Northumbria Research Link

VISUALISING DESIGN DRIVEN INNOVATION

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ABSTRACT

This research investigates the development of effective techniques for design to drive innovation in a multinational industry. It describes a study of the best design practices at a strategic level in Philips Design, Eindhoven as compared with industries very similar to or drastically different from Philips Design. The correlation of the research with literature in the field has led to it being based on the theory of innovation by Roberto Verganti (2009). The research explicitly defines the problems in practising 'Design Driven Innovation system' by making a detailed case study of the innovation process and practices within Philips Design based in Eindhoven, the Netherlands.

The research uses case study method, which was part of an empirical enquiry, where the researcher became a 'participatory observer' in Philips Design, conducting one-on-one interviews and using Delphi Technique for data collection. The secondary source of data collection was archival records and physical artefacts, which formed the backbone for the case study.

The research makes a tangible link between innovation theory as proposed by Roberto Verganti and practice through case study research done at Philips Design, Eindhoven and by comparing the findings with interviews with several other companies. The research highlights certain challenges in carrying out an effective innovation process to inform practitioners and comes up with recommendations to run an effective design driven innovation process, which is directly connected to the business.

Key Words: Innovation, Design driven innovation, Design strategy, Mapping, Innovation process.

1. INTRODUCTION AND DISCUSSION

This paper highlights the results of the empirical enquiry that began at Philips Design, with a project that investigated how to effectively map the innovation process and its practices in a multinational industry, to promote reflection, understanding, ownership and refinement by stakeholders within the company. The research further gathered data in the form of process papers and presentation from within Philips Design that helped in triangulating the information with an industry expert and 3 other multinational companies. General literature research allowed a broader perspective on the project and it further developed into a large-scale multi corporation case study research.

The correlation of the research with literature in the field has led to it being based on the theory of innovation by Roberto Verganti (2009). And further it makes a contrast between the theory and practice of Design Driven Innovation to point out the challenges and techniques for an effective and smooth innovation process.

1.1 EVOLUTION OF INNOVATION AND ITS MEANING

The past innovation theories have been guided primarily by the school of thought of 'technological push vs. market pull' (Schumpeter 1994). Whereas, in practice innovation has been focused on a 'customer centric' approach (Hettinger and Linger 2010), driven by technological innovations (Flichy 2007) or business strategies (Campbell, Stonehouse et al. 2001). Design has had a role of a support function in big organizations. In recent years the work of Design Thinking and its implementation in corporate strategy (Esslinger 2009) has made managers recognize that Design influences decision making in many different ways. Hence, the nature and scope of Design has undergone immense transformation and is still changing radically. As stated by Sharon Poggenpohl & Keiichi Sato (2009), "Here another kind of process unfolds, one initially divorced from physical making and more deeply engaged with processing information and understanding context through the generation of frameworks or conceptual diagrams, defining the problem to be addressed, asking questions, accessing research, constructing new research, and entertaining possibilities" (Poggenpohl and Satō 2009, 34).

This new concept of design requires disciplinary resources, something much more than style magazines and trends, and it moves beneath the superficial to the core of Design-Driven Development (Verganti 2009). The Design-Driven Development demands ideas about design processes and methods, research data and its analysis, knowledge of the past for the purpose of building something appropriate to the present or future (Schon 1983).

The empirical enquiry observed the way Design Research shapes the strategy of an effective innovation process in a multinational industry. This research requires design to be one of the functional leading disciplines of the company and perform under certain circumstances. It also requires employees to know the challenges in pursuing Design Driven Innovation (Verganti 2009) and how to curb the problems.

1.2 THE INDIVIDUAL AND THE ORGANIZATION

Empirical evidence from this program if research has shown that innovation is the work of self-motivated individuals who worked in a disciplined pattern even without the existence of an explicitly defined innovation process. This thought was supported by (Berkun 2010) when he stated that, Innovation begins with bright minds following their personal interests. Other innovations are driven for the quest for cash. Waves of innovations have come from individuals in need of something they couldn't find. The important question to be asked is whether there is a need to have an explicitly defined innovation process at all?

The answer to the above question was found in the depth of the theory and practice of organisational culture. The meaning of innovation undergoes significant change when used in the context of a multinational industry's corporate environment. Each corporation has an innovation approach, which usually is a very complex process.

