Mapping a design innovation process within a Multinational Corporation– A design perspective to using Delphi technique

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Abstract

The aim for the research was to proclaim Delphi technique as an appropriate tool to explicitly define the Philips Design strategic design innovation process and align the two fragments of the Research Development and Innovation team; the thinkers involved in making strategies for the breakthrough innovation and practitioners who were involved in protecting the core business for the organisation.

The aim was met by identifying a six-step approach incorporating Delphi technique, all participant workshops and one-on-one interviews. The approach enabled audit of design outputs for the functional leadership programme, explicitly defining the roles of involved stakeholders and communicating the process to other sectors within the organisation.

The paper contributes knowledge by describing a design approach that uses Delphi technique as a tool, incorporated within six-stages. The paper describes the six stages and their outcomes in detail before justifying Delphi as a design tool that could enable multinationals to obtain a detailed view of their process knowledge and bridge the gap between thinkers and practitioners.

Keywords
Delphi technique; designing Delphi sessions; Mapping; innovation process; Thinkers and practitioners; Design driven innovation; Philips Design.

Introduction
Philips Design is one of the oldest design-oriented companies using design in all its facets. In 2009 Philips Design began the design functional leadership programme that pushed the role of design from a contract-based entity into being one of the core functions for the company (Gilsing and Gardien, 2013). To
enable design become a core function the Research Development and Innovation team (RD&I) formulated a design innovation process for value proposition and development in Philips and the maintenance of a creative portfolio for Philips Design. Gradually, the design function struggled to perform in the functional leadership programme and found it difficult to collaborate with other recognised functions like strategy, futures and technology, and incorporate them within the design innovation process. The inability to establish itself as a core function, despite being provided a platform to contribute to strategic level decision-making, initiated a requirement for mapping the design innovation process at Philips Design. Hence, Philips decided to use design research to capture implicit knowledge and convert it into explicit information in the form of a map that would reconstruct and represent innovation at Philips Design. The RD&I design innovation process had underwent an evolution since its inception and there was a need within Philips to re-define the good practices and make redundant any obsolete ones. As stated by Aftab:

"Philips Design had identified the need for an explicit review to map the way innovation is being carried out then, keeping in mind past evolutions and landmarks, communication channels, specific roles and ownership of the steps within it. While mapping the process, the company also wanted the redefinition of its process names, actions and deliverables to make it more adaptable to future requirements." Aftab (2013, p. 131).

This need was turned into a research focus, which was established between Philips Design and Northumbria University with the intent to turn the project into a co-sponsored PhD. The researcher was involved in a nine months internship project and was stationed as a participatory observer within the RD&I team at Philips Design. The researcher worked on the annual cycle of the design innovation process with the RD&I team and used action research as an overarching framework to identify the activities within the process. This provided access to data that usually was restricted and seen to comprise commercially sensitive information.

Initially, the project required an explicit definition of the design innovation process but eventually the weaknesses within the design function broadened the scope of the project. Aftab, Young & Maclarty (2013, p. 149-159) identified certain weaknesses within the design function at Philips, like the non-definition of roles and actions, ad-hoc decision-making, implicit communication between

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1 Implicitly – Philips as an organisation has involved design into its strategic decision making very recently and does not have communication channels and ways of communication defined for interaction between design and other stakeholders. Most complex arguments and communication happen in an accidental manner without the intention of learning or decision-making. See: Reber, A. S. (1989). "Implicit Learning and Tacit Knowledge." Journal of Experimental Psychology General 118(3): 219-235.
team members and no record keeping, that made delivery of design capabilities and competencies irregular and inconsistent. Hence, the nature of the mapping was to not just represent the design innovation process, but also refine it and construct a new, reflective version of it.

Initial interaction with the RD&I team made it obvious that the design innovation process description was based on a constant interaction between two groups within the RD&I team. These groups were of ‘thinkers’, individuals making strategies for the design innovation process and were involved in identifying options for emerging markets; and ‘practitioners’ who defended the core business and acted on strategies formulated by the thinkers. Hence, the research was conducted with the aim of mapping the innovation process thought to be operating from the organisational process perspective (the thinkers perspective) and from the practitioner's perspective (Aftab, 2013, p. 10). This entailed an approach that would identify the successful and redundant activities existing since the year 2000, align the thought and practice of thinkers and practitioners in the RD&I team and get an agreement on ownership and reflection of the process in the future.

