relatively low number of representations was explained retrospectively by the Technology Lead as in having "yet again" produced a beautiful TV, not necessarily stretching the boundaries of either identity or competences, but instead building incrementally on what the company knows it can do. Therefore, the representations used throughout the process mainly reflect a link with what the innovation team believed should be considered as general guideline: develop a TV with some "magical elements" but still develop it with the standard process. This idea of TV did not raise many questions and ambiguity about competences and identity if we compare it to the other projects, and so it necessitated less representations that could address it.

Dynamic use of representations in the Speaker project

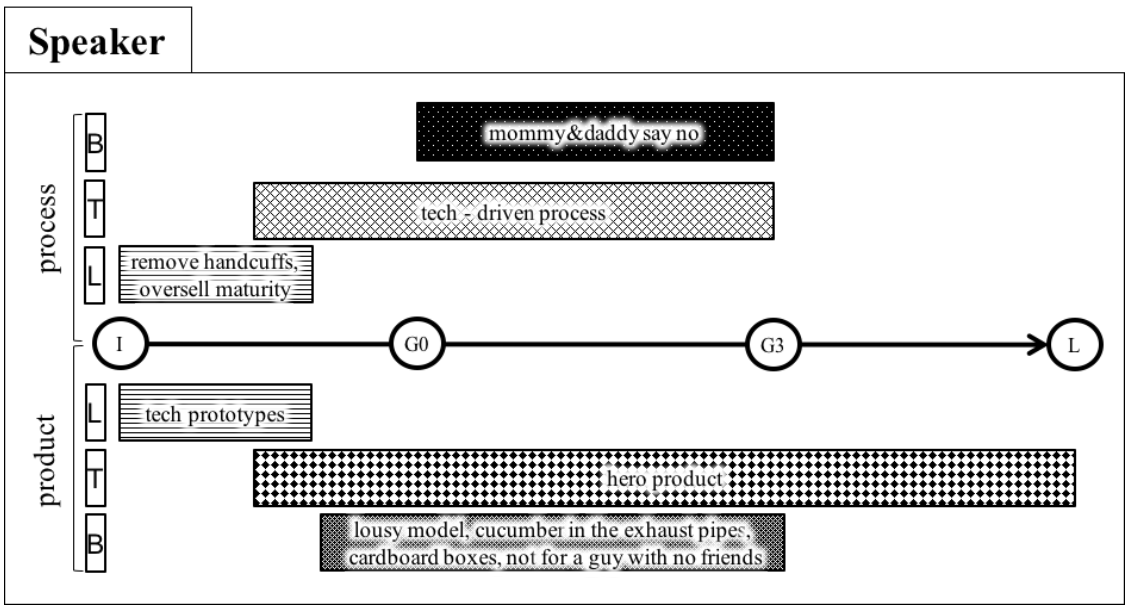


Figure 3 - Dynamic use of representations in the Speaker project

In contrast with the TV project, the Speaker project made extensive use of representations driven by the need to address considerable ambiguity, especially in its first phases (see Figure 3). Such ambiguity emerged from an "upside-down" approach to product development, with its inception grounded on the work of the highly-technical Acoustics department, which provided the core opportunity for an innovative project through their development of advanced and novel speaker technology. Such an advanced Acoustics department is itself one of the building blocks of the company's identity, and it is a department that the company considers of world-class quality. Yet, its contribution to the innovation process was often postponed and underplayed until after the design and concept of products had already been defined. As a result, their work was often constrained by features and forms already defined by other groups.

Far from being idle over recent years, the Acoustics department had been researching and advancing technology in collaboration with several academic institutions, to a point

when their confidence in having developed something worth of becoming a product was difficult to contain. This confidence and desire to break free emerged in two instances: the first is the bootlegging work of the "Tonmeister," a senior acoustics engineer, who as a side project to his regular work asked permission to use the company facilities to develop a "good pair of speakers for his home". Such project gave the Tonmeister freedom to develop something without any constraint, and the final result, when showcased upon request behind curtains to several senior management, established a new benchmark of sound quality within the company. Even more critical was the work on new technologies that were unique from a competitive landscape point of view, and thus widespread the idea that something "was boiling" and that there was something worth looking at from a business perspective. This confirmed the source of the innovation opportunity within the company's boundaries, ready to be exploited and symbolized by representations like "removing the handcuffs".

"Removing the handcuffs" was one process representation highlighted. Because of the non-standardized process multiple paths of action emerged and so did the need to reference to ideal models as a way to provide guidance and stabilization to launch an "hero" product, including a continuous reference to the "technology-driven process" behind Beolab 5, the iconic speaker that defined the company more than 10 years before. While these ideal models allowed for stabilization, the work still necessitated to be coordinated across the different cultural and functional domains. Such synchronization happened in two ways: the first within the innovation team, and the second across groups. In summary, there were many process and product representations used, and in our results section we will describe more fully how they worked to address ambiguity and develop common understanding or the illusion of clarity within the innovation team.

Dynamic use of representations in the Audio project

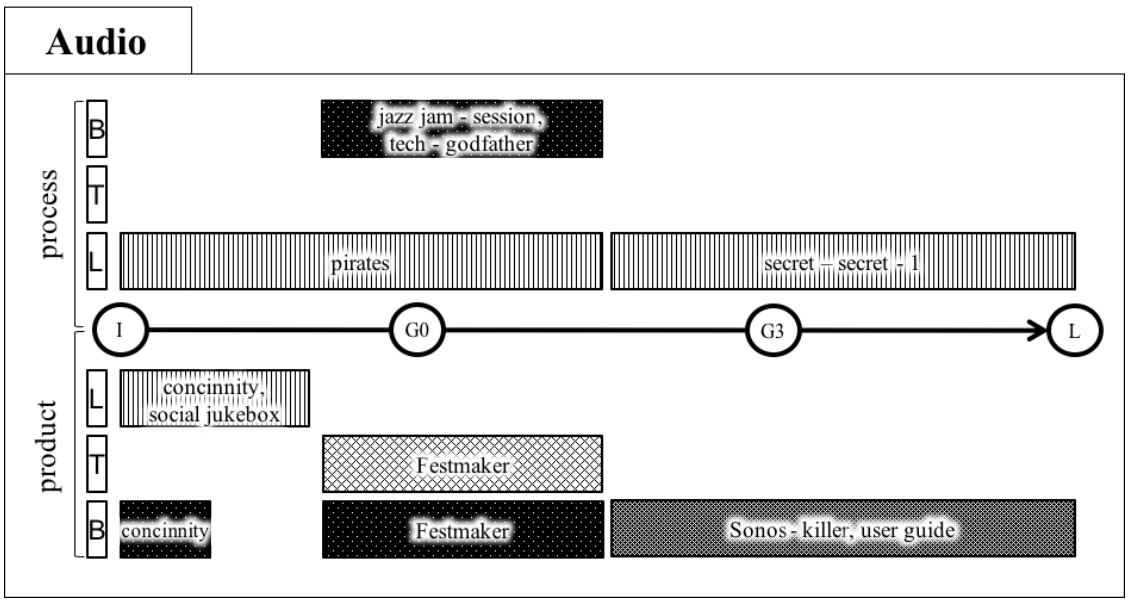


Figure 4 - Dynamic use of representations in the Audio project

While the amount of representations created throughout the course of the project of Audio are comparable to that of Speaker, their nature differs considerably and so their use throughout the process (see Figure 4). The considerable ambiguity emerged also in this case from the inception of the project, as the localization of the innovation opportunity placed it outside of the company's boundaries created a degree of ambiguity higher than in any of the other projects.

The initiation of Audio needs to take into consideration its soon abandoned predecessor, a product called Concinnity. The Concinnity product had the goal of bridging *everything*: old and new technology, old and new customers, old and new design impressions. Bang & Olufsen had been so far experiencing an ambiguity resulting from the continuous questioning of its identity and competences because of converging movements between the software and hardware industry, and an overall shift in the way music is consumed. The answer was to integrate what was the old identity of B&O with the new one, and

embody such transition into "Concinnity" – a product name chosen because of a fitting definition: "The skilful and harmonious arrangement or fitting together of the different parts of something.[3]". Unfortunately, the task of bridging so many elements led to the development of a product too heavy in features – and thus costs and resources – that the company could not follow through. Moreover, it was incurring in the risk of trying to please everybody without really focusing on any concrete customer segment.

In the aftermath of an intense executive retreat in Havreholm (DK), the CEO announced the Concinnity project dead, from whose ashes Audio should rise as the swift and sleek product that the company needed to tap into a new generation of customers and product. Even more importantly at that time, it was key to support the sales of speakers - the products with the highest margins - by adding an audio system as a bundle. Following up on this new plan to resolve the considerable ambiguity about the role of B&O and the new movements in the industry, the CEO called in Concinnity's Creative Lead and Business Lead. The solution would not organically grow from within the company boundaries like in Speaker, but was rather to be searched for outside of them. Contrasting the two approaches to identity, Audio's Creative Lead remarked:

> *[Speaker] was made to satisfy an ego. It was an ego of individuals; it was an ego of our own understanding of who we are. (...) [Speaker] is an ego-driven product and [Audio] is not. [Audio] is a humble product trying to fit in and belong and give meaning in the homes of people that can afford it, right, while [Speaker] is driven by ego and attracts ego (...). That's the major difference.*

The first representations thus tend to express this dissociation with the "hero" Speaker product, rather went a diametrically opposed direction with a "pirates" representation, eager to promote an alternative identity for B&O. These efforts required lots of

[3] The Oxford Dictionary

justification and legitimization internally, so that the following wave of representations aimed at stabilizing and grounding the exploratory project, hopefully integrating under his vision multiple perspectives from the different corners of the company as well as outside of it. As seen in Figure 4, a host of other representations, such as "social jukebox" and "Sonos-killer" would be introduced later in the process, as we will detail in the findings section.

In the preceding sections we have described how we coded 22 representations from across all three projects, and these representations were introduced as innovation teams addressed ambiguity in the product they were developing or in the process to follow. In the figures we illustrated how representations were introduced and used at different points in the innovation process. In the next sections we present our main findings, which were the strategies and mechanisms by which representations were used to address ambiguity and the effects of these strategies.

FINDINGS

A model of ambiguity resolution through representations in innovation

We present in Figure (5) the full model of ambiguity resolution through the use of symbolic representations. This model will be justified by the findings that we will describe in this section. The core addition with respect to standard models of the use of representations is the inclusion of ambiguity itself into the model, and the subsequent strategies to resolve it. Not of less relevance is the relationship with organizational identity and competences, explained in more detail below. Furthermore, we will develop our addition to the later phases in which we identified an additional goal besides the coordination of work through common understanding: the commitment to action through the illusion of clarity. Finally, having observed the use of representations throughout an innovation process, we believe that such model includes an iterative loop, as ambiguity continues to take up different forms, and necessitates thus to be resolved through different strategies and mechanisms.

To justify and develop our model, we first present an in-depth account of the 3 strategies of ambiguity resolution, followed by considerations on the two potential effects.

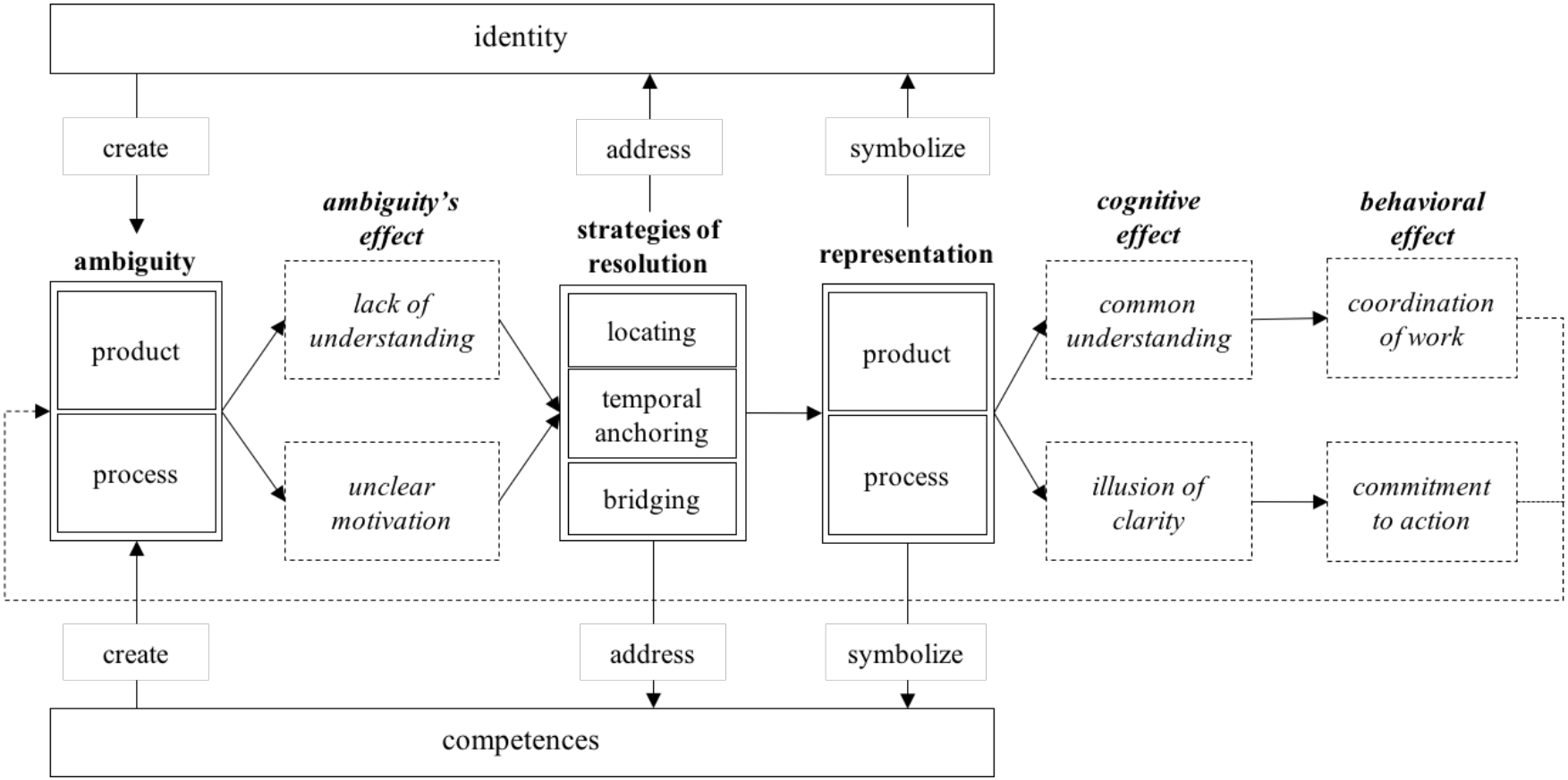


Figure 5 - Theoretical model for ambiguity resolution through the use of symbolic representations

Strategies of ambiguity resolution in three innovation projects

We used the three innovation projects as nested cases shaped by the boundaries of the current organizational identity, as well as by the limitations of the current organizational competences. We highlight this relationship in depth through the theoretical model, connecting it to the creation and use of representations. We find how, by symbolically embodying such relationship, the use and goal of representations varied throughout the innovation process. Organizational members involved in the innovative process relied on six types of mechanisms to resolve an existing ambiguity, which are clustered into three main strategies of resolution, as presented in Table (4a-c), occurring at different stages of the innovation process.