Innovation has a number of parameters and one innovation archetype cannot fit into all models (Jeffery Phillips 2010; John Seely Brown 1997). It is also worth stating here that empirical evidence suggested that individual behaviour affects organizational culture and is an important factor to the success or failure of an innovation system in an organization (Peters & Waterman, 1982). On the contrary scholars like Hoftstede believe that big organizations could train and alter human behaviour to maintain a healthy culture (Hofstede, Hofstede et al. 2010). The present research supports the former school of thought and believes that individual behaviour can influence organizational culture and its work radically (Schein, 1985: 34). Hence an explicit innovation process is essential to guide the thinkers and practitioners. It is important to keep in mind that an innovation process too rigid and bounded by rules with no freedom to navigate would hamper the growth process.

1.3   DESIGN AND ORGANISATION

Design poses new cultural challenges to an organization. Designers add a new dynamic to the organization by bringing in their new ways of thinking, reasoning and probing into new dimensions. Evidence shows that designers and design thinkers don't like to follow rules, they like working on their own. (Schon 1983; Yin 2003)

Design influences decision making in many different ways. Even the non-linear nature of product development cycle, uncertainty, and the fact that many specialities and departments would be required to input into a design process pushes the organization to develop a synchronized value scheme and a strong leadership to cultivate a corporate culture of innovation and strategic creativity that can solve this challenge. (Esslinger 2009)

Design as an innovation strategy has also changed manifolds since the last few decades. Being mere a part of a support function in the product development process (*Sharon Poggenpohl & Keiichi Sato, 2009)*, to idea generation and a research tool (Schon 1983), to a tool to understand and develop user centred design innovations to bring out ground breaking products to the world (Esslinger 2009) and finally the driver of value generated innovation of the whole organisation through its Design Driven Innovation (Verganti 2009).

1.4   EXPLICIT KNOWLEDGE, COMMUNICATION AND DESIGN DRIVEN INNOVATION

Most powerful dynamics occurred when tacit knowledge gathered from the Design process is converted into more explicit data and made visually evident (Nonaka, Takeuchi, 1997). Converting implicit knowledge into explicit data is more relevant with design taking new roles in the organisation. Literature agrees that designers follow the practice of 'learning by doing' (Arrow 1962) and also learning by using, (Rosenberg 1982). Throughout the existence of an organization, the practice of 'learning by doing' and other techniques, lead to accumulation of a lot of knowledge. 'Knowledge' being the most valuable asset for the firm (Tim Travers, 2000).

It is worth noting, that with design taking the role of a functional leading discipline a lot of knowledge at the strategic level could be tacit; i.e. in the form of skills, concepts, etc. The reason for this is because design and designers use their craftsmanship and skills on an adhoc basis unlike disciplines like accounts or business studies where they use analytical tools, and specific way of working.

Along with explicit knowledge there is also a need for an effective communication channel within the organization. Effective communication helps in broadcasting the explicit knowledge to the wider audience (Cushman and Cahn 1985). It also enhances productivity and stops alienation of the worker from the goal. Some argue that communication and management is more or less synonymous (Tompkins 1977). There are many ways and forms that a communication mode can take in an organization. But to establish an effective communication circuit one must understand current organizational communication structure and how that communication structure facilitates internal communication (Svecz 2010).

2. METHODOLOGY

The research philosophy, methodology, strategy and techniques without doubt and without question have been indoctrinated into combined research philosophies of positivistic (Comte 1858), constructivism (Crotty 1998) and empiricism (Baird and Kaufmann 2007). Constructivist stance (Crotty 1998) the primary research method was conducted in a field study at Philips Design as a participatory observer.

2.1 PRIMARY DATA COLLECTION

Under the umbrella of Empiricism the research used a case study approach (Yin 1994) (Figure 1) as an overarching method to gather data during field study. Within the case study the research involved Delphi technique (Sackman, H., 1974), one on one interviews along with participatory observation to collect data.

Data in the field study was collected in the form of PowerPoint presentations and internal process papers, which formed the initial Literature (Step 1, Figure 1). To get a better understanding of the company's management view of Design and Innovation process the data was arranged on an evolutionary timescale highlighting the achievement of milestones (Step 2, Figure 1), which described the changes in the thinking, and approach of the company towards its innovation practices. In the early stages a gap was seen and it was evident that the interviews had to be done with two focus group's namely; thinkers and practitioners. The interviews helped in defining the current innovation process in two perspectives; the top down perspective given by the thinkers and Bottom-up perspective provided by the practitioners (Step 3 & 4, Figure 1). The interviews helped in gathering information on the existing principles behind a sound innovation process and also lead to a sound understanding of the concept of Innovation in context with a multinational industry.