**Scope of the Case Study**

The aim of the nine months internship was to develop an effective approach of mapping complex innovation systems in a multinational organisation from a design case-study perspective. Therefore, the researcher had to determine the most suitable research method to objectively establish consensus on this complex problem, in circumstances where accurate information does not exist and inputs to conventional decision-making are so subjective that they risk drowning out individuals’ critical judgements. A range of qualitative methods was compared, including, Group Feedback Analysis (Heller, F. A., 1969), nominal group technique (Macphail, A., 2001; Cantrill, J. A., Sibbald, B. & Buetow, S., 1996) etc. The decision was taken to use Delphi technique in combination with workshops and one-on-one interviews to map the innovation process because other techniques did not ensure confidentiality, flexibility, and an opportunity to align communication between two separate groups within Philips Design.

The approach helped the researcher to understand that the past tacit knowledge and current skills of the thinkers, practitioners and stakeholders act as the backbone for innovation thinking at Philips Design, making it important to be captured and shared. This approach helped identify and align the intuition of thinkers and the experience of day-to-day business needs of practitioners and make them explicit.

This paper highlights the six step mapping approach used to map the design innovation process at Philips Design during the nine months study, which was also used as a data collection phase for the PhD study. It provides details on the use and evolution of Delphi technique as a tool within the six-step approach,
highlighting the strengths, weaknesses and guidelines for any future design research application.

**Selection of Delphi Technique as a design research method**

Delphi technique was developed in the 1950’s, by Dalkey and Helmer (1963) at the Rand Corporation as a suitable technique to be used for achieving convergence of opinion concerning real-world knowledge, solicited from experts (cited in Hsu, C.C. & Sandford, B. A., 2007). Delphi technique has been a reliable research method in a number of areas like education (Yousuf, 2007; Thach and Murphy, 1995, cited in Grisham, T., 2009); health care (Whitman, 1990, cited in Grisham, T., 2009); journalism (Smith, 1997, cited in Grisham, T., 2009); and management research (Day, 1975).

According to Linstone, H. A. & Turoff, M. (2002, pp.3), “Delphi may be characterised as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem.”

Linstone, H. A. & Turoff, M. (2003), Grisham, T. (2009), state that Delphi technique is used to investigate subjective judgments on a collective basis and not analytical techniques. They further add that Delphi technique is not a substitute for other scientific testing or consensus methods like group feedback analysis (Heller, A. F., 1969; Frank, H. A., 1969); but it is an option for complex interdisciplinary subjects of inquiry. In addition Rikkonen et al. (2006) suggest that Delphi technique, as a method was useful in structuring the communication of a group in order to enable them in solving complex problems. Okoli, C. and Pawlowski, D. S. (2004), Brill et al. (2006) claim Delphi technique as an iterative technique for building consensus between experts where information needed is predominantly subjective and participants are separated from each other.

Typically, Delphi technique uses multiple iterations with selected participants in order to reach a consensus on issues, which were exploratory in nature (Tapio, P., 2002).

Day (1975) highlighted the use of Delphi within the corporate environment, through in-house Delphi research, although very little evidence can be found due to reports not being published. Nevertheless, evidence for the use of Delphi, as a tool to trigger change and explore possibilities is abundant. He states, “Corporate utilization of Delphi is perhaps one of the least-known aspects of the technique’s application. This is a result of corporations regarding the products of their Delphi exercises as having a commercial, confidential value and, hence, restricting their distribution or description in professional literature” (Day, 1975, p.162).
Philips Design required a tool that identified a need for change and derived a consensus for the process of change. Okoli, C. and Pawlowski, D. S. (2004) believe that Delphi helps to restructure the communication process, making it effective and smooth. Delphi was also seen by them to be useful in receiving controlled feedback devoid of bias and judgments making anonymity and confidentiality an important aspect of the process (ibid.). This suggested that Delphi technique would be a powerful tool to be applied in the case study with Philips Design.