The first strategy for ambiguity resolution, *locating*, constructs a path of action based on where the innovation opportunity has been identified with respect to the company boundaries. The second, *temporal anchoring*, stabilizes by referencing to a model of ideal operation on the company's timeline. Third is *bridging*, which connects cultural sub-domains to ensure the contribution of multiple players. These three strategies form the frame within which the representation is created, addressing either a process or product ambiguity. For each, and as outlined in Table (4a-c), we identified two mechanisms, which are the stance that the innovation players take with respect to identity and competences. This frame of action is symbolized through a representation, either for product or process, as it was presented in Table (3). Representations provide an easy accessible connection to the space – in terms of organizational identity and competences – within which the path of actions should unfold.

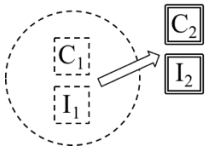
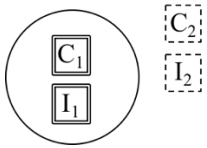
Strategies	Mechanism	Purpose	Visual	Invoked to address which ambiguity?	Relationship to identity	Relationship to competences	Exemplary quote	Examples
LOCATING	**Distancing**	Forming a path of action by diverging from the current identity through the exploration of new competences		When ambiguity is triggered by dissatisfaction with the current identity constraining outdated competences, which result in being inadequate to take advantage of innovation opportunities	The current identity is inadequate to take advantage of the innovation opportunities identified outside of the company's boundaries - a new one needs to be explored	Current competences are insufficient in providing solutions to tap into opportunities outside the company's boundaries - new ones need to be developed (or outsourced)	The CEO said "I need you to be pirates. I need you to be pirates in our own organization, so that we just get everything done. We rip the floor boards up to get this thing done. (...) It doesn't matter how much pushback you're going to get, it doesn't matter what the organization says. It's just got to get done." (A-CL)	*Pirates, hemmelig-hemmelig-1, social jukebox, Concinnity*
	Enhancing	Forming a path of action by reinforcing the current identity through the boost of current competences		When ambiguity is triggered by confidence in the current identity supporting yet untapped competences, which have the potential to create innovation opportunities	The current identity is adequate to take advantage of the untapped innovation potential within the company's boundaries	Current competences can be boosted into more advanced ones by releasing the untapped potential within the company's boundaries	We brought in people to demo, we demo them to Kalle (former CEO), Lou (Head of R&D) has heard them. Tue (CEO) has heard them, lots of people were brought in and said, "This is what we are capable of if you take off the handcuffs." (Tonmeister)	*Removing handcuffs, overselling maturity, tech prototypes*

Table 5a - Locating strategies of ambiguity resolution and associated mechanisms.

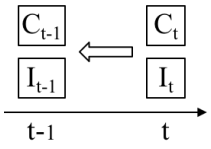
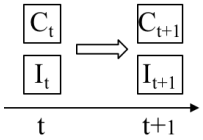
Strategies	Mechanism	Purpose	Visual	Invoked to address which ambiguity?	Relationship to identity	Relationship to competences	Exemplary quote	Examples
TEMPORAL ANCHORING	**Anchoring in the past**	Stabilizing by reaching back to past proven successes to create a degree of stability		When ambiguity is still high because of the multiple paths introduced through the exploration and boost of competences and identity	The identity of reference is what B&O *has been* or *was*, providing justification for the current practices	The competences required are what B&O *has done* or *did*, providing an archetype for the current practices	We took another project called the BeoGram 4000, it's super-famous. (…) We'll name this product the BeoGram Festmaker. We're going to make the next one: it's going to really have the values just like that one, the values of the people at the time and the core segment. (A-CL)	*Festmaker, tech-driven process, magical elements*
	Anchoring in the future	Stabilizing by reaching forward to future desired successes to create a degree of stability		When ambiguity is still high because of the multiple paths given by the current inadequacy of identity and competences	The identity of reference is what B&O *could be*, providing an archetype for the current practices	The competences required are what B&O *could do*, providing justification for the current practices	I think it's also a statement to the world that we still believe in ourselves. There's been so much talk about financial crises and where do we fit in the world and there's no place for Bang & Olufsen and things like that. I think this has been our guiding star, bring all our knowledge from R&D and engineering and the aluminium factory. Everything has to be pushed to a limit here showing what we are capable of. (S-CL)	*Hero product*

Table 4b – Temporal anchoring strategies of ambiguity resolution and associated mechanisms.

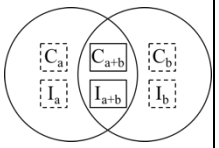
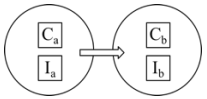
Strategies	Mechanism	Purpose	Visual	Invoked to address which ambiguity?	Relationship to identity	Relationship to competences	Exemplary quote	Examples
BRIDGING	**Integrating**	Bridging cultural domains by balancing their synergistic and complementary contributions		When ambiguity emerges because of the structural division between cultural domains threatening concurrent contributions	The parties recognize to be part of a shared identity at the convergence of their respective cultural domains (D & T)	The integration of D & T is a key shared competence	It's weird, the magic that happened. We hit kind of a group flow feeling, you know. We were... Even with these guys that were hard to work with and you get this feeling, yes, at the end of the day you've achieved so much. (A-CL)	*jazz jam-session, tech godfather, festmaker, mommy&daddy say no*
	Translating	Bridging cultural domains by communicating one's message in the recipient's language		When ambiguity emerges because of the structural division between cultural domains threatening consecutive contributions	The parties recognize to be part of unique identities distinct from other cultural domains (D vs T)	The unique competences of D & T are key in their own specific contributions	The physically printed user guide is used as this communication tool inside the organization to solidify what the concept is and make the communication happen. (...) The user guide had become an internal communication tool, document, stronger than the IT document or brief document. It was the document that told everybody what it was. (A-CL)	*Sonos-killer, user guide, lousy model, cardboard boxes, cucumber in exhaust pipes, not for a guy w/ no friends*

Table 4c - Bridging strategies of ambiguity resolution and associated mechanisms.

We introduce the three strategies, and use the data from our cases to illustrate their contextualized use within the frame of innovation projects, sequentially in the next sections. We also refer back to the previous Figures (2-4) through the lens of Figure 6 as the key to read the unfolding of representation mechanisms throughout the innovation processes.

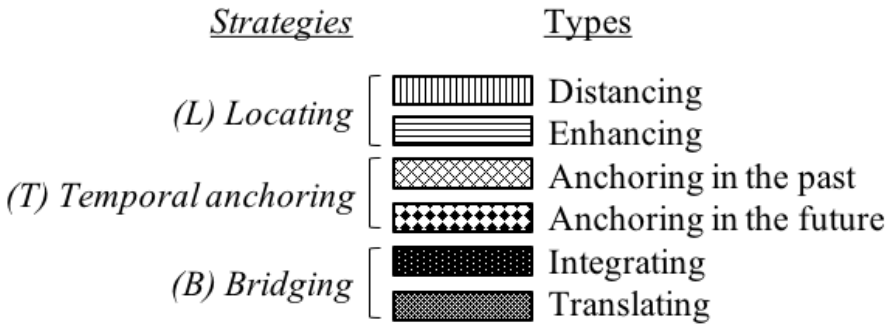


Figure 6 - Key to read representation mechanisms in Figure 2-4

Resolving ambiguity through a locating strategy

The "locating" strategy addresses where, with respect to the company boundaries, innovative teams localize the original opportunity on which to base an innovative project. At a given time, the organizational identity is deemed as either apt or inapt to make sense and take advantage of novel innovation opportunities, with organizational competences either supporting the realization of such opportunities or their inadequacy. We identified two types mechanisms through which innovative players take a stance with regard to such locating strategy, *distancing* and *enhancing*. Both of these mechanisms are described in Table 4a, and we describe each in turn next.

In the *distancing* mechanism, both the identity and competences are deemed unfit to take advantage of innovation opportunities arising outside of the company boundaries. This consideration triggers an ambiguity in which multiple alternative paths of action could be undertaken, thus leaving the development of an alternative identity and competences fairly open-ended. Representations will thus frame a path of action that symbolically diverges from the current identity and inspires its exploration through new competences.

Audio's process was a clear example of such a strategy from its very inception, both from a product and a process perspective. Once the CEO returned from the executive retreat, he called the end of Concinnity and mandated the start of a new project. He called the former Concinnity's Creative and Business Leads, and explained them what and how they should proceed in the creation of Audio. The product should embrace new types of user interface (UX) around a modern and wireless version of a "social jukebox", an audio-system that could serve as hub for the new music collections of people. In the words of Audio's Business Lead:

> *What we've got was basically the concept description, described to us that it should have this jukebox functionality, and it should be streaming only, and it should be without all the support for legacy products or interfaces, truly wireless.*

The "social jukebox" was a product representation that helped the team locate the product opportunity as distant from past products. A process representation also appeared early in the project. Their product needed to be on the market quickly and cheaply, and to achieve such feat, they should be careful in their use of the standard innovation process – known for increasing unnecessary complexities and costs. How was then innovation team to go about creating such an innovative product, if not with the usual innovation process? They were given freedom of operation in connecting to new partners, as long as it would grant the planned market launch. Audio's Creative

Lead remembers how they were given a leeway to be "pirates" in their own company, and engage in a project closer to being a skunk work than a regular one:

> *[CEO] said, "I need you to be pirates in our own organization, so that we just get everything done. We rip the floorboards up to get this thing done." (...) [He] was afraid that involving Struer would add time and cost. You can find a lot of examples for which it has taken way too long and had been really, really complex, and without the need to be.*

The use of these representations—such as "social jukebox" and "pirates"—in these very early stages symbolizes a clear *distancing* from the current identity and set of competences, which had so far failed to tap into the new dynamics that were becoming the standard in the music and electronics industry. Audio presents another example of such, but this time directed at the very new identity that the "pirates" were trying to promote. When the project had to be reintroduced into the standardized NPD process, it raised several red flags and a defensive mechanism from the established R&D's organization. The alienated R&D re-dubbed Audio's code-name "HH1" (as in Havreholm where it was conceived) into "hemmelig-hemmelig-1" (which stands for "secret-secret-1" in English). Differently from the *distancing* from the early phases, this representation does not symbolize a questioning of the organization's identity and competences, rather it does so with regard with the alternative embraced through the Audio's exploration efforts. The following is the account of Technology Specialist, who remained personally connected to the part of the organization that had been left unaware of the occurring development while unofficially supporting the technology integration of Audio:

> *Hemmelig-hemmelig-1, that's the same of secret-secret-1. The intent was that the B&O Struer or any B&O part of the company shouldn't build it. (...) It was so naïve and it was so secret that even the door to the meeting rooms in Lyngby were equipped with lockers. (...) It caused panic because [it made people believe that]*

for the next B&O product, the engineers weren't supposed to develop that. (...) In my honest opinion, the reason was that with the new management there has been little trust in the employees at B&O. They look at what were the expenses in terms of R&D, and what we could actually source from the rest of the world. I think there is certain work that it's too expensive, it's too complicated, it takes too long when B&O engineers have to develop the product, so we wanted to use someone external to do it, a partner. That was sort of sensible information that was flooding out into the organization. I think [top management & innovation team] were afraid that might cause some panic. That's why they kept it secret more or less, and that's the joke about HH1, secret-secret-one.

In the *enhancing* mechanism however, the innovation opportunities emerge from within the company boundaries and identity, especially in terms of yet untapped competences. Ambiguity arises as multiple paths emerge that answer to why so far such competences were not used to their extent, and if safely remaining within the company boundaries is justifiable in face of industry dynamics questioning the role of the company therein. If ambiguity is resolved, representations in this mechanism will frame a path of action that symbolically enhances the current identity and inspires a leap forward in the development of internal competences. For this mechanism, the Speaker project is more representative. The creation of the first prototypes served as a physical representation of what the company could do if the "handcuffs (from the regular process) were removed", as the Tonmeister explained when recalling the discussions with his former boss:

We made a deal. The deal was that he would let me built a pair of speakers for my house. I had to pay for the parts but I could work on it at work. I built a pair of speakers where basically the goal was… if cost was no object and design didn't handcuff us, what could we make a speaker sound like? He called it a technology project, a technology investigation or technology-framing project. I called it building a pair of speakers for my house. (...) I built them and for the first two years they just lived in the listening room. We just brought in people to demo, we demo them to Kalle - that's the former CEO – [Head of R&D] has heard them. [Current CEO] has heard them, lots of people were brought in and we said, "This is what we are capable of if you take off the handcuffs."

Similarly, Speaker's Business Lead recalled how the Acoustics department was on their toes to push for a project with technology at its core, and led to stories that bordered the "overselling" of the maturity (as it would turn out later on):

> *I would say the mood in acoustics department and research department was that "should we get started"? (...) I think that was also very important in the sense of proceeding towards IMT stating: "yes, insecurity is not that big because we have tested some of these and we know what would work".*

In this *enhancing* mechanism, the confidence in the current identity – embodied in the high-end production of acoustics – was very strong, and not put into question. Yet, so far, the group believed the company had not built on that as it could have, and was now presented with the opportunity to do so by symbolically "removing such handcuffs" (process-wise) and build on the innovative "tech prototypes" (product-wise), boosting the internal competences.

Resolving ambiguity through a temporal anchoring strategy

The "temporal anchoring" strategy addresses where on the timeline of the company innovative teams are anchoring a reference point as a form of stabilization to an ambiguous situation. At said time, ambiguity emerged because of the company's identity and competences were being questioned, so that a reference to an ideal model is drawn to ground current innovative activities. We could identify two of such mechanisms of anchoring on a timeline, one in the past and one in the future. Examples of anchoring in the past and in the future are both given in Table 4b, and each will be described in turn.

When *anchoring in the past*, ambiguity emerging from exploring new competences and identities was offset by linking back to an idealized model of what the company successfully *was* or *did*. The case of TV, the project that more reflected what the

company already was and could do, mainly employed such strategy, as for example in terms of "magical elements". Such "magic" had been for long praised as a differentiating factor from the competition, and studies by product-placement companies showed how the majority – if not all – of B&O products that appeared in the background of movies had movable mechanics to create some sort of "magic" experience. As TV's Tech Lead explains:

> *I don't know if you will call it strategic, but one of the things we [wanted] to have in our products again was some magic. When we have this boulder product and you define a new TV series, you also have the opportunity and chance to do something a little bit more than the traditional series. The ongoing thought was that it was the "TV [that] moves", or the "concept that moves us" (the customers) so to say. The magic stuff and movable mechanics became a red line through this product, where we would like again to step up and show the world what we could do with movable mechanics.*

Similarly, from a process perspective, the retention of older models of operation emerged when the TV team was asked to employ a new framework for the innovation process as one of the pilot projects. However, as TV's Tech Lead explains, "I^2 (the name of the framework) does not change anything":

> *We say to each other in the product management team many times they can call it I^2 or whatever, we know what to do more or less. We know what to do. It's about utilizing the right people, taking the right decisions, that kind of stuff.*

Such story was then told to the Innovation Management Board, making the point that such framework would simply get in the way of experienced project managers, and that the biggest project so far in the history of B&O should not become the guinea pig of a new framework. A compromise was found in which selected principles from the I^2 framework would be employed, as with "tougher gates" to ensure a consistency of the innovation project.