Delphi technique helped in the refinement of the process and helped in analysis of the formal process description by the thinkers as against the informal process description by the practitioners (Step 5, Figure 1).
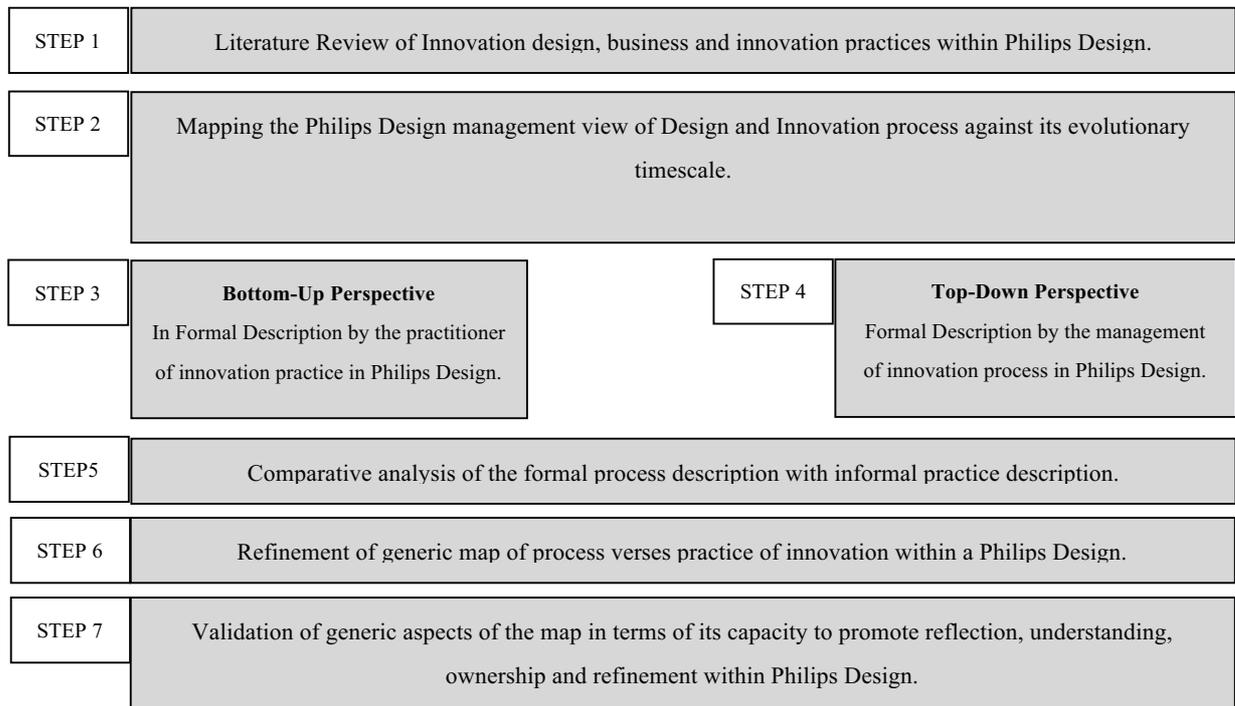
STEP 1	Literature Review of Innovation design, business and innovation practices within Philips Design.

STEP 2	Mapping the Philips Design management view of Design and Innovation process against its evolutionary timescale.

STEP 3	**Bottom-Up Perspective** In Formal Description by the practitioner of innovation practice in Philips Design.	STEP 4	**Top-Down Perspective** Formal Description by the management of innovation process in Philips Design.

STEP5	Comparative analysis of the formal process description with informal practice description.

STEP 6	Refinement of generic map of process verses practice of innovation within a Philips Design.

STEP 7	Validation of generic aspects of the map in terms of its capacity to promote reflection, understanding, ownership and refinement within Philips Design.

Figure 1: Methods

In the end two forms of maps of the innovation process were generated. The first was a detailed map explaining the innovation process with seven predefined design variables. The design of this stage was based on Quasi Experimentation (Shadish, Cook et al. 2002) because of the changing nature of the variables and existence of two focus groups that influenced the experiments (Table 1).