Delphi technique had to be evolved to enable the capture of ambiguous descriptions of the activities within the process, align the thinkers and practitioners thinking and make the process explicit. Consequently, reinforcing a culture of common reflection and evaluation from both the thinkers and practitioners for continuous future refinements to the design innovation process. Winter et al (2006, pp.642), Cicmil (2006) claim Delphi as the appropriate tool to enable participant’s transformation into reflective practitioners, hence making it appropriate choice for the investigation.

**Selection of participants**
Selection of participants is an important decision in structuring Delphi techniques. Tapio states,

“Delphi critique often remarks that in applications, little effort is put to a reliable selection of the panellists. Often used combinations tend to result in a biased sample because experts apparently nominate colleagues that represent similar schools of thought” (Tapio, 2002, p. 86).

The selection of participants for the Delphi sessions at Philips Design met with a number of challenges. Philips Designs’ innovation process was interdisciplinary. Additionally, the connections between the stakeholders were formed intuitively and were influenced by the structure of the organisation making any statistical and mathematical modelling difficult. Also, the structure of the organisation, the RD&I team, the annual innovation cycle; involved stakeholders, thinkers and practitioners also influenced the selection of participants for the Delphi sessions. Consequently, the selection of participants for the study was taken away from the researcher and a decision was made to include all individuals involved in the design innovation process as participants of the Delphi sessions.

To avoid any methodological error occurring due to predefined participants, the researcher took inspiration from de Loe,’s multi-level, interactive survey method, which altered the traditional Delphi technique to suit his workshop-based survey (de Loe, R. C., 1995). This divided the RD&I team and stakeholders, including audit committee members, into three groups i.e. thinkers, practitioners and stakeholders.
Design and Administration of Delphi sessions

Another challenge faced during administration of Delphi at Philips Design was the availability of each participant at the same time. None of the Delphi sessions could be held with all of the participants present due to their busy schedule and non-availability. Hence, the researcher had to use smaller groups i.e. thinkers comprising of four participants, practitioners comprising of six participants, and stakeholders comprising of four participants, separately. This made participant availability possible and upheld the anonymity and confidentiality.

In addition to small group Delphi sessions, all-participant Delphi workshops were also conducted. These workshops were used to communicate the research agenda to all participants, help the participants align their thinking and come to an agreement with the outputs generated in small group sessions. The data brought to all participant workshops were anonymised and coded, making all responses confidential.

In addition to the small group Delphi sessions and all-participant workshops, the Delphi sessions were supported by one-on-one interviews with each individual participant. These interviews helped maintain confidentiality amongst the participants and also helped in gathering unbiased data.

The combination of Delphi sessions, one-on-one interviews and all participant workshop as a decision-analysis tool (Linstone, H. A. & Turoff, M., 2003) was used in a number of Delphi case studies like Policy Delphi (Turoff, M., 2002) and research within the corporate environment in Bell, Canada, education, medicine and business (Day, L. H., 2002). Grisham, T. (2009, pp. 118) states, “The epistemological foundation of the Delphi techniques is to reduce the effects of personal bias. This is done by assuring that all expert feedback is anonymous. By doing so, the technique captures the opinions, experience, and knowledge of each panel member. Personal knowledge is harvested, interpersonal interaction biases are stripped away.” Hence, all responses collected were collated based on the selected variables on a excel sheet.

Analysis

The Delphi sessions conducted at Philips Design were qualitative in nature and collected responses in the form of expertise, actions, experience and opinion hence, making it difficult to quantify the responses. On qualitative analysis, Crisp et al (1997) suggests that Delphi technique should not use percentages and the process should stop when the data is consistent between all participants. Lincolna and Guba (1985) add that criteria for qualitative studies and analysis should be made on three important points; credibility of the information collected; applicability of the information and consistency of the information.
Therefore, the units of analysis for the Delphi technique was focused on the seven variables selected. These variables defined the criteria on which the innovation process was to be defined and Delphi sessions gathered information from the thinkers, practitioners and stakeholders (see details in later description stages 3A and 3B).