In the case of Audio however, the anchoring in the past emerged more as a form of counter-balancing of a very explorative process, rather than because of a general stability from an incremental innovation. Once the idea of Audio was generated and the first interactions among team members occurred, the ambiguity that was located outside of the company's boundaries had also to be temporally anchored in search for some sort of stability. Being already outward-looking, the innovation opportunity was anchored with one of the most recognized products the company produced in the 70s, the BeoGram 4000 – a record player that has been granted a place in the permanent design collection of MoMA in New York. Such product achieved the much-coveted meaning-driven innovation by combining an innovative use of technology (an electronic tangential arm) with stunning design, and thus by removing the vibrations between the headpin and the record, it redefined the UX of dancing around a playing vinyl. Audio aimed at the same meaning-driven innovation and to redefine how music was to be consumed socially, and was thus named internally "Festmaker", a direct reference to the BeoGram 4000. In the words of Audio's Creative Lead:

> *We called the project the Festmaker, because it makes parties, right. We took another project called the BeoGram 4000, it's super-famous. (...) The name of this product will be the "BeoGram Festmaker". We're going to making the next one: it's going to really have the values, just like that one, the values of the people at the time and of the core segment. They understood that it was about dancing and partying and had this special suspension system.*

Similarly, the case of Speaker also made use of such stabilization by identifying older models of product ideals and process practices. BeoLab 5 was taken as a reference as the latest model that about 10 years before fulfilled a similar role in defining the technology standard of the company. Such speaker emerged from a process that prioritized technology-driven values and decisions. A*nchoring in the past* and using such "tech-driven process" as a symbolic model of success provided Speaker's innovation

team with guidelines and best practices to employ in the current project. Usually, in the large majority of the innovation projects, priority is given to design-driven decisions rather than technology-driven ones, as explained by Tonmeister:

> *There is a direct conflict between how the designer wants the speaker to look, and the desired sound quality. In most of our products the sound quality will lose that fight.*

By employing a "technology-driven" process, such model of operation was turned around to grant freedom to operate with different priorities, as explained by Speaker's Tech Lead:

> *It has been a long time since we have actually made a radical innovation. The last five speakers we made had the same PCBs, with different tuning, different configurations, two tweet or one tweet and two basses, one tweet and one bass, a mid-range and so on. But basically, the same amplifiers, power supply and so on. (...) On this project, I was given freedom to say "Okay, what kind of amplifiers? What kind of speaker volumes? What kind of power supply do I need for this?" Also, [we could influence] the industrial design.*

Anchoring in the future aimed at achieving a similar form of stabilization, yet by using an ideal future model as an answer to the current inadequacy of identity or competences. This was highly necessary for Speaker, which lacked the exploratory nature of Audio but still aimed at going beyond a reproduction of past success and promised their further enhancement. Both NPD team and executives *anchored* Speaker *in the future* by referring to it as a "hero & guiding star", the one that should herald a new era of products and symbolize, in its greatness, the newly achieved status of the company. Far from being only an abstract denomination, being the "hero" would grant special attention and resources from top management, and continuous commitment by the rest of the company that see in such product its best reflection. In the words of Speaker's Creative Lead:

[Speaker]'s a statement to the world that we still believe in ourselves. There's been so much talk about financial crises and where do we fit in the world, "there's no place for Bang & Olufsen" and things like that. I think this has been our guiding star, bringing all of our knowledge from research and development and engineering and the aluminium factory. Everything has to be pushed to a limit to show what we are capable of.

Resolving ambiguity and coordinating among sub-entities through a bridging strategy

The "bridging" strategy addressed the relationship between multiple sub-identities and sub-competences, and how their interaction ought to be carried out. The structural divisions between groups and departments created a gap between such sub-entities, but their synergistic contribution remained crucial for the success of any innovation project. In this regard, we found two mechanisms, *integrating* and *translating*. While TV rarely made use of such mechanism, Audio and Speaker heavily depended on them, as the importance of synergizing efforts across departments was as pronounced as the divisions that often emerged among them. Examples of the integrating and translating mechanisms are given in Table 4c, and we describe each in turn.

With *integrating*, structural threats to synergistic contributions are answered through the creation of a shared space for the concurrent contributions of identity and competences across groups, and symbolized through a representation that embody such collective integration. In the case of Speaker, it occurred from the inception of the NPD team at Gate 0, when an explicit discussion among the innovation team members established a code of conduct in face of the permeating structural divisions across groups (especially between the R&D and Creative departments). It was represented through the metaphor of a "consistent" parenthood, in which both "mommy & daddy say no" to their kids

when asked in separate occasions, as explained by innovation Tech Lead and one of the most experienced project managers:

> *The innovation team is "one voice". It's not like, "Mommy, can I have this? No. Daddy, can I have this? Yes." I think maybe we are so aligned that some people are frustrated because they cannot split us, right? If they go to [innovation Creative Lead] and say, "I don't like this design", he goes "This is how it should be. We need to have fabric on." Then they come to me and say, "Martin. The fabric is very expensive." They try to use another argument but I say "Yes [I understand], but we need this as a part of the project. We need to keep it on". I think somehow, sometimes, people are frustrated that we are so aligned.*

The concurrent contributions of technology, design and business were ensured throughout the process, so that the different sub-identities and competences of such groups could be synergistically *integrated* in a shared working space – the innovation team.

In the case of Audio, *integration* was even more relevant as an answer to the split between different groups. The "Festmaker", besides *anchoring to the past* and providing a model that could serve as guideline to stabilize the permeating ambiguity emerging from an explorative innovation project, was also a clear example of *integration*. "Festmaker", as Beogram 4000, was iconic because it was able to successfully integrate technology and design. So far however the special set up of the innovation was underplaying the contribution of technology – thus risking its failure from the outset. A Technology Specialist was asked to unofficially join the innovation team as "technology godfather" because of his well-rounded knowledge of the technological competences in the company and their systemic integration. Audio's Creative Lead explains the background:

> *[We asked Technology Specialist] to be our product integration godfather. I mean, we know that, in the long run, we're a Bang & Olufsen's product and even if we do*

> *some of the stuff in secret, there's going to have to be deep connections back to what we do and Technology Specialist, he is the source of that. I mean, [Audio's first Technology Lead] is pretty new in the company.*

Not only that, the Technology Specialist valued integration in the early stages more than what the usual structural division across domain allows for, so that he initiated, supported by all team members, innovation roundtables. These "jazz jam-sessions" (with flowing concurrent contributions) were to be contrasted to the "orchestra model" (championed by an almighty concept developer or designer directing the rest of the organization). This early *integration* not only achieved a fairly stable innovation project against all odds of the silo-ed structure of the company, but also managed to go beyond the company boundaries. By connecting to several new partners, the innovation team was able to source the technological competences the company so far was lacking (mainly in software development) from well-regarded players in the industry. Such integration across internal and external players played a crucial role, Audio's Creative Lead remembers:

> *It's weird, the magic that happened. We hit kind of a group flow feeling, you know. We were... Even with these guys that were hard to work with and you get this feeling, yes, at the end of the day you've achieved so much and there... all that's happened is you've discussed the stuff and drawn some pictures on the blackboard but you've actually achieved them and that's... I think that feeling is why people keep working here, because they remember the time they had that and they hadn't had it somewhere else or hadn't had it for a very long time or they wanted... Oh, they're searching for that thing again. (...) If you use the metaphor of jazz, where to play jazz music you have to be very well trained at playing in the orchestra. Once you're super well trained at playing in the orchestra, then you are ready to learn jazz, and you start off not even by, like, going away and improvisation. You start off by learning the jazz numbers, the ones that are part of the common language, and then it's all about listening.*

The *translating* mechanism, on the other hand, recognizes the distinct existence of two or more sub-identities and sub-competences which speak different languages and cannot

come together in such a shared space. Thus, the translation of the message from one group to the other is symbolically represented to achieve their consecutive contribution to the project. In Speaker, examples of such are the "cardboard boxes" stacked on top of each other used by the Acoustical engineers to define the first measurements and volumes to work with for industrial designers; the "lousy model" used by Speaker's Creative Lead to convince the Innovation Management Board board that despite strong focus on technology, considerations about design were also being brought forward, thus securing their commitment; the metaphors "cucumber in the exhaust pipes" directed to the industrial designers, usually given much more freedom of expression, who this time should focus on not hampering the technological features developed by the acoustics team, as explained by Speaker's Creative Lead:

> *The designers were told that we need speakers, a lot of speakers and in 360 degrees directions. We also know that if you want to do state of the art speaker, high end, the best speaker you can find, you are not allowed to put stuff in front of the speakers. It should be as open as possible. Every time you put a block in there it's like putting a cucumber. You can imagine highly tuned engine but if the exhaust pipe is thin or blocked then it doesn't perform right.*

Similarly, a story about the "guy with no friends" suggested a transition away from a model of speakers developed for a sweet-spot-centred listening experience, for which the extreme case would be a dedicated room with a single chair in the middle positioned at the perfect converge of sound – a chair next to it would not be in the same sweet-spot, hence the scenario of a "guy with no friends". This translation was essential to convert the concept of Speaker's user experience and make it available to different groups in the company that might still doubt its role. In the words of Speaker's Creative Lead, discussing the difference between the speakers created by the Tonmeister and the new Speaker project:

> *You have this sweet spot, which is the one for the "guy with no friends" and all that stuff right? And that's the speaker [Tonmeister] did. What [Tonmeister] knew was that if you wanted to make that perfect sweet spot experience, the speaker drivers have to be placed like this and that. [Tonmeister]'s speaker will play very well in that room. If you take it to a different room, it'll sound different. The reason for having all the speakers placed all around [as in Speaker] it is so that you can remove the room [where you play the music]. The speakers that are facing forward are providing the sound to you. All the other speakers are removing the reflections that you don't want. They are counter-balancing all the noise. What [Speaker] does is actually to [tear] down the walls so it's like sitting on a football field right? (...) I think what [Tonmeister] managed to do was to show and demonstrate how nice a speaker can sound if it's placed in the right conditions which would be a listening room. What we wanted to do then was to take this experience into a normal living room.*

Audio also reached a point where being able to coordinate the work across departments became more challenging. The later phases in the innovation process have fewer cases in which the concurrent contribution is necessary, rather rely on the specific sequential contributions of different groups aimed at its implementation. Yet, the project was painted with tensions and resentment. The role of *translating* mechanisms of representations became crucial, so that consequent types of work could be accomplished. For example, the role of the "user guide" became critical as an internal tool of communication, instead of aiming exclusively at the end customer. The explanation of what the product's UX was, helped the understanding of people that had been developing products for decades with different UXs and for a different customer segment. In the words of Audio's Creative Lead, and one of the crafters of such user guide:

> *They read this thing, they flip through this thing to their chapter as with level system or service or how to do this or how to do that, and they read in the user guide what we're telling the customers and that tells them what it is and what their role is and all this kind of stuff. So, the user guide's actually used... The user... physical printed user guide is used as this communication tool inside the organization to solidify what the concept is and make the communication happen. (...) We realized along the way that the user guide had become an internal communication tool, a*

document, stronger than the IT document or Brief document. It was the document that told everybody what it was.

At the same time, the R&D department was coming to terms with the Audio product on their own, for example through the introduction of the name "Sonos-killer" in the hallways to create a sense of urgency linked to the rising competition in the market. Such buzzword symbolized how the technological proposition of Audio could in fact deliver a product to answer such threat, and thus align the shared effort of multiple departments. We next turn to the effects that representations and their associated strategies had. As illustrated in Figure (5), there were two outcomes: coordination of work through common understanding or a commitment to action through the illusion of clarity. We describe each of these effects in turn.

Coordinating work through common understanding

Representations symbolizing a path of action are shareable within and across multiple groups, and serve the purpose of aligning their commitment and intensions. Through the achievement of a common understanding, it is ensured that people share a similar stance to organizational identity and competences so that the coordination of work is achievable. In the B&O case, we have seen how the structural divisions across departments jeopardized the creation of this common understanding, risking the progression of the innovation project. This mechanism of ambiguity resolution is the one most covered by the existing literature, and we found confirmation of it especially in the bridging strategy - the *integrating* and *translating* mechanisms. In these cases, the project was already advanced, and multiple group's contributions had to be coordinated, either concurrently or consequently. Yet, the difficulty in doing so raised the level of ambiguity to be resolved. Representations gave a clear and symbolic guideline of action

to be followed, and by being shared by the parties that had to be involved, it achieved the desired coordination of work.

Commitment to action through the illusion of clarity

An aspect that has been so far neglected by the literature and that we found as relevant – especially in the first phases of the innovation project – is the role representations play to achieve the commitment to a course of action. The effect of representations that led to such commitment, comparable to what the shared understanding is for the coordination of work, is what we term the "illusion of clarity." We introduce such term to make sense of a path of action symbolized trough a representation, still partially open and ambiguous, yet clear enough to inspire motivation and commitment. The process leading to the commitment to action is less direct than that of the coordination of work, and has potentially both positive and negative consequences, as it can be evinced from the last column in Table (3). Because it uses the unresolved part of the ambiguity to its potential advantage rather than straightforwardly reducing it, decisions might end up being based on *false assurances* and have challenging consequences. On the other hand, such strategy might be the only viable option to let go of unresolvable ambiguity, take a *leap of faith* and thus move forward on to the next stage. This phenomenon is more relevant in the first stages of an innovation project when ensuring the commitment has priority over coordinating the work. We differentiate between the two potential effects and provide examples for both:

a) **Leap of faith.** In projects in which the questioning of identity and competences is the strongest, so is the initial ambiguity with which the initiators of an innovative project have to deal with. More than basic coordination of work, the first challenge in this phase is to bring on-board inspired and motivated people that share or can be persuaded to share the same stance with regard to identity and competences. Thus, the key goal is to ensure their commitment to a course of action. Representations like "social jukebox", "Festmaker", "technology prototypes" or "hero product" can serve to share the vision with others and ensure their alignment. Parties involved are aware of the limitations of a representation: the "Festmaker" is an evocative name and inspires a meaning-driven success like its predecessor BeoGram 4000, but we are not re-creating a record player; "technology prototypes" have been in the making for years and can provide the basis for a solid technology-driven innovation, but we still do not know exactly what the product will be. Yet, these are "tough questions" that people believe will be soon answered in the course of the project – if we get the resources and commitment we need – and that now need to be leaped over if we are to bring the project to the next phases.

b) **False assurances.** The other more negative aspect of commitment to action is when certain questions should have been answered, rather than leaped over. In this case, the illusion of clarity masks the necessity to stop the project and resolve the ambiguity that is being left unanswered. Like in the *leap of faith,* the representation is able to provide enough clarity about how one is going to answer such "tough questions". Yet, the leap forward is premature or unjustified and the answer is composed by false assurances on which the project will then be built. Using the same examples as above, "Festmaker" failed to recognize and plan ahead how to

deal with the structural divisions across departments, and carry out process-wise the integration it was symbolizing product-wise; "technology prototypes" on the other hand had proven to be incredible technologies by themselves, but the integration of them all into a single product proved so challenging that it took 4 more prototypes and months of iterations to achieve a workable product, jeopardizing the support for the project and being stopped several times.

In summary, strategies of ambiguity resolution were found to help build either common understanding or the illusion of clarity. In either case, they were invoked by teams to move a project forward, with a combination of positive and at times negative effects. Our inductive model, as depicted in Figure 5, helps to describe how teams in a context of organizational identity threat and considerable ambiguity navigate their way forward through strategies that invoke a broad range of representations. We next discuss the implications of our findings.

DISCUSSION AND CONCLUSION

Representations as tools to resolve identity-related ambiguity

Our research describes how representations and associated strategies of use help to resolve ambiguity in a context of identity threat and existing competences. This stance is necessary to guide innovation activities, which through new product creation can substantiate either the current or an alternative identity. Considering the innovation process—and the cognitive process of innovation players—as detached from organizational dynamics in which it unfolds does not reflect reality as experienced. It is

therefore plausible for representations to symbolically reach beyond such domain of activities.

Gioia et al. (1994) have pointed out in their case study how “symbolism became the language for understanding change”. Similarly, Fiol (2002) has underscored the role of language in not only reflecting the product of identification, but also shaping its process. If we consider radical innovation projects like Audio or Speaker as opportunities to explore and promote change (as opposed to purely incremental ones like TV), these arguments make symbolic activities in the innovation process necessary.