Variable Name	Process & Sub process name	Duration for the process	Required Input	Key Activities (Philips Design)	Key Activities (Philips Business)	Deliverables	Ownership
Control Features	Controlled by Researcher	Controlled by the Researcher	Controlled by Researcher	Influenced by Practitioners	Influenced by Thinkers	Influenced by Thinkers	Controlled by researcher

Table 1. Variables and controls under quasi experimentation

The second map was a graphic representation of the detailed map. The graphical 'mapping' was an effective way of data visualisation and later was used for effective communication. The maps were further put to test within the company for the purpose of validation, going through minute adjusments based on one on one interview with the owner for each of the processes (Step 6, Figure 1). In addition to mapping initial analysis was done for other observations and information gathered during the field study, which later formed the basis of the main research question.

2.2 SECONDARY DATA SOURCES

The next phase of the research was done by collecting secondary data in the form of an extensive literature search and review that covered the issues of Organisational theory, nature of design and innovation process, current role of Design in the organisation and Innovation Driven by Design. This helped in developing meaningful values and attributes that formed a basis for contextualised framework that substantially informed Primary data gathering process.

2.3 VALIDATION OF FIELD STUDY

Due to the fluid identity of the innovation process of Philips Design it was necessary to align the conclusions with an expert (Figure 2). The expert required having a good knowledge of Philips Design as well as the knowledge of other industries and academia. In this case it is Professor Steven Kyffin who had worked for Philips Design for a span of 10 years and now he is heading the school of Design at Northumbria University as the Dean.
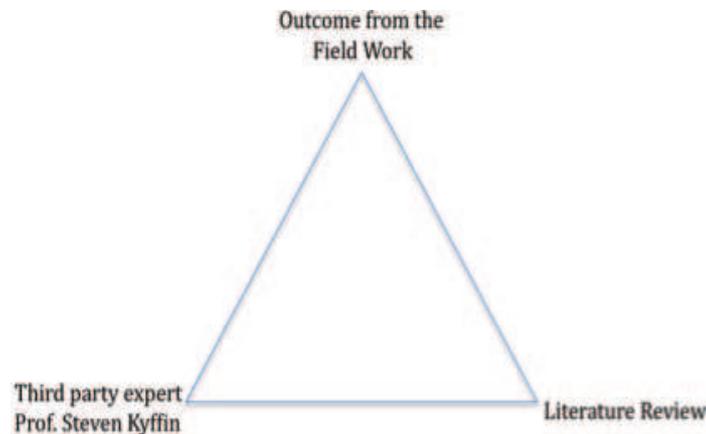

Figure 2: Triangulation with a third party expert

Triangulation method (Bailey-Beckett and Inc. 2001) was used to validate the conclusions made during field work and literature gathered in secondary research with the expert. A Semi-structured interview was arranged with professor Kyffin, using questions that focused on gathering insights on the research conclusions and methods chosen.

2.4 TERTIARY DATA AND VALIDATION

The research carried out another round of interviews in order to gather tertiary data that supported or rejected the claims made during Triangulation process. The research was driven towards a second validation where three companies were to be chosen and interviewed. The criteria of selecting the three companies were:

a) Corporations serving diverse categories with a creative portfolio management team.

b) Corporations where design has a functional leading discipline role.

c) Corporations, which follow an innovation approach independently applicable to the organization. Essentially in contrast to Philips Design's innovation policy.

The interviews were largely open ended and a questionnaire was constructed in order to highlight the main arguments.

2.5 FINAL TRIANGULATION

The research has to conduct another triangulation to validate the arguments raised from the interviews with three other organisations. The same third party expert would be carrying out the triangulation at this phase but the data set would be different (Figure 3).
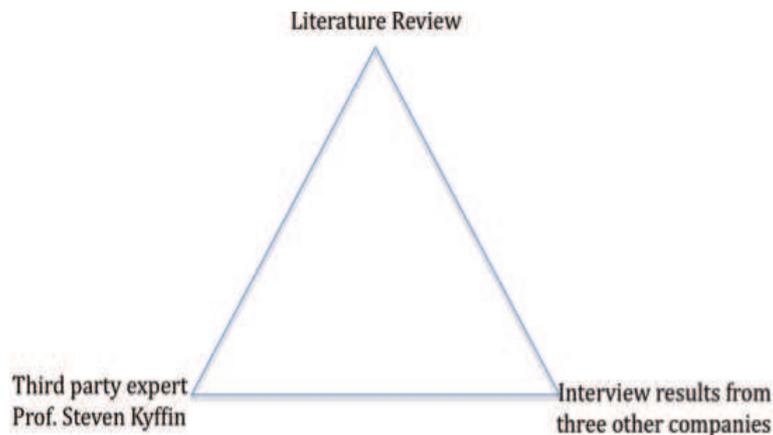

Figure 3: Final Triangulation

The results then will be presented to Philips Design and the other three companies that have participated.