The Delphi session at Philips Design was done in four stages inspired by Linstone, H. A. & Turoff, M. (2003); phase one – exploration of the subject under discussion; phase two – identification of units of agreements and disagreements between participants; phase three – detailed exploration of the disagreements and analysis of the underlying reasons for the disagreements to occur and phase four – final evaluation and feedback for consideration.

The design for Delphi session was then put into application at Philips Design in six stages described below.

**Application of Delphi Within the Six Stage Mapping Process**

As stated above, a Delphi technique was applied to extract the implicit information and transform it into explicit material. Workshops and one-on-one interviews supported the Delphi sessions in a six stage mapping process (figure 1). This established a strong platform for the researcher to build a connection between data collected from past Philips Design communications and current information gathered from the participants. The stages were as follows:

Stage 1: Internal literature search
Stage 2: Mapping Philips Design literature on an evolutionary timeline
Stage 3A & 3B: Informal description of the process by the practitioners and formal description by the thinkers
Stage 4: Comparative analysis
Stage 5: Refinement of the map
Stage 6: Validation of the map
**Stage 1: Internal literature search**

This stage involved a preview of Philips’ literature outlining the different concepts of innovation over the past eight years. This process helped to build an understanding of the culture and thinking of Philips Design. The source for the literature was; past power points, process papers, conference proceedings, event details, experiments, and prototypes etc. published by Philips Design employees over the last eight years. Following the literature search, the relevant data was arranged on the map to find connections (figure 2).
Visual mapping of internal past literature helped identify connections and gaps in secondary data. A similar map was constructed for the process that established the role of design within Philips based on the internal literature search (figure 3).
Stage 2: Mapping Philips Design literature on an evolutionary timeline

In order to identify milestones achieved by Philips Design, the researcher arranged the relevant secondary data collected in stage one on an evolutionary timeline (figure 4). The timeline assisted in identifying connections in the literature, and identified the historical evidence that led design to be established as a functional lead at Philips Design. The timeline identified the role of design within the corporation and visualised the change in the design innovation thinking. For example, in 2002, Philips recognised the use of design research to understand the change in the personal and social environment. In 2004, Philips involved design in making a creative portfolio for value propositions, which resulted in recognising design as a function within Philips. The Design function was seen collaborating with other functions like technology and strategy in 2005 and 2006. Between 2006 and 2008 design was seen collaborating in research on social innovation projects, health and independent living applications etc. Finally, in 2009 design was integrated into the new corporate development programme called the ‘functional leadership programme’. The timeline highlighted that in a span of eight years Philips Design got the status of a core function within Philips and was part of the functional leadership programme.
2002/2003
Building an understanding of people, technology and environment.
Did project to establish a balance between freedom and system.
Identified the activity flow: potential, nature, diverse, growth and vitality.
Saw value in sensation, action, reaction and value.
Conducted a project of open tools for human engagement with work.
Started the research for innovation, a holistic approach towards developing a creative portfolio.
Started using ‘persons’ as a research tool.
2004
Involved in value proposition for the organisation.
Worked on the concept of mass customisation.
Worked on changing trends in Philips Design towards increasing efficiency and accelerating functionality.
Concentrated on putting ‘vision into practice’.
Started the high design process.
Started focusing on core competencies.
Connected innovation with design.
Worked to get long term and sustainable experience.
Build the concept of SKMotion: Felt communication emotion, idea and information in order to
sculpt data completely to enhance and enrich its meaning.
Collaborated in starting the TDDO approach: Technology and Design objectives in a collaboration. Build the slice of life pro-
ject with this collaboration. Started to make a connections between the physical and the mental world.
2005
Developed a project called ALÆSBI: Through the concept of [S+M] Sensorial, Memory and imagination.
Started deep customisation: New things will be driven designed directly by the needs of the user and so much
by the designer.
The project were made more context driven.
Concentrated on experimental design.
Promoted mass adaptation.
Final decisions were made on the themes for Philips creative portfolio through the value proposition programme.
2006
Started supporting business capabilities.
Iniilised foresight by design.
Conducted open innovation projects.
Build contextual experience.
Design started being used for precreation.
Started focusing on quality of life.
Concentrated on design for emerging markets.
Initialised the TODOSO approach for probes: Technology objective, design objective and strategy objective in col-
laboration.
2007
Worked on democratising the future.
Started the concept of context economy: connected ecology, ecological growth.
Began adding to the economic value: personal value, social value, global value.
Started to focus on healthcare and wellbeing.
Evoking through social innovation delivered through technology: social needs, social research and social in-
novation.
2008
Enabled healthy living.
Enabled independent living.
Integrated design with brand and innovation.
Focused on global trend and paradigm research.
2009
Started designing to value people by valuing people.
Created innovative, experimental and refined solutions.
Started putting focus on the brand.
Invented new methodologies for design probes.
Integrated into the new corporate innovation programme: Functional Leadership Programme.