The larger part of the literature on representation seems to disregard organizational context and visualize the activities around representations as in their own microcosm (Bechky 2003, Nicolini et al. 2012, Seidel and O'Mahony 2014). In these cases, the reach of representation is parallel to the reach of the cross-disciplinary collaborations that make up the practice using representations. This perspective does not explicitly address contextual factors that affect such collaborations while under identity-threat, as in “do we still believe in what we are” and “do we still believe in what we can do”. This emerges as well from a use of representations that is limited to concepts or products as in Seidel and O'Mahony (2014), while our cases show the power of process representations in providing guidance on how to bring about an innovation project in an identity threatened context.

On the other hand, the literature on organizational identity change focuses on long-cycle processes of identity redefinition, neglecting to explain how such process unfolds at lower levels in the company while the top debates how to strategically shift the company. In our case, innovation teams had to deal with a challenged identity in their day-to-day work and thus figure out what identity components to draw on to move forwards. Corley

and Gioia (2004) looked at the misalignment between meanings and identity labels, which are a "symbolic expression of how organization members collectively answer the question "Who are we as an organization?" (p.177). They showed how, when new identity labels (e.g. "independent" or "technology leader") are not fully understood by organizational actors or old ones do not hold meaning anymore, the resulting meaning ambiguity is what allows for change. Similarly, Gawer and Phillips (2013) touch on the short-cycle dynamics with the use of "job 2" (the new platform-driven identity) contraposed to "job 1" (the old processor-driven identity) to explain how what was a schism became tolerated, and eventually constituent of a new revised identity of Intel. New evocative terms emerged from such process, as a "catalyst" and "architect of the industry", which are new identity claims that however emerged from symbolic representations used when first exploring new platform-related practices. These studies thus first suggested insightful instances for the potential effect on organizational-level claims by day-to-day resolution of ambiguity through representation, which we empirically explored.

The process behind the construction of these representations, and how they trigger the transition of the organizational identity, is what we propose in our study. We propose six mechanisms that better explain how the use of representations in innovation projects is not detached from the organizational dynamics in which they occur especially in cases where the organizational identity is threatened. We integrate insights on the potential of symbolism from the organizational identity literature with literature on representations to show how shorter cycles of identity change occur at multiple levels in the organization as part of long-cycles of top down identity redefinition.

We also find indications for a dynamic view in the use of representations' mechanisms over the course of a project, even though we have not enough data to fully support it. What we observed is a sort of compensation in the degree of outreach beyond the company's identity and competences with more recognizable elements: for the Audio project, a distancing mechanism reaching out of the company's boundaries (e.g. through *pirates*) was compensated with a look inwards to the company's history by anchoring in the past (e.g. through *Festmaker*); in the Speaker project, an enhancing mechanism supporting the current identity and competences (e.g. through *tech prototypes*) was compensated with a look directed to the future to still claim innovativeness and change (e.g. through the *hero product*).

Inertia and change through commitment to action

Research on organizational identity shows how attempts to change it are met with inertia from a larger part of the organization, making tools to break free from it valuable. Identity can cause the company to filter out the potential and value of upcoming technologies, so that when moves are undertaken to take advantage of upcoming trends, the company will have an ambiguous phase of questioning what it should do (Tripsas 2009).

Representations have the potential to cause inertia, but we also show how they become a trigger for motivation and thus lead to the commitment to action. Representations' inertial component makes them become "sticky" as expressed by Heath and Heath (2007), and they might hold back the organization more than they are spurring it forward. An example was the case of Polaroid, where sticking to film-based metaphors prevented Polaroid leaders to open themselves and the company's strategy to digital photography

despite having the necessary resources to do so (Tripsas and Gavetti 2000). At the same time, other research on representations has indicated the motivation they can trigger. Sillince et al. (2012) show how ambiguity can become the vehicle for linguistic representations to enable action, thus confuting the model in which action occurs *despite* ambiguity. Nicolini et al. (2012) has proposed a similar line of thought for material representations when considered as epistemic objects. It is the underlying ambiguity as in the "lack of completeness that generates energy and the emotional investment" (Nicolini et al. 2012, p.618 based on the work of Knorr Cetina, 1997).

Our data clearly point in the same direction and further substantiate the notion that representations, both material and linguistic, can lead to the commitment to action besides improving the coordination of work. The cognitive effect that lead to such behavior is rooted in an illusion of clarity about the course of action despite an ambiguous situation. What is called "invitational ambiguity" by Sillince et al. (2012) is about inviting someone to similarly interpret a situation by connecting over a common interest, and thus trigger his/her participation to the goal. What Sillince et al. (2012) proposes is that it is the construction of ambiguity through rhetoric to trigger action, while in our study we believe that the impression of resolution (the illusion of clarity) is what leads to it. Moreover, our "illusion of clarity" is not connoted necessarily positively, and recognizes that the perceived clarity of a common goal is a double-edged sword; unfolding actions can be based on a leap of faith that as well as false assurances, giving the "invitation" to commit to action a more nuanced outcome.

Team-project level identity work as a contribution

Our third contribution is about the micro-foundations of identity work. Team-level dynamics are explored that have a shorter cycle of cause-effect compared to the longer cycles of top-down and organization-wide identity reshaping processes. At this level of inquiry, a different dynamic of identity work emerges: while for organizational-level processes of identity repositioning phases like "distancing" and "reinforcing" are sequential (cf. Tripsas 2009), in our data they happen parallel as part of different projects. The model proposed by Ravasi and Phillips (2011) show how organizational leaders promote identity change by "periodically selecting (or reselecting) a subset of all the features that could plausibly be claimed as central and distinctive, which are perceived as fitting current circumstances, and re-enacting them by making them salient to members through reformulated identity claims" (p.131). With our study we show how these features that organizational leader "select" are created in the first place through experiments in new product development.

Understanding the micro-foundation calls for understanding how individuals play a role in an organizational level dynamic like organizational identity work (Felin and Foss 2005, Felin et al. 2015). To understand organizational identity, considering its interplay with individual identity becomes highly relevant (Fiol 2002), as such lower level identity is "nested" within the higher-level organizational one, and the salience of such two level of identities is bound to shift depending on the dynamics the individual is subject to (Ashforth et al. 2001). In our study, we encountered representations that engaged different numbers of organizational members, like with *tech godfather* establishing a personal identity among the larger social one of innovation players, while the *secret-secret-1* engaged a much larger group of people contraposed to those who developed the

Audio project. The ambiguous situation of an organizational identity threat is perceived by individuals themselves, who are going through an identity redefinition of their own, as pointed out by Petriglieri (2011): "To maintain a sense of continuity over time and yet adapt to shifting personal and social conditions, individuals need to balance their need to preserve identity stability with their need to sustain identity dynamism" (p.642).

Individuals seek to balance their personal and the social identity, so that when there is a perception that the higher-level social identity of the organization is "greedy" over the personal one, an individual will employ differentiation techniques to maintain a sense of self (Kreiner et al. 2006). Also, as suggested by Fiol (2002, p.653) "less identification may be needed to generate the possibilities for change outside the bounds of the organization's current reality", supporting the idea that shifts in salience of different identity levels are what allows identity change. We believe that the cross-departmental identity of the team become relevant in this discourse, as these are temporary and cross-cutting groups of people with whom a strong bound is created (Barker and Tompkins 1994, Ashforth et al. 2001), as some of our examples of representations show: in the case of *mommy and daddy say no*, the identity that was given priority over any other affiliation was that of the team;, also, the *hero* Speaker's team saw their progress through the innovation process as an enhancement of an organizational identity they supported, and the *hero* identity managed to grow a following throughout the organization. Opposed to this is the case of the *pirates'* process, where the team identified itself, through such product and project, with an alternative identity to be spearheaded by Audio. This last example speaks also in terms of how by "violating" the existing identity through alternative innovation practices (Pratt et al. 2006), they tried to extend not only their own personal identity, but also the organizational one, to encompass what they were

proposing. Petriglieri (2011) showed how individuals have two answers to identity threat: either concealing the threat and reinforcing their current identity, or rather accepting the need for growth and change as the solution to eliminate such threat. We can clearly see how the identity work at the team level reflected such strategies, especially in the *distancing* and *enhancing* mechanisms of representations.

CONCLUSION

Our study presents a theoretical model of the use of representations to resolve ambiguity triggered by identity threats. The model is composed by six mechanisms of resolution, grouped into three strategies, which create a symbolic frame in which representations are constructed to address and take a stance towards the current identity and competences of the company. The use of symbolic representations to resolve ambiguity has two potential outcomes: the first is an improved coordination of work achieved through the shared understanding among organizational members; the second is the commitment to action of the same, triggered by an illusion of clarity based either on the beneficial leap of faith or damaging false assurances. By integrating the literature on representation and organizational identity work, we have provided a contextualized picture of how innovation actors in an identity-challenged company use representation to guide their innovation efforts, and experiment with tentative different identities at the team-level to inform longer-cycle processes of identity redefinition.

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REAPING BENEFITS FROM THE DIVERSIFICATION OF EXPLORATION ACTIVITIES: HOW BARRIERS TO INTEGRATION ENHANCE AND UNDERMINE OPPORTUNITIES FOR STRATEGIC RENEWAL

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ABSTRACT

Exploratory learning is a key process in supporting the ongoing adaptation of organizational competences to the evolving conditions of market and technology. The induced variation grants the opportunity to experiment in periods of high uncertainty and ambiguity, and thus more effectively answer the imperative for strategic renewal. While the value of exploratory learning is rarely questioned, we still lack adequate knowledge about the micro-processes that enhance or restrict the process of learning. Especially around the integration of exploratory arguments within rigid systems, inertial barriers at both the behavioural and cognitive level can have detrimental implications. Through a qualitative study at Bang & Olufsen, a Danish manufacturer of high-end consumer electronics, I inquire on the effects such barriers have on the process of learning integration. I find how the perceived degree of success from an innovation perspective can both trigger or undermine the process of learning institutionalization and the reconsideration of barriers to integration. Secondly, I find how the variation in the structural autonomy of exploratory activities grants complementary learning for renewal in terms of evolving market conditions and bottlenecks in the process of integration.

INTRODUCTION

Schumpeterian environments demand for organizations to be able to cope with increasingly frequent and complex changes (Brown and Eisenhardt 1998, Schumpeter 2013). Changes in the technology underlying a whole industry can make it almost impossible for incumbents to innovate in order to adapt to the new competitive conditions (Tushman and Anderson 1986), even more so when such technologies represent an architectural innovation (Henderson and Clark 1990). What is even more frightening, is for such changes to render what were the organization's core strengths into rigidities (Leonard-Barton 1992), preventing it from

recognizing and adapting to the new emerging paradigms in a timely way (Christensen 1997). To sustain and maintain a process of continuous adaptation, the value of internal variety has been since long underscored (Ashby 1956). The matter of survival is tightly linked with the competitive effects of variance. Those organizations that have the ability to engage in exploration are also those that not only discover new forms of organizational routines and new products, but also improve the existing ones (March 1991, Levinthal and March 1993, Tushman 1997). While the importance of exploratory learning is rarely confuted, the increasingly frequent pace of challenges from new firms and emerging technologies with potentially devastating effects calls for an richer understanding of how to manage variance-generating processes (McGrath 2001).

Exploration is commonly associated with a form of organizational learning (March 1991, Gupta et al. 2006). Scholarly work has dedicated attention to organizational learning as a process spanning multiple levels, where organizational adaptation and renewal occurs following its institutionalization (Crossan et al. 1999). The nemesis of such a process is organizational inertia, defined as the inability to overcome cognitive and behavioural barriers that prevent such change from occurring despite significant external imperatives (Tushman and Romanelli 1985, Gilbert 2005). The crux of the interaction between learning and inertia is in the challenging process of integration of exploratory arguments within rigid systems, which has led to the proposal of different strategies and organizational forms (Gans 2016). Based on the extant literature, what is yet to be fully understood, are the processes around the dynamics of integration. How do they enhance or restrict the flow of learning across levels, and eventually lead to organizational renewal (Crossan et al. 1999)? How do unexpected forms like discovery and recognition contribute to learning (McGrath 2001)? Moreover, too many studies consider exploratory learning as a single and unified phenomenon, while many organizations are known to pursue different parallel activities. These considerations are at the basis of this

study, in which I ask "*how do inertial barriers to integration impact diverse processes of exploratory learning?*"

I chose the case of Bang & Olufsen, an innovation-driven consumer electronics producer that has recently been challenged by high-velocity and complex developments from market and technology. I employ qualitative methods of data collection and analysis to first investigate the validity of the organizational learning model by Crossan et al. (1999), and then extend it through a cross-case comparison of four parallel exploratory activities. I first find how the perceived degree of success from an innovation perspective can both trigger or undermine the process of learning institutionalization and the reconsideration of barriers to integration. Second, I find how the variation in the structural autonomy of exploratory activities grants complementary learning for renewal in terms of the evolving market conditions and bottlenecks in the process of integration.

THEORETICAL BACKGROUND

In this section I provide an overview of the scholarly work that informs both the underlying process of exploratory learning necessary for strategic renewal in times of threats from market and technology changes, as well as the inertial barriers that organizations have to overcome to achieve it.

Strategic renewal as exploratory organizational learning

Strategic renewal, as a type of organizational change implying the refreshment or replacement of organizational attributes (Agarwal and Helfat 2009), is a way to overcome inertial barriers and close the gap between existing competencies and the evolving basis of the competitive

advantage in the industry (Floyd and Lane 2000). Such a process is different from a mandated re-orientation by top management, and relies rather on a bottom-up, multilevel accumulation of exploratory learning from individuals to organization (Burgelman 1991, Crossan and Berdrow 2003). Indeed, exploratory learning results in a greater variance in both new knowledge and new routines, and thus in a possible adaptation advantage (McGrath 2001). The work of Crossan, Lane and White offered a preliminary model of such a process of organizational learning for renewal, and has encouraged other researchers to refine and extend it (e.g. Zietsma et al. 2002, Jones and Macpherson 2006). Their "4I framework" identifies four processes of learning – intuiting, interpreting, integrating and institutionalizing – and spans three levels of analysis: individual, group and organization. The model relies on the notion of cognition (knowledge, understanding, beliefs) and behavior (action) being tightly intertwined, yet very distinct. Organizational learning is, from their perspective, not just a matter of transferring knowledge and data. A change in thoughts does not imply a change in action. The authors define the four micro-processes as it follows, which I report in full (Crossan and Berdrow 2003, p. 1090):

» *Intuiting* is the preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience. This process can affect the intuitive individual's behavior, but it only affects others as they attempt to (inter)act with that individual.
» *Interpreting* is the explaining of an insight or idea to one's self and to others. This process goes from the preverbal to the verbal and requires the development of language.
» *Integrating* is the process of developing shared understanding amongst individuals and the taking of coordinated action through mutual adjustment. Dialogue and joint action are crucial to the development of shared understanding. This process will initially be ad hoc and informal, but if the coordinated action taking is recurring and significant it will be institutionalized.
» *Institutionalizing* is the process of ensuring that routinized actions occur. Tasks are defined, actions specified and organizational mechanisms put in place to ensure that certain actions occur. Institutionalizing is the process of embedding learning that has

occurred by individuals and groups into the institutions of the organization including systems, structures, procedures, and strategy.

The process of exploration starts from intuiting at the individual level, through to institutionalizing learning at the organizational one. The literature points to the phase of integration as being the key struggle in the process of learning for renewal (Dougherty 1992b). Scholarly work has, over the years, debated on the different structural forms of integration the organization should consider as most effective in their attempts at exploration in times of potentially disruptive environmental changes (Gans 2016).

Implication for structural integration

The question about how much freedom of operation from the established organizational system is needed to achieve fruitful exploration of environmental dynamics in market and technology merits attention. As Gans (2016) argues, two core organizational forms have been discussed, for which the key distinguishing element is the degree of integration with the established organizational structure and processes. The first is a paced yet consistent adoption of the emerging and potentially disrupting technology into the core organizational structure, the second is its pursuit within a structurally and procedurally autonomous unit.