3. RESEARCH OUTCOMES

The enquiry to date has concluded the role of Design in a multinational industry. It highlights where Design can play an important role and how big organisations could use Design to its full potential.

It also highlights major challenges in the procedure of effective Design Driven Innovation. Keeping in mind the challenges the research also provides a concept for Design to be an effective tool to the business by providing new competencies and new ways of working in conjunction to the business aspirations of the company.

3.1 DESIGN DRIVEN INNOVATION

Design Driven Innovation is a term coined by Roberto Verganti (2009). He bases his theory on a research based on a number of medium and small size organisations in Italy and other parts of the Europe. Design Driven Innovation is a concept that works excellently with products and organisations seeking to innovate the value of the product offering to the customer. Roberto Verganti explains that firms aiming to creating radical ideas use Design Driven Innovation. These firms take a broader perspective by investigating the evolution of culture, society and technologies, and make proposals putting forward a vision about possible new product meanings that people are not solicited but that they were eventually just waiting for (Roberto Verganti, 2009).

The challenge for the current research is to compare the theory of Design Driven Innovation in a multinational industry with its actual practices and find out challenges in its operation. This would also provide suggestions for the practitioners and enable them to be more of an asset to the business they are involved with and to add value to the culture of the innovation within the organization.

3.2 DESIGN IN BUSINESS

Design to date has played multiple roles in a business. Design has been the backbone of all businesses when it comes to product development and incremental innovation. Design has played the role of a support function in a lot of businesses. Design is used to find market gaps, explore scenarios of the future, challenge the function of technology and scientific development. Last but not least in multinational industries Design is playing the role of a leader. Empirical evidence proves that design uses its skills to effectively see the future, study any weak signals, explore the cultural, political and environmental changes and trends in the market and in the end make value maps that inspire a company towards breakthrough innovations.

The research has confirmed that Design can guide innovation and lead a company into having breakthrough solutions. But as no process comes without its pitfalls and challenges, Design Driven Innovation in multinational industries also is no different. There is evidence of a lack of ownership of the innovation process by the practitioners and a lack of understanding of the designs roles at the strategic level. This problem is evident in almost all other multinational industries that are being interviewed in this research.

The mapping of the innovation process has tried to make the activities more explicit and visually simple to understand. The graphical maps made the information easier to be communicated to the team as well as other stakeholders in the company that interact with the Design team at the strategic level. But making data explicit did not come without challenges. The biggest challenge was that the mapping of the business innovation process from a design perspective is new to the corporate world; hence, there is a need to define variables on which the process of 'Design Driven Innovation' can be based. Specific design variables to lay down a process will help multinationals in formulating a process, which can be used as scaffolding rather than a rulebook of procedures. Multinationals could base their initial outlines of a Design Driven business model on specific variables, previously defined through quasi experimentation rules but later validated to have been generated keeping in mind '*design principles', 'resources' & capabilities'(Winter, Zhao et al. 2010).* Basing these variables in 4 broad categories: marketing, offering, operations & management (Baldwin and Klark 2000) a sound innovation process can be organised.

The design variables chosen for the purpose of mapping an innovation process are:

a) Process and Sub process name: Clear and concise name of the process including its sub process. Choosing the names that are self explanatory and short.

b) Inputs: Required inputs including the communication channel involved in gathering the inputs.

c) Duration: The time span given to finish the process.

d) Key activity for Design: Key activities needs to be done by Design keeping in mind the three capability icons i.e 'design principles', 'resources' & capabilities'.

e) Key activities other: The other departments involved in completing the process and their activities.

f) Deliverables: The outcome of the process including its sub processes. Specific details include the kind of paperwork done to prove that the process is complete.

g) Ownership: The leader of the process and the person who is answerable.

These seven variables defined the Design perspective of mapping an innovation process. Care was taken to put it in line with the business innovation and strategy mapping as by linking it to the capability icons.

3.3   DESIGN FOR BUSINESS

The dynamics of Design Driven Innovation changes once it has to add value to the business. The practice of Design Driven Innovation sees a big challenge, which disrupts the integration of Design and makes it difficult to turn ideas into a reality. This problem is further put to test with an existing gap between the thinkers who are trying to define new businesses and practitioners who defend the core business in the multinational industry.