Figure 4: Evolutionary time-line for Philips Design from year 2002-2009. (Aftab, M., p. 140)

Stage 3A & 3B: Informal description of the process by the practitioners and formal description by the thinkers
Stage 3A & 3B were carried out with the intention of aligning the thinkers and practitioners and defining the innovation process. Figure 5 gives a graphical representation of the structure of the steps within stage 3A and 3B.
The Delphi approach started with a workshop involving all participants. This session was infested with disagreements between the participants, especially the thinkers and practitioners. As discovered during the case study, the reason for the disagreement was due to the different work patterns of the practitioners and the usability and usefulness of the variables for them (Aftab, M., 2013, p. 136). The thinkers and stakeholders took the final decision in choosing the variables in accordance with the audit requirements. The variables selected were:

- Name of the step
- Focus summary of each step
- Timeframe for each step
- How – Different levels within the step
- Required input for each step
- Key activities (Philips Design)
- Deliverables/Output for each step
- Who – Core or sub-step owner
- Who other – Other stakeholder involvement details
- Remarks – A reflection column for any learning.

Simultaneously, small group Delphi sessions were used to streamline the first map of the process based on the selected variables. The Delphi sessions at this stage were conducted with thinkers and practitioners separately and then a rough map collating both opinions was constructed on an Excel spreadsheet (sample figure 6). Figure 6 was then shown to the audit team and the thinkers for approval and feedback was provided.
Several iterations of the small groups Delphi sessions were made in order to streamline the design innovation process map.

**Stage 4: Comparative analysis**

The next stage was carried out to compare the top-down formal description by the thinkers against the informal bottom-up description of the innovation process by the practitioners. Therefore, Delphi sessions were followed by one-on-one interviews with practitioners who were identified as the owners of the steps and the sub-steps within the innovation process and thinkers who constructed the innovation strategy (figure 7). While the thinkers were merely approving the refinements of the map, the practitioners were responsible for refining it based on their intuition, experience and work requirements. This step helped the practitioners take ownership of the process and refine it. Additionally, this led to a pragmatic definition of the map for the purpose of reflection, refinement and audit.
Sample 7: Process design for stage 4. (Aftab, M., 2013, p. 141)

Stage four ended with an all-participant workshop where the thinkers and practitioners agreed to the need to further refine the map and add a cyclical reflection procedure in the annual plan. The output of this stage was a consolidated excel sheet description of the design innovation process, which had all the details necessary from all its stakeholders as compared to figure 6 (excerpt figure 8).

![Diagram of the process design for stage 4](image)

Figure 8: Excerpt from the full Excel version of the explicit innovation process map. (Full map available at (Aftab, M., 2013, p. 13)
**Stage 5 & 6: Refinement and validation of the map**

Further one-on-one interviews were conducted to refine the map at a microscopic level. This stage also addressed the process of making the map transferable to stakeholders and other sectors. Hence, the Excel sheet was converted into small A4 size graphical images. These graphical maps visualized the communication flow, the point of contact and the departments involved at different levels of the design innovation process (Figure 9).