The first approach relies on the company being able to become adaptive by emphasizing the exploratory learning that emerges from the continuous and synergistic integration of diverse functional knowledge. Lack of such integration implies having the unique component-knowledge stored within distinct disconnected groups, leaving a company unaware of architectural (i.e. between-components) innovations (Henderson and Clark 1990). Yet, such a tight internal integration within and between market and technology is necessary for both exploratory innovation and the renewal of an organization (Dougherty 1992b, a, Kahn 1996).

The core assumption in such a perspective is that because organizations are boundedly rational, their structure comes to mirror the internal structure of the product they are designing (Henderson and Clark 1990). However, because achieving such an organization-wide integration is challenging and likely slow, the firm risks incurring in the loss of its short-term competitiveness (Gans 2016). Attempting to integrate a new technology can potentially trigger animosity across old and new business lines now sharing the same resource space, and demands high managerial attention if the company is to succeed (Bresnahan et al. 2011, Greenstein 2016). Moreover, an organization limiting itself to the integration of such a technology at the product level without considering how to extend the organization's identity and strategic horizon might undermine any attempt of change (Voss et al. 2006, Fiol et al. 2009, Tripsas 2013).

The second approach considers how the structural autonomy of exploratory activities grants freedom to experiment in a distinct culture unconstrained by the routines, biases and assumptions of the parent firm (Tushman and OReilly 1996, Christensen 1997, Gilbert 2005). Through such a strategy the company self-disrupts itself before others do by mandating the detached unit with the competitive task that a new entrant would have had (Christensen 1997). The autonomous unit can freely experiment and pursue new opportunities by coming up with innovative business models, cost structures, processes and values without dealing with the conflicts and tensions that would have occurred by staying within the normal domain (Gilbert 2005, Christensen and Raynor 2013). Gilbert (2005) showed moreover how this structural differentiation allows businesses to decouple the perception of threat in the parent company from the perception of opportunity in a new venture. The risk is that if the autonomous unit remains autonomous for too long, it ends up playing the same role that a disrupting new entrant would play on the parent organization. The question about a future re-integration remains thus always in the background (Gans 2016). Moreover, while the creation of a separate unit with its

own distinct identity may be optimal for the development of the new, it may create ambiguity or even conflict about the whole organizational identity (Tripsas 2013). Finally, the initial idea of setting it up could be even the sign of deeper distress by top management being uneasy in dealing with the autonomous strategic behavior of middle management, key for the ongoing organizational renewal (Burgelman 1983b).

Forms of inertial barriers

Organizational inertia is defined as the inability to enact internal change in the face of significant external change (Tushman and Romanelli 1985, Gilbert 2005). The struggles of incumbents to overcome such inertia when threatened by discontinuous technological change has been the subject of much scholarly work (Henderson and Clark 1990, Huff et al. 1992, Tushman and OReilly 1996, Tripsas 2009). The risk of organizational failure is the highest when such environmental change includes a competence-destroying technology, which gradually nullifies the value of the incumbent's technology and market competences (Abernathy and Clark 1985, Tushman and Anderson 1986). Over the decades scholarly work has sought to better understand two types of inertia: the first one looks at behavioural barriers, the second at cognitive ones (Tripsas 2009).

Behavioural barriers

In terms of behavioural barriers, Gilbert (2005) differentiates between resource rigidity and routine rigidity. Resource rigidity refers to the failure to change the resource investment patterns and structure, especially due to resource dependency and incumbent reinvestment incentives. For example, companies tend to underinvest resources in emerging technologies that underperform in terms of their initial price/performance and that do not appeal to current

customers (Christensen and Bower 1996). Gilbert (2005) shows however how a threat of perception might help overcome such a rigidity, while amplifying the routine one, which is concerned with the failure to change organizational processes that use such resources. Routines are defined as a "repetitive, recognizable pattern of interdependent actions, involving multiple actors" (Feldman and Pentland 2003, p. 96), and tend to persist in the face of environmental change as self-reinforcing mechanisms (Nelson and Winter 1982, Levinthal and March 1993, Teece et al. 1997). Routines amplify the struggle to promote joint exploratory learning across different "thought-worlds" (Dougherty 1992a, p. 179), so that the opportunity to develop new capabilities is compromised (Burgelman 1994), especially in cases of architectural innovation (Henderson and Clark 1990). Furthermore, being able to make short-term and flexible changes further increases the lock-in effect as it prevents recognition of how unfit the current system is (Burgelman 2002). This leads previously effective sets of routines, codified into whole competences, to become rigid as a set of inappropriate knowledge for new projects trying to align with new market requirements (Levitt and March 1988, Leonard-Barton 1992). Changing the content of knowledge is, however, not enough, if the company is unable to change the practices around how such knowledge is used in the day-to-day operations (Orlikowski 2002, Nag et al. 2007) or the tensions it triggers (Greenstein 2016).

Cognitive barriers

From a cognition perspective, it is "schemata of interpretation" (Goffman 1974) helping individuals to organize and understand information around them, which form the barriers to change. Catching up with the technology is thus not the final step. Consider Polaroid, which caught up in developing technological capabilities related to digital imaging, but the ingrained belief of top management in the blade-razor business model prevented them to commercialize

a successful digital camera (Tripsas and Gavetti 2000). Other forms of cognitive inertia are for executives to become ingrained with beliefs about causes and effects that may not hold true after environment changes (Prahalad and Bettis 1986), further enhanced by a feeling of complacency preventing any attempt to make improvements (Miller and Chen 1994) and one of self-efficacy when change is considered (Audia et al. 2000). Generally, individuals tend to suffer from a learning myopia, overlooking what appear to be distant times, distant places, and even failures, without realizing their necessity to promote a continuous learning if failure is to be avoided (Levinthal and March 1993). Cognitive schemas related to organizational identity can prevent the interpretation of potential environmental events in a positive light (Albert and Whetten 1985, Fiol 2002, Ravasi and Phillips 2011). This could lead to the disregard of technological changes that do not fit with the company's existing identity (Tripsas 2009) or interpreting such changes as a threat and thus underplaying their potential, as with the inadequate transition of many newspapers from paper to digital (Gilbert 2005). Finally, managerial attention also plays an important role, as shown by the low attention of CEOs to the emerging fibre optics technology delaying the firm's entry in the market (Eggers and Kaplan 2009), or the unfaltering focus on existing customers precluding the recognition of other emerging segments and where to apply core competences (Christensen and Bower 1996).

If organizational inertia cannot be overcome, the risk is a "co-evolutionary lock-in" (Burgelman 2002), a "positive feedback process that increasingly ties the previous success of a company's strategy to that of its existing product-market environment, thereby making it difficult to change direction" (p.326). The company will struggle in its attempts to alter its resources and routines in the face of environmental change (Danneels 2011), and the increasing divergence between organizational areas of competence and environmental demands will plague the company (Sorensen and Stuart 2000). This will be further reinforced by faltering communication from a permeating identity ambiguity (Tripsas 2009) and fear of sharing

negative information (Vuori and Huy 2015). Gradually, the company will lose relevance in the market, and eventually disappear.

RESEARCH DESIGN & METHODS

Research Design

In 2015 B&O celebrated its 90th birthday, which has renewed the interest in the company's history and the challenges it has overcome over the decades. Indeed, B&O is the essence of an incumbent company, which has managed to survive multiple threats against is existence (Ravasi and Schultz 2006) – this last threat of digitalization being probably the most severe. The selection of B&O aims at studying an extreme case that clearly exposes the dynamics I aim to inquire on (Flyvbjerg 2006). Two main factors point at B&O as an ideal case to understand how barriers to integration impact exploratory learning. First, its long-standing history and perception of threat make for increased routine rigidities (Sorensen and Stuart 2000, Gilbert 2005). Second, exploration is mostly pursued in innovation-driven organizations (March 1991, Levinthal and March 1993). B&O reflects the image of a company that emphasizes different forms of exploration, which could however be hampered by strong inertial forces, and represents thus the ideal case. Because exploratory learning is an emergent and multilevel phenomenon (Crossan et al. 1999), its study is better pursued by relying on the rich descriptive characteristics of qualitative methods of data collection and analysis (Kozlowski et al. 2013) within a single case study (Siggelkow 2007). In this study I first adopt and validate the framework by Crossan et al. (1999) as a basis for framing the process of organizational learning within B&O, and to generally structure four different yet concurrent cases of exploration within the organization. Secondly, I extend such a theory through the

iterative comparison of these structured case studies to find patterns of similarities and differences (Eisenhardt 1989), from which I develop propositions.

Background

Bang & Olufsen (B&O) is a high-end manufacturer of consumer electronics and was founded in Struer – a small town in the North of Denmark – in 1925. For over 90 years they have created iconic products recognized for their industrial design, which combine "the best of both worlds: the unique combination of technological excellence and emotional appeal" (Bang 2005, Cattaneo et al. 2015, p.223). The recent developments in digital technology, the rise of a younger and connected generation of customers and the necessity to provide smart user experiences have all come as a threat to the organization. The broad industry where B&O holds its niche position – consumer electronics – saw years ago the rise of products that first offered a connection between mobile hardware and digital content, for example Apple's iPhone docks and Sonos's Bluetooth system. Such products represented a move away from CDs and related analog reproduction. Yet, at the time, they did not attract regular B&O's customers, affluent Baby Boomers who prioritized quality and design over price. The new products were black plastic boxes, when B&O was splendid Nordic design; they had poor sound quality, when B&O sounded pure and high-fidelity. However, these new propositions appealed to a new generation of customers, music-loving Generation X in their 40s that rejoiced in being early adopters of technologies. With time, digital products improved on the same measures of quality that B&O used, and also developed specific competitive advantages over their analog counterpart, as with easier modularization and the migration of functionality to software (Shih 2012). This technological transition from analog to digital has rendered the capabilities, tacit knowledge, and experience bases of many an incumbent irrelevant, making this transition competence-

destroying (Tushman and Anderson 1986) and potentially disruptive (Christensen 1997). The acceleration of product life-cycles and the shift of distribution channels away beyond physical stores have been an additional threat to B&O, which only distributes through brand-only retail stores inviting customers to experience the full range of products guided by expert personnel. The first attempt by the company to tackle digital technology resulted in Beosound 5 in 2009, its first digital music system. The product did not get enough traction to redefine and renew the company, rather stayed as a stand-alone product that scratched the surface of possibilities offered by digital. While B&O was granted a buffer of time from digitalization because of its status as a high-end niche player, still topping brand rankings in early 2010s[4], its customer started lamenting an increasingly disappointing lag of technology in B&O's products compared to the competition. A new top management team was established in 2011 to deal with such a transition. The background and mind-set of the new team was tuned for such turnaround. They redefined the innovation process to bring contemporary products on the market aligned with a *Leaner, Faster, Stronger* corporate strategy, and re-establish the relevance of the brand with consumers (Cattaneo et al. 2015). In this context, exploration was pursued through various projects, which are the specific research setting I use for my study.

Research Setting

In this particular study I am interested in exploratory activities aimed at the discovery and experimentation of new knowledge (March 1991) with regard to the market and technology development surrounding digitalization. During my data collection I've come across projects that are more exploitative, for which the focus is rather on known competences and certainties. For the purpose of this study and the interest of primarily explorative learning, they have been

[4] See e.g. rankings by The Centre for Brand Analysis, where B&O still appears in the UK's top 10 « coolest brands » until 2012, slipping to 16th in 2015.

considered as background and context, but not as part of the analysis. I review four exploratory activities in this study, all initiated between 2012 and 2014, called by B&O as the New Opportunity Process, the Innovation Sprint, B&O Play and BeoSound Moment. These cases emerged from the data collection as those that, more than others, prioritized exploration as their driving force. As will be explained below in more detail, I've constructed four distinct case studies by triangulating data sources and types, summarized here below:

New Opportunity Process

An initiative by the Creative department, championed by Scoping Manager (a new role granted to a former successful Concept developer), which aims at establishing a more structured front-end to the newly developed innovation process. While the new innovation framework is a stage-gate process with the purpose of transforming selected concepts into marketable products, the New Opportunity Process has stronger incentives for exploration. Overall, it set to inquire on how people live with sound today, and integrate such insights into concepts to be fed into the innovation framework. To do so, the Scoping Manager put together a group called the "Experience Team" composed of skilled individuals from different functions, who could support him in synergistically creating the vision at the base of the New Opportunity Process. Challenges in bringing people together led the process to focus on creating more concrete opportunities rather than on the bigger vision.

Innovation Sprint

An initiative by the new COO and championed by a Program manager. The COO successfully ran a similar process in his former job position as senior manager of a large consumer electronics company. Its goal was to harness the collective creativity of the company, without a defined scope, but leaving it open to new improved processes of production and to new innovative concepts to answer a digital transformation of the market. A jury panel was put together across top and senior managers from various functions. Among them is Senior Concept Developer #1, also responsible for the development of BeoSound Moment. Dissatisfied with the current status of the winning idea, he took it up as a personal project, and together with a small group created B&O Create, began the exploration of audio-related ideas connecting B&O and external communities of practice.

B&O Play

A sub-brand established by the new CEO to explore a more direct engagement with a younger audience – Generation X – that was so far partly underserved by the Core brand. Part of the *Leaner, faster, Stronger* Corporate Strategy 2011-2016, the characteristics of such a sub-brand were being more energetic and contemporary than the Core brand. The sub-brand was set up as an autonomous unit located in Lyngby, a hip suburb of Copenhagen, a 5h train ride from the B&O Core's Headquarters in Struer. While it developed strongly over the years reaching more than a third of total B2C sales, it remained disconnected with the Core brand, as few interactions between the two occurred.

BeoSound Moment

As an explorative project initiated by the new CEO and championed by Senior Concept Developer #1, it aimed at redefining the social and digital high-end of music consumption. The CEO granted the NPD team (composed of three people from the Creative, Technology and Business departments) a special degree of freedom to initially operate at a distance from the Core's standard processes. The NPD team, working mainly within the Creative department to sharpen the product's concept, set out to explore new processes and partner up with new companies. The project was well under way when it had to be reintegrated in the standard development processes and engage more with both the Technology and Business department, who perceived that their lack of involvement in the earlier phases led to a product misaligned with B&O's values. They actively rejected and under-committed to its development, leading to an unsatisfactory market launch.

Data Collection

I created a large repository of qualitative data from 3 rounds of semi-structured interviews, a compilation of personal observations over 40 full days and the collection of archival material. I collected the data primarily aiming at getting a deep understanding of the organizational dynamics from the perspective of internal organizational actors (Miles et al. 2014). I show the collected data in Table (1). The first round of interviews occurred in June 2014, when I asked 9 informants about general dynamics occurring in the organization and throughout the innovation process.