This gap hinders the flow of communication within the departments and gets in the way of implementation of a healthy process. On continuing the research it was found that this gap exists in every company and at every level. Evidence shows that this intellectual gap is because of the differences in individual beliefs and sub cultures within the organisations. Another reason that makes this gap more evident is lack of effective communication channel and lack of explicit knowledge.

The purpose of the business is core to the innovation process driven by Design. Business development similar to Design has 3 strategic levels in their innovation architecture, the incremental innovations, adjacent innovations and breakthrough innovations (Figure 4). Hence, Design should complement each innovation architecture by developing the right core competencies.
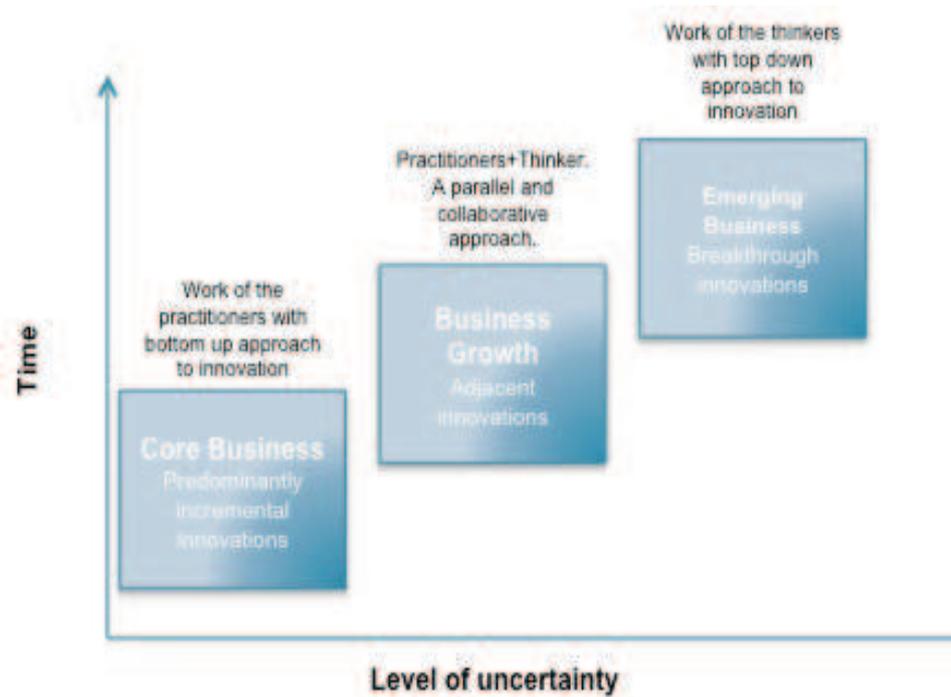
Figure 4: Three levels of business growth in a multinational industry

There is a need for a strong communication channel and a strong leadership with knowledge of integrating design into business within the process to engage thinkers and practitioners for a common cause. Evidence gathered during triangulation shows that Design has the capability of being a bridge between the gaps that exists in the innovation process. The solution predominantly lies in a multidisciplinary team involved in making all knowledge explicit and engaging in generating competencies that develops value for the business and provides new value propositions to the company.

4. CONCLUSION

The paper has highlighted the evidence collected in support of an effective Design Driven Innovation from a field study and contrasted it against its theory by Roberto Verganti. This helped in identifying challenges in running an effective Design Driven Innovation in a multinational industry and proposed effective techniques that could help its cause. It takes the readers on a journey of role of Design and innovation within an organisation and its importance to the business and also highlights important observations with evident literature support.

The research has validated the data gathered from Philips Design against the three other multinational industries. (The names cannot be discussed due to Non disclosure claims).

Keeping the above in mind the current research contributes to knowledge in 4 broad categories. First is by validating the philosophy of Roberto Verganti (2009) and taking it a step further by highlighting challenges attached with Design Driven Innovation. The mapping helps to find effective techniques that would be useful to bridge the gap that

exists between, the thinkers who try to define new competencies for the business and, practitioners who work to defend the core business. This knowledge will act as a technique to avoid the major problems. The third, contribution is the knowledge derived by mapping the innovation process from a design perspective. Through the literature it has been seen that strategic mapping in corporations is the work of business and management studies. And this is the first time that design has been used to map and make the innovation process more explicit. Last but not the least it identifies some new knowledge and highlights new areas of research, which would make the theory of Design Driven Innovation more manageable and attainable.

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