![Graphical representation of the innovation process map including subprocesses.](Aftab, M., p. 143)

Stage six involved Delphi sessions with thinkers, stakeholders and the audit committee at Philips Design. This session was focused on validating the detailed Excel map, the graphical map and the ways in which the RD&I team can engage in communicating their role to a wider audience within Philips Design.

**Conclusions: Evaluation and guidelines**

The Delphi approach at Philips Design was aimed at defining, validating and refining the innovation process and reaching a consensus between the thinkers, practitioners and stakeholders in making the process explicit and auditable. Use of Delphi technique enabled the RD&I team to unanimously identify and explicitly define their innovation process; the process defined was then validated within Philips Design. Hence, the use of Delphi for this purpose was successful and led to fulfillment of the aim of the internship. However, this tool had its
strengths and weaknesses, which are highlighted in this section. Based on the researcher's experience and observations and secondary research (de Loe, R. C., 1995, Landeta, J., 2006), guidelines are provided for designing Delphi sessions for design process mapping and the alignment of multinational corporations.

**Benefits and Limitations**

The benefits of the Delphi technique can be summarised as follows:

**Engagement:** The Delphi technique allowed the selection of participants based on the structure and communication channel of the organisation rather than mere knowledge and expertise. Moreover, in the case of mapping processes, the best participants for Delphi were deemed to be the practitioners of the process and then those who conceptualised it. The Delphi technique made the two separate groups of thinkers and practitioners interact and align their thoughts during the administration of all-participant workshops, thereby engaging all participants in co-creating an explicit, auditable innovation process and a reflective RD&I team. This was a profound strength of the technique.

**Flexibility:** de Loe, R. C., (1995) provided examples showing that Delphi sessions could allow high levels of flexibility, therefore he could incorporate tools like workshops within his ‘policy Delphi design’. In the case of the Delphi technique at Philips Design, flexibility led to the inclusion of one-on-one interviews and all participants' workshops within the administration of Delphi sessions. This ensured confidentiality and unbiased data collection.

**Efficiency:** Involving thinkers, practitioners and stakeholders within the premises of Philips Design proved to be inexpensive. Most communication happened face-to-face leading to efficiencies in time and people management.

**Effectiveness:** The iterative nature of the Delphi approach and the combination of interviews and workshops made it possible to involve participants while keeping in mind the structure of the organisation. This led to interaction between different hierarchies making the process definition successful and fruitful for the team.

**Reflective:** The Delphi technique made the participants engage in a dialogue leading them to reflect on their action as well as the process. This made the definition of the process more reflective and enhanced the accuracy and viability.

The Delphi technique is most effective when flexibility is allowed in its design. The most important aspect for the administration is to achieve a consensus between the thinkers and practitioners as well as providing them with individual
freedom and anonymity.

As with any other tool, Delphi technique also has its limitations. Needless to say, when this Delphi is applied in other organisations, the influence of organisational structure and hierarchy might present new challenges that are not identified in this paper. The limitations found in this research can be summarised as follows:

Firstly, the limitation to the application of Delphi is its correlation to the structural, hierarchy of the organisation and the team, making confidentiality and anonymity crucial issues. Initially, the practitioners at Philips Design did not engage in sharing their activities, leading to a two-month extension in the internship. However, being stationed within the Design team helped the researcher gain the trust of the team members and access relevant data.

Secondly, the influence of individual and group culture was immense during discussions in Delphi sessions. The Dutch belief in co-operative culture made most discussions long. All-participant workshops required the thinkers and practitioners to come to consensus on the variables on which the mapping of the innovation process was defined. Sessions had to be repeated for three consecutive weeks without any results. Consequently, the researcher had to involve the stakeholders and chose the variables depending on the need for an auditable process rather than the thinkers or participants. Later, the thinkers were asked to approve the selected variables and then the same was communicated to the practitioners in the following sessions. This sequence of event illustrated the thinkers to be the decision makers in Philips Design.