Data source	Use in the analysis
Interviews	
First round (June 2014): 9 interviews, 9 informants Technology Specialists, Scoping manager, Head of Research, senior managers in business, technology and concept development	Interviews were conducted by one researcher, lasting between 40min and 1.2h, taped and transcribed verbatim. The questions spanned an introduction to the dynamics of innovation process, the challenges the company was experiencing, their role in such dynamics.
Second round (September – December 2014): 29 interviews, 23 informants COO, Heads of R&D, Product management and Creative Centre; Technology specialists, Scoping manager, majority of senior management spanning business, technology and concept development involved in innovation activities	Interviews lasted between 1h and 3.5h. The questions explored and followed particular innovation activities, leading to multiple interviews with same informants to track events and follow-up, the tensions between past and future, departments and hierarchical levels, details of specific product development, and strategic consideration of the latest years
Third round (January 2015 – September 2015): 18 interviews, 17 informants CEO, COO, Head of Product management; Technology Specialist, Scoping manager and senior manager involved in selected innovation activities, all members of selected NPD Teams (BeoSound Moment, BeoLab 90, BeoVision Avant)	Interviews lasted between 50min and 4h. The questions inquired more specifically on dynamics that emerged in the previous phase, including the details of event timelines for innovation activities and NPD projects, the relationship between strategy and innovation, the processes and causes of organizational changes
Personal observations	
40 full days recorded in daily templates compiled every evening from personal notes and recordings about informal interactions, the attendance to 8 meetings about new product development, and particular insights emerging from the interview rounds to be used for further inquiry	While providing a record of daily progress, the main purpose was a continuous engagement with the data throughout the collection phase that could point to emergent themes to follow-up on, missing data, personal elaboration and first triangulation of sparse data collected
Archival data	
Stage-gate documents for 3 selected NPD projects, including minutes of Innovation Board for Gate presentation (e.g. for BeoSound Moment)	Triangulation of observation about event timelines, comparison of official statements versus interviews, tracking of changes in concept and product statements
Corporate presentations & documentation on technology development, innovation efforts, structuring of the innovation process	Triangulation of observation about structural and procedural statements, insights on future developments
"CEO's tweets", personal and frequent communications of CEOs to the company's employees	Triangulation of personal statements and positions versus official communications
Scholarly work on Bang & Olufsen (Ravasi and Schultz 2006, Austin and Beyersdorfer 2007, Krause-Jensen 2010, 2011, Ravasi and Phillips 2011, Krause-Jensen 2013a, b)	Triangulation of observation about company's history, additional field-data and the successful answers to previous disruption threats
Internal news, external press, company biographies (Bang 2005)	Triangulation of personal statements and positions versus official communications

Table 1 - Details of data collection

The second round occurred from September to December 2014, and through 23 informants I explored particular innovation activities and multiple tensions characterizing B&O, as in between past and future, hierarchical levels and departments. Finally, the last interviews occurred from January through September 2015, where 17 informants answered questions inquiring on specific events for the completion of timelines I had started to construct, as well as dynamics that linked the innovation process to that of strategy and organizational changes. In total, 56 interviews were conducted over a year, complemented by 40 full days of observation reported in daily templates, as well as a large collection of archival data from specific project documents to the document crafted by the new top management team outlining the corporate strategy between 2011 and 2016.

Data Analysis

The first phase of analysis occurred while collecting the data by reporting interesting patterns and recurring themes, to be further explored while still on-site. Once data collection was complete, I started constructing a chronological account of the different case studies by triangulating multiple sources and types of data. Through the case chronology I could sharpen the roles of the people involved and develop a timeline of key events and activities, such as the causes that led to its inception, the major challenges the process went through and changes in organizational structure and activities that were connected to it. I sorted the data into individual, group and organizational levels of analysis, and started inquiring on how learning moved from one level to another. I then compared such levels with the framework developed by Crossan et al. (1999), and identified when the process emerging from the data was aligned with that of the framework, and when not. When I confirmed the overlap, I decided to use such a framework as a reference to structure my four cases in terms of *intuiting, interpreting, integrating* and

institutionalizing. I used these phases of organizational learning as an approach to deductive coding (Gilgun 2010), which led me thus to further validate the theoretical framework. The four cases are presented in Table (2) based on the "4I" framework of exploratory learning, supported in the Appendixes (1-4) by significant quotes from my informants.

At this point, I had conducted a deep within-case analysis of cause and effect for each of the exploration activities, becoming familiar with it as a stand-alone entity before I could start generalizing. I started comparing across cases to find patterns of similarity or differences (Eisenhardt 1989) between the effects of cognitive, behavioural and structural inertial barriers (e.g. Gilbert 2005, Tripsas 2009) onto both the flow and outcomes of explorative learning. I now turn to present the results of this analysis.

	New Opportunity Process	*Innovation Sprint*	*B&O Play*	*BeoSound Moment*
Intuiting	Scoping manager believes the company ought to find again an encompassing and systemic strategy to guide the creation of new products and every innovation effort	Successful experiences in the COO's previous job create the basis for an attempt at harnessing the power of collective creativity through idea management activities	CEO believes in winning over the digital generation with an alternative yet energetic and contemporary identity – and turn over the company like he did with his former company	Both champions – CEO and Moment's Creative Lead – perceived the opportunity of changing the meaning of how music is socially consumed in a digital generation
Interpreting	"Serene Living" emerged from the Scoping Manager as such a framework, so to make the portfolio of products hang together through a shared experience, and was presented as such to Head of Creative & to an "experience team" that ought to contribute cross-functionally	While COO's and the Program manager's considered successful the submission of 700 ideas into an Idea Spring, yet one of the judges – Audio's Creative lead – believes there is no value in the winning ideas as they are.	B&O Play is created as B&O's answer to a digital generation, and as a complement to the higher-end segment of the Core brand	BeoSound Moment is the answer, to be shielded from the Core's operations as on a special roadmap of exploration to avoid complexity and freedom of development
Integrating	Given the low commitment of the experience team, Scoping Manager struggle to get insightful contributions from a jam-session with people "in the zone", and thus fail to deliver on his ambition of creating a new strategy that could impress top management – but still deliver 9 workable opportunities.	A tight collaboration between Audio's Creative Lead and the winner of the idea break apart the idea and reshape it around an idea that so-far is kept under the radar	Integration with Core business not existent, as the only people involved in any strategic or operative activity connected to Play are CEO and COO.	Despite few rare moments of alignment, several tensions plagued the process: a poor assessment of feasibility based on core competences, the rejection of the concept by a silo-ed R&D, the increasing complexity of added features demanded by product management and the strong disagreement on software development between concept developers & R&D
Institutionalizing	The goal of feeding ideas into the roadmap has been delivered, so that the process did not need to be routinized. Scoping manager & people involved in the Experience Team left the company.	B&O's Create is formed as an exploratory movement connecting with external communities of practice to inquire on novel uses of sound. While running, it is not yet connected to the Core and remains at the borders of the company.	B&O's business is streamlined into B2C only, and the strategic importance of B&O Play is further sharpened as the accessible entry point base of the whole brand – yet, its very diverse identity and business model trigger doubts about an upcoming integration.	Issues identified in the bad integration phase trigger the understanding about the pitfalls of such a process. A review prompts solutions including a new conceptualization of SW development as well as the establishment of a UX Concept team

Table 2 - Organizational learning for exploration activities

FINDINGS

In this section I first present the findings about different forms of inertial barriers to integration at multiple levels, which emerged from the cross-case analysis. Then, I inquire on the effects that these barriers had in the four cases, and provide an analysis to understand how the innovation and learning output got impacted. I finish by answering how the structural differences between exploratory activities can grant complementary learning outputs that effectively support organizational renewal.

Inertial barriers to integration at multiple levels

Barriers to integration at the organizational level

Rigidities at the organizational level primarily emerge for structural and procedural reasons, and when under the perception of threat from environmental dynamics, result in routine rigidity and struggle in institutionalizing new learning. They also indirectly impact the process of integration by constraining behaviors in social interactions and limiting individual's cognition.

Such organizational-level barriers are expressed in B&O's struggle in transitioning from what they call an "orchestra" paradigm to a "jazz jam-session", one caused by rising complexities and speed of change in the consumer electronics industry. The struggle affected all activities related to innovation, especially in their integration efforts. The orchestra model relies on the capacity of orchestra "directors" – from concept developers to sometimes CEOs – to embody a vision by balancing design, technology and business, and integrate these three corners into the brand's values and product offerings. Technology Specialist #1, involved with the company for more than 25 years, recollects:

> *A director conducted the orchestra and made the different musicians play better than they would have if they played the tune individually. Not a democratic process, but a process led by that particular director.*

These people deeply understood the brand's heart, and as a group of 3 to 4, could spearhead the innovation efforts throughout the company. The recent developments of digitalization in the consumer electronics industry affected the effectiveness of this paradigm, increasing the complexity of disciplines that are necessary to be integrated. Where before the orchestra conductor could focus on materials, industrial design and physical user experience, it now also has to consider a product that is smart, cloud-connected and provides versatile user experiences. The underlying concept has been revolutionized to an extent that one single person finds it difficult to still embody a correct balance of design, technology and business. Technology Specialist #1 further elaborates how the company was structurally and procedurally tuned like the products it was designing:

> *The role of concept managers has changed; they cannot as a single person balance the musicians in the band anymore. It's too much, there are a lot of disciplines that you need to know about. (...) The paradigm changed, it has been disruptive for my concepts to a degree that I haven't really acknowledged as a company. The reason why the orchestra model could work is because we were built like the (products), very much about the industrial design. But it could not work today.*

The balance between design, technology, and business now needs to be distributed throughout the organization. An alternative paradigm that is making its way into the company is the idea of a "jazz jam-session", a reference to the practice born in the 1920s where single skilled musicians would come together in an intimate setting, and based on few basic rules of interactions, they would improvise innovating tunes by building on each other's leads. The key idea here is, as expressed by Senior Concept Developer #1, that *because* you've been a great orchestra musician, you are now especially well trained to join a jam-session conversation:

> *"Once you're super well trained at playing in the orchestra, then you are ready to play jazz. You start off not by, like, going away in improvisation. You start off by learning jazz numbers, the ones that are part of the common language, and then it's all about listening."*

Intimately knowing what the others musicians' strengths and weaknesses are is fundamental to achieve such a flow. Some people recognize the value of such paradigm, and rather than conductors, they would like to become the initiators, or those who invite others. The transition from orchestra to jam-session is a whole organizational transition between modes of learning, of interacting, and of understanding how innovation is created. It impacts the routines and processes that are central to the development of new products, yet inertial forces cause most of the people to still understand the NPD process in terms of an orchestra, for which a conductor is now missing. The result is strong departmental divisions into silos, and the inability to fully bridge what the company used to call the "friendly fighting" (Austin and Beyersdorfer 2007). Technology Specialist #1 and Senior Concept Developer #1 could carve out such an intimate space in BeoSound Moment, even if only briefly for the creation of the product's system architecture. It failed for the New Opportunity Process, because of group-level barriers that I indicate in the next section. The peripheral activities of the creation of B&O "Create" and the structural autonomy of B&O Play avoided this struggle, as they could independently carve out such a space distant from the core operations.

In conclusion, the impact of organizational-level rigidities prevents the transition to a new and more integrated mode of learning throughout the organization. The more the creation of new knowledge through exploration requires a change in the established routines, the stronger the barriers.

Barriers to integration at the group level

Rigidities at the group level primarily emerge across social interactions, shaped by both organizational routines as well as individual behavior, and impact directly the group's ability to integrate different interpretations to achieve synergistic results.

In the New Opportunity Process, barriers emerged because of a lack of a routinized behavior that would bring such individuals together in the same room on a frequent basis, creating a "zone" of shared understanding. When that happened, individuals had the tendency to mask their lack of knowledge and prevent the creation of trust and open exchanges required to achieve a "flow" in the jam-session. As Head of Research mentions with regard to the process, this is very different from the scientific and feedback-driven environment that he is used to:

> *"People brought up in an industrial environment cannot go to meeting without an agenda. It sounds completely bizarre, but they would say "what is it that I should discuss?" So the idea to just go in a meeting and say "what are you working on guys? Are you having any problem? I have this problem can anyone help me?" is very strange. You do not want to show your colleagues that you don't know what you are talking about. That is really a key issue. So an answer like "I don't know but I will find out" is not acceptable."*

Not only routines, but structural barriers, cause particular behaviors that do not foster a shared understanding. Generally, they can be summarized as the failed transition from the orchestra model, where the integration of business, technology and business occurred within an individual, to the jam-session, where the integration relies on social interactions between individuals. BeoSound Moment's original concept was developed primarily relying on the interpretation of Senior Concept Developer #1, as in the NPD Team there was no real counter-balancing force from the technology department. This prevented the creation of a shared understanding of the product, as well as balanced contributions towards its development. Strong frictions emerged when the technology department became more involved and could not accept a concept development that seemed to have disregarded its feasibility based on

B&O's technical competences. Groups involved in product development thus have not yet managed to adapt their behaviors for a jam-session – if anything, the divisions between them have increased so to make them fragmented into silos. Strong allegiance to the respective departments makes it further difficult for individuals to becomes involved in exploration projects. As Technology Specialist #1 explains, priority of department belonging over group-belonging makes it difficult to create a safe space for synergistic contributions shielded from external politics:

> *"[Some of top management] came with the mind-set of treating people with a lot of discipline, and an over-hierarchical structure where even small decisions will be pulled upwards. And that does not foster innovation. You should definitely break that kind of thinking, and empower teams."*

The case of B&O Play is the other end of the spectrum, as its structural autonomy grants total freedom to develop a tighter integration within the unit, shielded by the Core business's politics. Yet lack of formalized routines between Play and Core, as well as a geographical distance between the units' locations, made informal encounters rare and further distanced the two already diverging identities.

In conclusion, group-level rigidities prevent the creation of a shared understanding and synergies across different functional and hierarchical groups. This occurs at the departmental level, but also within teams where individuals are asked to prioritize their departmental allegiance. At the same time, complete freedom to develop a group identity through structural autonomy also prevents any further integration with the rest of the company.

Barriers to integration at the individual level

Rigidities at the individual level primarily emerge from cognitive reasons, and impact directly the individual's intuition and interpretation. This impacts integration in which such rigidities at the individual level shape social interactions at the group-level, as well as the ability to recognize learning opportunities to institutionalize at the organizational level.

In the case of the New Opportunity Process, a very different attitude to uncertainty was creating the base for disagreement between the Scoping manager and the Head of Creative. Their expectations differed between an abstract strategy to frame new opportunities, the longer-term goal favoured by the Scoping manager, and new concrete opportunities themselves, the shorter-term goal favoured by the Head of Creative. The personal experiences of both shaped such individual interpretation of the process, and limited their understanding of the other party when attempting to integrate. Individual barriers also undermined the Experience team gathered by the Scoping Manager was able to enter that "zone" of intimacy and openness. Getting in the "zone" demanded trust in others and the ability to disconnect from busy daily lives. For the case of BeoSound Moment, I could perceive a general rejection of the project's concept by individuals in R&D, especially those who had been with the company for decades. They had not been involved in the first phases of development of an exploratory concept that they then struggled to grasp being aligned with a different – partly outdated – understanding of what makes a B&O product. While bordering the emotional component, such rejection is also based on a foundation of cognitive complacency. A large portion of R&D's employees have lived through the golden era of B&O's industrial design and created some of the most iconic products, which has led them to underappreciate the new digital technologies in favour of their previous understanding of what made B&O successful. A similar form of cognitive inertia comes from relying on the current customer base, and basing on such knowledge the potential

impact of an exploratory product that was meant for a new group. While for Senior Concept Developer #1 the customer target was clearly Generation X, so far underserved by B&O's offering, for Head of Product Management the first customer are the dealers of B&O's dedicated retail shops, which he knows well. He therefore required additional features on BeoSound Moment that reflected such an understanding:

> *"I have over the year spoken to a lot of dealers. I understand what the dealers are doing. (...) I said, "If this is going past me, I have to have [network capabilities] in."*

Across the project, senior management lamented a degree of self-efficacy by the new top management, a group of people that was introduced to the company not long before, with the exception of Head of Product Management. They are perceived to having come to B&O "with their minds made up already", unwilling to understand and appreciate the peculiarities of the company's DNA, which senior management think they embody, as they have been around for decades. Technology Specialist #1 explains:

> *"They are skilled people, and they are bringing good value to B&O. Absolutely. I definitely second that. But they're not grown within the company, and they do not trust in any ambassador of the brand's DNA (...) Everybody's going "we are here to save the company" - then why the hell aren't you listening?"*

In conclusion, individual-level rigidities create very diverse interpretations of events, strategies and symbols, difficult to change as they are the direct result of personal experiences. While they create the basis for diverse and complementary contributions to the exploration of new knowledge, too divergent interpretations create the basis for conflicts at the group-level, and are a strong barrier to integration.

Impact of barriers to integration on innovation and learning outcomes

The interplay between the forces that drive the exploration and barriers against it impact its expected results, both in terms of innovation output and opportunity to institutionalize learning.

I define innovation output as the development of a product or an idea with the potential of (or basis for) a successful short to medium-term launch on the market. I define learning output as the institutionalization of learning implemented as change organizational level, in which the process of intuiting, interpreting, and integrating has been embedded into an adaptation in the organization's routines, processes, and strategies. In Table (3) I present a comparison between the intended output at the inception of the exploration process, and the resulting output at the conclusion of such a process. By combining interview data for individual's perceptions and archival data for more objective measures, I inductively defined a scale to systematically grade the outputs. Through iterative within- and cross-case analysis, three main measures emerged that were consistent and internally valid across the exploration activities (Miles et al. 2014). A *high* measure corresponds to a radical outcome with impact on the whole organization, in terms of revenue potential, brand recognition, and justification for change in organizational routines and processes. *Medium* corresponds to a moderate outcome that while being successful, remains limited to the project level or in potential form for the organization. Finally, *low* corresponds the failure to achieve any substantial outcome, or the low impact of such outcome with regard to the whole organization. The change between the intended output and the resulting one due to barriers to integration is visualized in Figure (1).

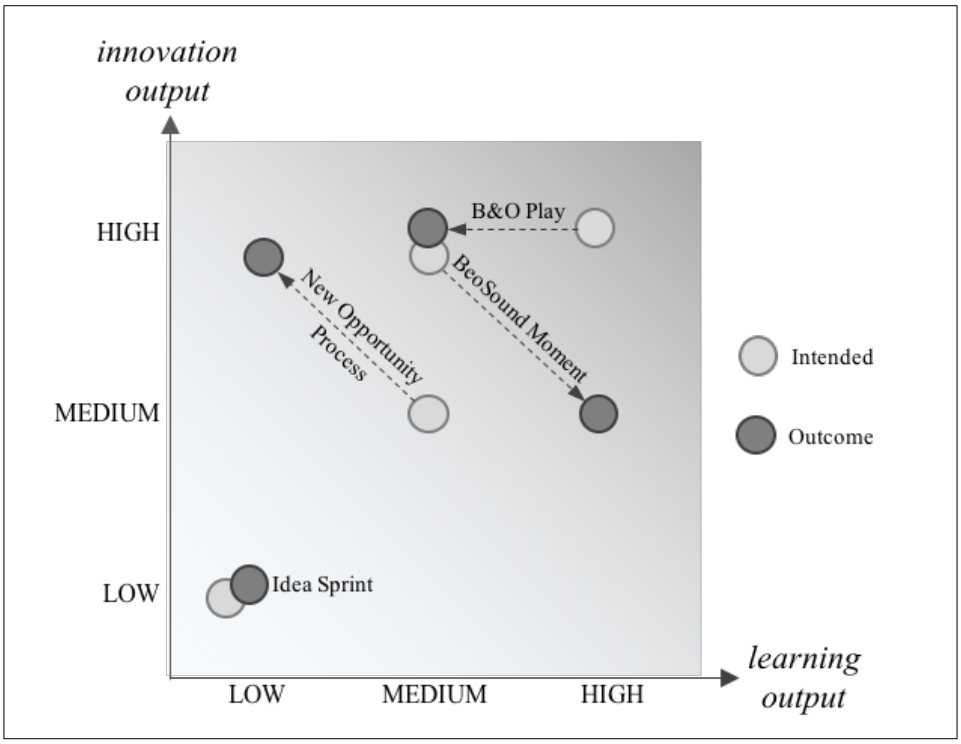

Figure 1 - Effect of inertial barriers on innovation and learning outputs

	Innovation output		**Learning output**	
	Intended	Outcome	Intended	Outcome
New Opportunity process	*MEDIUM* Ambition to create a long-term portfolio framework	*HIGH* Diverging expectations pushed a focus on short-term innovation, 9 opportunities generated	*MEDIUM* Translate ethnographic insights into long-term strategy	*LOW* Struggle to substantiate through cross-functional expertise left it abstract
Innovation Sprint	*LOW* Collect ideas from organization's wider base	*LOW* Ideas collected are limited in value, top 3 are considered for implementation	*LOW* Test and support innovation culture in organization	*LOW* Culture is proven innovative, Idea Spring is routinized yearly
B&O Play	*HIGH* Establish new line of younger and contemporary products	*HIGH* New line is financially very successful, product output is continuous & consistent with new sub-identity	*HIGH* Tackling new digital generation will generate valuable knowledge on new market	*MEDIUM* Knowledge remains within B&O Play and little spills over to Core
BeoSound Moment	*HIGH* Visionary product that will redefine how music is socially consumed by a digital generation	*MEDIUM* Mediocre result, as product could not live up to the height of the concept's expectations	*MEDIUM* Explore new partners for outsourcing, but otherwise follow standardized NPD process	*HIGH* Clear highlighting of bottlenecks for change towards a company able to deliver a digital product

Table 3 - Effect of inertial barriers on innovation and learning outputs

What emerges is a substantial effect of the inertial barriers, emerging from different levels, on the intended outputs.

In the New Opportunity Process, Scoping Manager – responsible for the project - aimed at creating a long-term strategy for the Core business' portfolio, which would bear fruit in later phases by informing the creation of new projects. He brought people together from different departments as an "experience team", who should have synergistically contributed to such a future vision. Barriers to integration prevented a smooth exploration, so the project struggled to deliver the consistent results required by Scoping Manager's boss. His boss pushed then for a shorter-term focus, aimed at creating concrete opportunities for projects rather than an encompassing strategy. The change of focus in the exploration project was successful from an innovation perspective, as it produced 9 opportunities ready to be placed on the current roadmaps. Scoping Manager reached a higher innovation output by working singularly with specific individuals, as he recalls:

> *"Now I'm working with [Senior Concept Developer #1], [the Insight manager] and Øivind Slaatto as the designer. This afternoon I'll talk to [System Engineer #1] and [Technology Specialist #1] for a tech perspective (...) and then to the business guys for business opportunities. (...) I found it very difficult to make them all come together in the same room. (...) I couldn't make it."*

At the same time, it occurred at the expenses of longer-term learning outputs, as the efforts to overcome the integration barriers within the experience team faded. Because the innovation output was more than satisfactory, top management did not perceive the necessity to routinize the process. Scoping manager was made to leave the company, and so did other members of the experience team.

Similarly, B&O Play was able to institutionalize valuable learnings about the market it is now successfully tackling. Nevertheless, from the perspective of the core company, the integration of such a learning with the core operations is very limited, meaning that the contribution of B&O Play to an overall shared understanding is limited by its autonomy as a sub-brand. Until a process of integration occurs, the knowledge will remain located within B&O Play in potential form for the core business.

What emerges is that satisfaction with the short-term results from an innovation perspective risks incurring in a perception of self-efficacy, in which the underlying barriers to integration are not reconsidered as obstacles to the institutionalization of learning. This dynamic can be formalized as:

Proposition 1a:

A satisfactory innovation output undermines the opportunity to institutionalize learning as it prevents the reconsideration of barriers to integration.

Very different is the case of BeoSound Moment, which was intended to be a visionary product aiming at changing the meaning of how music is consumed in a digital generation. Several barriers in its integration undermined its process, like in the case of the New Opportunity Process, yet the resulting product suffered from faulty software and sub-par quality when compared with both the company and the customers' expectations. The product could not be fully endorsed by B&O retailers, and weakened their efforts in reaching out to the intended Generation X, further disappointing the established customer base of Baby Boomers for whom

the product was not intended. Despite the fact that the product has been updated to a fully functional product and its software improved, it is neither what was conceptualized at the beginning by Senior Concept Developer #1, nor the product that R&D would have liked to produce. Its innovation output was not satisfactory. Considering its learning output though, as Figure (1) shows, the process of BeoSound Moment has had a huge impact on the company's processes and structure. It highlighted the bottlenecks that are preventing the company from adapting its competences and being able to create products aligned with the new digital generation and with B&O's standards of quality. The strong barriers against the process of exploratory learning could be clearly recognized, providing an alternative – and maybe even more valuable – opportunity to institutionalize learning. Such a recognition was translated into actions by adapting the software organization, and the whole NPD process accordingly.

Thus, a dissatisfaction with the innovation output triggers a reflection on the effects of barriers to integration, which provides an opportunity for learning. I can formalize this dynamic as:

Proposition 1b:

A dissatisfactory innovation output enhances the opportunity to institutionalize learning as it triggers the reconsideration of barriers to integration.

Finally, the Innovation Sprint could achieve both what it planned on both innovation and learning fronts, yet because the impact of such a process is limited to few moderately interesting ideas and remains in the potential form as motivation for employees, its overall contribution remains low. As a summary, the integration phase is impacted by barriers

converging from multiple levels, as explained in the previous section, which impact innovation outcomes and learning opportunities. The outcomes might differ from what was initially planned, which trigger or prevent the reconsideration of the barriers to integration. This phase is thus a key bottleneck to the flow of learning from intuition to institutionalization.

Variation in learning from exploration activities

Exploration is a variation-generating activity, and its aim is to learn new knowledge. Variation in exploration – as a higher-order variation – through different parallel activities further enhances the potential of renewal as it results in different knowledge stocks that could prove complementary. Barriers to integration at the individual, group and organizational levels affect exploration activities differently, as shown in Table (3), and combined with the innovation outcome alter their learning outcome not only in terms of impact, but also of content. I consider which learning has been institutionalized from the two exploration activities that provided medium to high learning outputs.

First, consider B&O Play: because of its purposeful structural barrier to any form of integration with the core business, it was able to explore new digital technologies, younger design impressions and different forms of distribution. Its autonomy prevented established processes and structures to hinder their exploration process, thus enabling the sub-unit to acquire deep knowledge on the recent developments in market and technology. Because of the ability of the sub-unit to tap into a new customer base, its role has been consolidated from an experiment into a core business with a specific strategic position for the brand. As COO explains:

> *"The strategic thinking going forward (...) I have this [pyramid] where I have B&O Core on top and Play below. B&O Core in the end should not be something generating a lot of money but it should be building the brand. It should be the dream. You're dreaming about*

the B&O's fantastic system but for the moment you can afford the Play product (...) and when you get a greater salary, then you start buying into the B&O system."

Besides a new financial stream, the ability of B&O Play to cater for such a new generation of customers grants the core brand a buffer of time in its adaptation efforts. Such a buffer also provides more time to consider the question that clearly remains open, namely how and when this knowledge should be integrated into the core business by decreasing the autonomy of the sub-brand.

Consider now BeoSound Moment, a project that attempted to also tackle the threat of digitalization, yet by remaining within the system of the core organization. In this case, the learning outcome is about the unexpectedly strong barriers that prevented a successful outcome. In the words of Senior Concept Developer #1:

"It's been a catalyst that is renewing the company. It's really shown us how unfit we are. It's exposed us for being not as good as I say we are. It's made us face truths. It's made us face organizational issues. It's made us face all kinds of stuff. It's really been a mirror. It's been a mirror where no fancy industrial design can hide behind, you know, no raising the price up can hide behind. It's been a mirror and we are coming out as a better company for it."

In this case, the barriers to the exploration process are the core learning, not the content of the exploration. The ideal process would have looked like a jam-session, yet strong barriers from all levels contributed to its partial failure. The product got launched on the market, but because its performance was not satisfactory made top management reconsider what caused the project to go wrong. Barriers to integration got highlighted, and renewal of processes and routines occurred by altering the internal process of software development and the organization behind it, the creation of a User Experience team under the leadership of Senior Concept Developer #1 and the inclusion of a system engineer in the early phases of every upcoming project to ensure a fairer assessment of technological feasibility.

While these two projects were both answers to the question of how to tackle digitalization, barriers to integration made the learning outcomes very different. B&O Play delivered learning about the recent developments in market and technology; BeoSound Moment delivered learning about how to adapt organizational competences for a better alignment with those environmental dynamics. These two learnings are highly complementary in an organizational process of re-aligning to the evolving industry.

In conclusion, variation in exploration activities delivers multiple and complementary opportunities to institutionalize learning. Because of different effects of barriers to integration, the resulting knowledge stocks cover different facets of a renewal process in tackling the misalignment between organizational competences and environmental changes in market and technology.

Proposition 2:

Variation in the structural autonomy of exploratory activities grants complementary learning for renewal in terms of the evolving market conditions and bottlenecks in the process of integration.

DISCUSSION

B&O has experienced the transition to a new industrial paradigm, which has impacted negatively the relevance of its competencies. Innovative technology for speaker products can be sourced from within B&O by the internal acoustics research department, objectively one of the most remarkable in the industry and able to produce iconic speakers like BeoLab 5 and the latest BeoLab 90. The fact remains however, that for other technologies – especially with regard to digital ones – B&O has to explore alternatives. I discuss here the propositions that emerged from my results.

The impact of inertial barriers on exploratory learning

My results show how inertial barriers, especially in the integrating phase, can hamper the process of feed-forward exploratory learning as defined by Crossan et al. (1999) that would support B&O's strategic renewal. I confirmed the multilevel process of organizational learning, and expanded the understanding of how inertial barriers from multiple levels impact the process of integration. That different levels do impact the process of integration is not represented in the linear model of the 4I framework that is often taken as reference (cf. Zietsma et al. 2002, Jones and Macpherson 2006), but appear in their "4I matrix" in Crossan and Berdrow (2003, p. 1091, cells from (1,3) to (4,3)). This distinction is important to understand my results. Struggle in the integration phase led to two different outcomes: the first, an improvement in the innovation output as a shorter-term focus at the expenses of longer-term exploratory learning, which is aligned to considerations of self-efficacy (Audia et al. 2000) and the success trap (Levinthal and March 1993). This is represented by the cases of B&O Play and the New Opportunity Process. The second, a dissatisfactory innovation output triggered the opportunity to learn about the barriers to integration themselves, thus offering an alternative

path towards the institutionalization of the exploration efforts. This requires the individual-level processes of intuiting and interpreting to occur again, and learn about something (i.e. the effect of inertial barriers) that is different from the initial product idea. This is represented by the case of BeoSound Moment. From this perspective, the work on "vanguard projects" by Brady and Davies (2004) suggests that projects that operate at a distance from the core organization can experiment with new processes, as happened for the first phase of BeoSound Moment, yet it explains organizational change only triggered by the success of such projects, rather than their failure. I find more support in the work of Leonard-Barton (1992), who similarly hinted at how project-work could pave the way for organizational change by highlighting core rigidities, which in the case of BeoSound Moment were clearly exposed by trying to fit its exploratory process in a rigid innovation process. My results underscore the difficulties in directly achieving the "integration strategy" advocated by Gans (2016), symbolized at B&O in the struggle to successfully transition from an orchestra model to a jazz jam-session. At the same time, they provided an example of how project work could be a way of testing the bottlenecks of such a transition, and taking a step towards a jam-session model.