Thirdly, the information produced by the Delphi sessions was compiled in an Excel sheet as shown in figures 7 and 9. This was done to uphold the anonymity of participants and gather accurate and unbiased data. Although the Excel sheet articulated the innovation process, it could not communicate the depth of discussions that followed during the Delphi administration and interviews. As a result it showed the innovation process as a static, rule bound activity. Nevertheless, it did make the process explicit and the inclusion of graphical representation of the innovation process led to the inclusion of certain levels of design and human factors within the definition of the process.

Finally, the information gathered applying Delphi was difficult to correlate with predefined variables on an Excel map. The depth of discussions as stated above used to expand the premises of the innovation process making it difficult for the researcher to refocus the participants back to the innovation process. It was difficult to assess the support and opposing arguments from the discussions. Consequently, extensive coding had to be incorporated to identify the arguments in favour or against the process.

The outcome of the internship led to the conclusion that Delphi technique was the right tool for explicitly defining the innovation process and aligning the thinkers and practitioners. The key for any future application of this process is to
recognise the flexibility in the guidelines, the benefits and limitations, and apply the tool appropriately. Though it is not able to express the valuable human interaction and discussions during the Delphi sessions, nevertheless, the design approach helps in explicating the process knowledge for organisations, which otherwise is challenging.

**Guidelines**


**Group size** – The objective of mapping innovation processes was to align the thinking of thinkers and practitioners involved in the day-to-day activities within the process. The choice of the participants for Delphi sessions was taken away from the researcher and depended on the structure of the team involved in the process. Hence, separating a team into different groups was a good decision. Additionally, administering separate all-participant workshops was important to ensure a consensus in all decisions.

**Mixing tools with other creative methods** – Delphi sessions must be combined with other methods like one-on-one interviews, workshops, surveys, market research etc. Mixing methods helped anonymity and confidentiality of the participants, validity and accuracy of data and simultaneous reflection on the process of mapping.

**Deciding variables on which the process will be mapped** – The outcome of the stated Delphi approach is to explicitly define an innovation process, aligning the thinkers and practitioners who run the process. Hence, the variables on which the mapping was to be carried out had to be fixed before the process of discussion and debate began. Decisions about variables helped in data categorisation and validation in the later stages of the process.

**Communication of the outcome** – Dissemination of the outcome to the participants is very important when research involves multiple participants. Hence, once the research process was over the process and the outcomes were shared with the wider audience.

**General Conclusion**

The Delphi approach and the six step mapping process is an efficient, flexible, robust and a trustworthy tool to be used by practitioners and researchers in
understanding and mapping innovation processes. It helps in identifying the current competencies, skills and knowledge that the team has acquired over years of practice. Additionally, it helps the team identify where they want to be and the competencies and skills they need to acquire to reach that position. When this Delphi approach is mixed with other methods and tools they strengthen the process and develop an environment that enables co-creation by the team in the creation of a reflective innovation process for the future.

References


**Dr. Mersha Aftab**

Dr. Mersha Aftab's research interest lies in Design Leadership for Innovation. She has embarked upon this journey by completing a PhD in collaboration with Philips Design based in Eindhoven. Additionally, her practice has made her collaborate with multinationals like Nokia, Daimler, Airbus and Lego. She is focused on mapping strategic level design led innovation processes in order to establish design as a functional leading discipline in multinationals and plans to expand this research across the three sectors within United Kingdom.

**Professor Robert Young**

Young's research and teaching interests cover studies that explore the future of design practice; design's evolving role within society; design innovation and
entrepreneurship, including contexts to create new economic, social and environmental value in business and society, promoting design-led innovation in industry. And, within the area of social innovation through service design; understanding how designers can use their skills, creativity and enterprise to envisage, shape and create a better world through co-creative processes.

Three framing aspects have been recurrent throughout his research into for and through design practice i.e.: the contents, processes and contexts of designing. These aspects work in conjunction with the three types of knowing referred to by Polanyi as; tacit, implicit and explicit knowing. The issues that these aspects and types of knowing throw-up include questions about:
- The traditional and evolving role of the designer?
- Design as a Creative Process?
- The increasingly strategic use of Design and design thinking in business and society?
- Why design is continuing to grow in importance and how it will affect our wellbeing and sustainability?
- The emerging challenges and opportunities for the Designer and the Designer's influence on society?