Diversifying exploration activities for diversified learning

To avoid a co-evolutionary lock-in (Burgelman 2002), a complete answer to complex challenges from the environment is composed by a renewed alignment between the new demands of market and technology and organizational competences (Floyd and Lane 2000). While complementary, I have found that learning about the two components of this relationship occurs separately. On one hand, the company needs to learn about the new drivers of competitive advantage, the opportunities of new business models and the challenges of new distribution methods. On the other, it needs to assess what is preventing change in the

organization and what causes such rigidities. The latter is what Argyris and Schon (1982) called a double loop type of learning in which whole practices, even those up to now considered good and legitimate, are put into question and potentially changed (Van de Ven 1986). Literature points to two structural forms to support exploration, one focusing on the integration of the emerging technology with the core business, the other grants freedom to experiment through structural autonomy. Based on my results, I believe neither a pure integration (Henderson and Clark 1990) nor a pure autonomy approach (Gilbert 2005, Christensen and Raynor 2013) can deliver a satisfactory degree of institutionalized learning in both while reporting stable quarterly results. While the autonomy strategy could lead to institutionalizing learning about the emerging market and technology, it would fall short of identifying which internal routines and structures require being changed to act on such new knowledge. Likewise, only focusing the institutionalization of learning about routines and processes does not allow learning about the evolving dynamics of the new market, so that the time window to answer such threats could pass the company by. I thus critique the dualistic approach of Gans (2016) in presenting the two strategies as disconnected and independent alternatives, while the benefits of a joint approach are multiple. Similar to how scholarly work on exploration and exploitation has discussed an organizational ambidexterity to structurally combine both forms of learning (Raisch et al. 2009), I propose how variation in the structural forms *within* exploration should be considered for higher effectiveness. Indeed, if variance-seeking exploration fosters the creation of new knowledge and new routines (McGrath 2001), one could assume that variance in exploration – a higher-order variance – further enhances such outcomes. In such a perspective, I propose how combination of structural autonomy and integration in exploration activities grants mutually reinforcing effects. First, an autonomous unit grants the company an exploratory foothold in the new market and, assuming a moderate success based on the incumbent's brand or resources, an extension in time and financial to sustain the experiments

in transitioning the core business towards an integrated organization. On the other hand, the core business can initiate the exploratory learning process through project-work aimed at institutionalizing new competences, knowing that the specific knowledge related to the new market could be integrated when necessary from the autonomous unit. This also prevents jeopardizing the financial flow from established customers and the company's legitimacy with investors and board of directors. Such a strategy did not occur on purpose at B&O, rather emerged from a series of connected events and continuous strategizing. Indeed, the intended goals of most of the exploratory activities I have studied were not met. Still, the benefits can now be identified with hindsight by reviewing the case. As a structural autonomous unit, B&O created a brand-extension, using thus established brand names to enter new product categories or classes while maintaining a clear differentiation from the core business (Aaker and Keller 1990, Keller and Aaker 1992). The benefit of a new unit as a brand-extension over skunk-works are multiple. First of all, its direct commercial impact, that in B&O Play was considerable and key in granting additional resources to the core business. Granted a powerful brand, an autonomous extension can stretch beyond the core's existing zone of comfort and compete in arenas in which the main brand would not fit, but at the same time use such connection as an authentication and legitimization of a well-regarded incumbent. The direct capture of a new market segment through a legitimized brand re-positioning can trigger the creation of leads into the parent brand (Chen & Liu, 2004), something the COO emphasized when transitioning the overall corporate strategy to a pure B2C, mimicking high-end fashion brands as in "Hugo by Hugo Boss", or "Emporio Armani". The risk of brand dilution and identity ambiguity is to be considered, but the stronger the brand, the lesser the risk (Keller and Sood 2003, Martinez and Pina 2003, Keller 2012). In terms of integration experiments, product development projects have been shown to become the focal point for the tension between innovation and status quo, "microcosms of the paradoxical struggle to maintain, yet renew or

replace core capabilities" (Leonard-Barton 1992, p.111). Innovators manage to wall themselves off from an "anti-innovation configuration in the rest of the organization (...) as self-contained bubbles, micro configurations in which resources, processes, and meaning are aligned with innovation" (Dougherty and Hardy 1996, p.1145). This is what occurred for BeoSound Moment, in which the NPD Team engaged in the exploration of new approaches and deviating from established routines (Brady and Davies 2004), yet while being embedded in the organizational system.

CONCLUSIVE REMARKS

Exploratory learning provides the variation that organizations needs to secure an ongoing adaptation to evolving market and technology conditions. This study answers to the need of shedding light on the micro-processes that enhance or restrict the flow of learning and that sustain the process of renewal. In this study I asked how inertial barriers to integration impact diverse processes of exploratory learning. I have adopted a multilevel model of organizational learning (Crossan et al. 1999) to investigate parallel exploration activities at B&O, and extended such a framework in two ways. First, I find how the perceived degree of success from an innovation perspective can both trigger or undermine the process of learning institutionalization and the reconsideration of barriers to integration. Furthermore, I find how the variation in the structural autonomy of exploratory activities grants complementary learning for renewal in terms of evolving market conditions and bottlenecks in the process of integration. I suggest that the effective management of innovation in times of volatile environments requires to take into consideration the complementary effects of diverse exploration activities, the potential they have in unlocking a rigid organization and promote renewal through learning.

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APPENDIX

Appendix 1 - Exploratory learning process for the New Opportunity Process

Exploratory learning phases	New Opportunity Process	Supporting quotes
Intuiting	Scoping manager believes the company ought to find again an encompassing and systemic strategy to guide the creation of new products and every innovation effort	• *"Traditionally, the system offer has been very strong for B&O (...) I saw the possibility of having the products work together not only on an operational level but also on a tactical & strategic level, something that I struggle to find again." (Scoping manager)*
Interpreting	"Serene Living" emerged from the Scoping Manager as such a framework, so to make the portfolio of products hang together through a shared experience, and was presented as such to Head of Creative & to an "experience team" that ought to contribute cross-functionally	• *"I saw the scoping manager role as a role where I should, or could potentially, make the portfolio hang together season by season (...) I saw Serene Living as an approach where I could make this hang together from an experience point of view" (Scoping manager)* • *"I framed it around sounds and living space experience, as this is where I need to drive and build new concepts and ideas, to deliver that vision."(Head of Creative)*
Integrating	Given the low commitment of the experience team, Scoping Manager struggle to get insightful contributions from a jam-session with people "in the zone", and thus fail to deliver on his ambition of creating a new strategy that could impress top management – but still deliver 9 workable opportunities.	• *"It was a matter of time and how many resources you can drive from people. I was asking 20%, but in reality, in order to meet that deadline, I needed more. What I had in mind was to do an innovation camp like when I had students for 3 weeks and they'd work their asses off to make an experience and prototype that experience. I thought I could do the same in the organization - super intensive but spread over a longer period. I was hoping with professionals I could get further with these resources. It was totally the opposite; my ambition was too high." (Scoping manager)* • *"'Serene living' can be very fluffy from some. You really need to make sure that I have a lot of meat on the bone, and you can really deliver something that has a sense of serenity when you clean it, and we are not there yet." (Head of Creative)* • *"[Head of Creative] thought it was a high-school level, the discussion of these opportunities I put forward. I said, "this is innovation. you show your dirty underwear. You don't show finish stuff when it's innovation. This is a dialogue, a discussion, right?"(Scoping manager)*
Institutionalizing	The goal of feeding ideas into the roadmap has been delivered, so that the process did not need to be routinized. Scoping manager & people involved in the Experience Team left the company.	• *"The outcome this year was very good. I think the best way to say this, is that out of 9 presented opportunities, 4 of them are already onto the roadmap, and one project is actually now in fast speed mode." (Head of Product Management)* • *"Seen from the outside it was a great success because a lot of opportunities were put on the roadmap. Nonetheless, I couldn't make it. You can also see I made myself jobless because I put too many things on the roadmap so when there's no need to put things on the roadmap for the next few years then I become obsolete". (Scoping manager)* • *"[Scoping manager] was trying to do the [jam-session] but he was laid off because in that process, they wanted products. He was trying an innovation process, and that's totally different (...) it did not resonate with the executives" (Technology Specialist #1)*

Appendix 2 - Exploratory learning process for the Innovation Sprint

Exploratory learning phases	Summary	Supporting quotes
Intuiting	Successful experiences in the COO's previous job create the basis for an attempt at harnessing the power of collective creativity through idea management activities	• *"I don't have a culture today creating ideas and delivering them" (Program manager)*
Interpreting	While COO's and the Program manager's considered successful the submission of 700 ideas into an Idea Spring, yet one of the judges – Senior Concept Developer #1 – believes there is no value in the winning ideas as they are.	• *"What I do here is to ask everybody in the organization to create or deliver ideas to the process. That of course can go in many directions (...) ideas about earning or do more cheap production or whatever or create business in different ways." (Program manager)* • *"This proposal doesn't hold even the slightest drop of water. None, zero, zilch. it is fiasco written with capital letters on a piece of paper (...) but it won. And because it won, it must have some intent. (...) It wasn't the project that won, it was the intent. Well, what's the intent? It is that we are more in touch with what is going on out there by being more open." (Senior Concept Developer #1)*
Integrating	A tight collaboration between Audio's Creative Lead and the winner of the idea break apart the idea and reshape it around an idea that so-far is kept under the radar	• *"We are playing jazz (...) " (Senior Concept Developer #1)*
Institutionalizing	B&O's Create is formed as an exploratory movement connecting with external communities of practice to inquire on novel uses of sound. While running, it is not yet connected to the Core and remains at the borders of the company.	• *"I have this community and they all grow and get stronger, but we'll still be super under the radar because no one knows about this community except for the hundreds of thousands of people that are in them (...) I will have trained a community of people capable of working with sound and caring about sound." (Senior Concept Developer #1)*

Appendix 3 - Exploratory learning process for B&O Play

Exploratory learning phases	Summary	Supporting quotes
Intuiting	CEO believes in winning over the digital generation with an alternative yet energetic and contemporary identity – and turn over the company like he did with his former company	*/ based on strategy documents and informal discussions*
Interpreting	B&O Play is created as B&O's answer to a digital generation, and as a complement to the higher-end segment of the Core brand	• *"There are a lot of ideas that are floating around, not clear definition, not enough resources and not a mature enough organization to understand. They have dreams on what they can do and they can't execute that" (COO)* • *"(...) branded separately from (the) core B&O brand (...) yet, the two brands belong closely together and share the same values. (...) The new brand will gain credibility from the mother brand by being associated, and that the "Red Dot" brand can pay back to the mother brand with increased energy and contemporary feeling." (Corporate strategy 2012-2016 document)* • *"Starting Play was though. it was changing the organization in terms of thinking. It was trying to preserve the Core, but having the guts to change some of the rest. That was though." (Head of Product Management)*
Integrating	Integration with Core business not existent, as the only people involved in any strategic or operative activity connected to Play are CEO and COO.	• *It's a total different business compared to the normal AV Core. We've had a bit of a problem that B&O has tried to put processes and everything used for the Core business on Play - and then you're dead. I need (...) two different designs to appeal to Gen Y the youngsters and then the older Gen X of B&O, two different marketing campaigns, like Mini & BMW (...) two different supply systems because Play is availability" (COO)* • *"I have [Head of Play] that's really focusing on earning money on Play. [Head of Product management] then who is owning products for Core, focuses on that. My responsibility is to try to get everything together." (COO)*
Institutionalizing	B&O's business is streamlined into B2C only, and the strategic importance of B&O Play is further sharpened as the accessible entry point base of the whole brand – yet, its very diverse identity and business model trigger doubts about an upcoming integration.	• *"The strategic thinking going forward (...) I have this [pyramid] where I have B&O on top and Play below. B&O in the end should not be something generating a lot of money but it should be building the brand. It should be the dream. You're dreaming about the B&O fantastic system but you can only afford the Play product (...) and when you get more salary, then you start buying into the B&O system" (COO)* • *"Now we're reframing Play for Millennials, which means Core is getting reframed as the actual core of Gen X, rather than the Baby Boomers it was before." (Senior Concept Developer #1)*

Appendix 4 - Exploratory learning process for BeoSound Moment

Exploratory learning phases	Summary	Supporting quotes
Intuiting	Both champions – CEO and BeoSound Moment's Creative Lead – perceived the opportunity of changing the meaning of how music is socially consumed in a digital generation	• *"[I want to] demonstrate to the world that we are leading in high-quality, wireless sound and that I love music and understand how to create a social culture around music and my products." (CEO's mail to Senior Concept Developer #1)* • *"The vision was created for a simple audio system that could connect all the Play products [and others] to the wireless loudspeaker, sort of the Holy Grail" (Senior Concept Developer #1)*
Interpreting	BeoSound Moment is the answer, to be shielded from the Core's operations as on a special roadmap of exploration to avoid complexity and freedom of development	• *"Leave the team to deliver the product and don't get everybody involved, because I trust the team to do it. So, give them peace and quiet to do it" (CEO)* • *"Bang & Olufsen's social music system allowing you to access all your music content and play it in high-quality surround in your main room and stream to all other rooms in the house with Playmakers + Bang & Olufsen speakers or B&O Play products as second room "clients." (CEO's mail to Senior Concept Developer #1)* • *"The original whiteboard sheet where [CEO & others] drew up the actual concept of what it should be, it wouldn't stand a sober, you know, analysis. I mean, it just didn't work. It was like drawing a cow with five legs. It just doesn't... It was a wireless, portable device that could do WISA wireless... The battery life of this thing would last seconds. The concept they made didn't exist. (...) Two blind men, you know, describing an elephant sort of thing. It was just two sets of opinions on one piece of paper but with the name HH1. Give it to a team of change-makers, take on suicide missions and see if they can make some-thing out of it." (Senior Concept Developer #1)* • *"[CEO] was afraid that involving Struer would add time and cost. You can find a lot of examples for which it has taken way too long and had been really, really complex, and without the need to be. I think that was the main concern, but obviously these directions were given without any clue how does it actually work in Bang Olufsen. I mean, that now way it was possible – but I found out later." (Project manager)*
Integrating	Despite few rare moments of alignment, several tensions plagued the process: a poor assessment of feasibility based on core competences, the rejection of the concept by a silo-ed R&D, the increasing complexity of added features demanded by product management and the strong disagreement on software development between concept developers & R&D	• *"There's been these "I haven't been asked, I haven't been involved, so why should I throw myself into this now, sort of on the road to a bad thing." There was this around: "Okay, you haven't asked from the beginning, why do you need my help now? Outsourcing was good enough for you back then, now you need my help?"- kind of discussions." (Senior Project Development manager)* • *"I ended up, from a concept stand-point, having too creative ideas of how [BeoSound Moment] should be executed. Very innovative, but out of sync with my ability to implement. (...) I've been honest about this, my product management was not strong enough on this. Product management is responsible for coordinating what is my vision and my dream, and what I can actually deliver. (...) There was an imbalance between the vision and the dream and what was actually the reality of my capabilities" (CEO)*

		• *"BeoSound Moment became in many ways the hostage of that way of changing the organization"(Head of Product management)*
Institutionalizing	Issues identified in the bad integration phase trigger the understanding about the pitfalls of such a process. A review prompts solutions including a new conceptualization of SW development as well as the establishment of a UX Concept team	• *"People underestimated the efforts that were needed to make it up and running, that's one thing. The second thing is that I didn't have enough skills in the software area to handle it actually. With this totally crazy outsourcing type of strategy, it was well less impossible to get that. I'm surprised that I have been able to launch it to be honest because it's more or less a mission impossible." (COO)* • *It does expose issues on my side, in terms of software development, in terms of running software projects. (...) Another of the major learning is that you allocate more engineering resource well, that software-hardware, to the process up front to pressure test the ideas and the vision of the concept team" (CEO)*

CO-AUTHORSHIP STATEMENTS

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Title:	The Bright Side Of Conflict: Organizational Renewal Through New Product Development Failure
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The article/manuscript is: Published ☐ Accepted ☐ Submitted ☐ In preparation ☒

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1. Formulation/identification of the scientific problem	B
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5. Writing of the first draft of the manuscript	A
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