Meanings and uses of design for innovation: conversations with UK companies

Ricardo J Hernandez[ab*], Rachel Cooper[c], Constanza Miranda[d], Julian Goñi[d]

[a]*DILAB School of Engineering, Pontificia Universidad Católica de Chile, Santiago, Chile*
[b]*School of Design, Pontificia Universidad Católica de Chile, Santiago, Chile*
[c]*Lancaster University, ImaginationLancaster, Lancaster, United Kingdom*
[d]*DILAB School of Engineering, Pontificia Universidad Católica de Chile, Santiago, Chile*

*Corresponding author

Abstract

In this paper we discuss how design can have different meanings and uses in practice and what of those are related to innovation processes. The paper looks at diverse theoretical stances in regard to the meaning of design. Later on, the paper describes data collected through in-depth interviews with fifteen UK companies in the manufacturing, engineering, transport, urban living and digital services areas. The findings inform our understanding about definitions and uses of design. In addition, we identify some of the difficulties companies experience in measuring the value and contributions of design, and illustrate alternative methods companies use for that purpose. The paper concludes with a synthesis of the findings from this research.

Keywords: design; design ontology; design in industry; design epistemology; design and innovation

Introduction

A recent literature review (Hernandez et al. 2018) revealed multiple definitions and uses of design that have coexisted in practice, academia and research during the last 30 years. These multiple definitions are an insight into the reality of the design practice. Design's expansion in industry has come with a diversity of views and approximations on the ontology of design. In the literature review mentioned, six major groups of definitions and uses of design were categorised as: 1) design to differentiate, 2) design for the introduction and adoption of innovations in the market, 3) design to transform ideas into concepts and 4) design as a (creative, generative) thinking process, 5) design as techniques to articulate ideas and, finally, 6) design to integrate concepts, people and functions. The review exposed the changing nature of the practice of design and how it could be considered as an open

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epistemological system that welcomes different world views.

These results were validated further by a national survey carried out in UK on 2015 (Hernandez et al. 2017). The survey was answered by more than 300 companies, and 158 completed surveys were considered for the analysis. The results revealed that the most common meaning applied to design found amongst the companies was 'as a creative process' while other definitions like 'design as a creation of artefacts' had much lower recognition. However, design was also recognised by the respondents as 'means to improve the experience for customers' and as 'a differentiator'. The same survey also confirmed that multiple views of design and its contributions inside an organization could coexist. Nonetheless, there was no clarity on why and how this happens. More than a 70% of the 158 companies surveyed have a design department, but there is no clarity on how that department works in the organisational structure or even if there is any consistent approach to comparing its organisational performance across companies.

These gaps in knowledge led us to consider the need for a more in-depth and contemporary study related to the perceived role of design in today's companies. Therefore, we carried out a set of in-depth interviews with companies from diverse industrial sectors investigating routines that exposed that design plays a role and has an impact on their performance. We focused especially on the role that design played in their organisations, the hurdles to measure its impact, and in the relationship between the personal and organisational view of design.

Design's diversity as a philosophical theme

As frequently illustrated in previous work "Design" tends to mean different things to different actors, both in academia and in practice. In this diversity lies a philosophical question: "What, in general, is design?" (Love 2000, 293). This question may seem like a fundamental academic theme to explore in order to resolve the conceptual disputes. Nonetheless, the ontology of design has largely been overlooked by academia (Lakew and Hedström 2016). There isn't even agreement whether this diversity is a true philosophical problem.

For instance, Buchanan (2004, 1) argues that "one of the strengths of our field is that we hold different views". Buchanan sees a practical value in the ontological diversity in design, as every philosophical perspective serves different practical objectives. As a result, "design eludes reduction and remains a surprisingly flexible activity" (Buchanan 1992, 5). In his words, the field should "understand that definitions serve the purpose of shaping a particular line of inquiry and that the field will be vital as long as definitions come and go" (Buchanan 2004, 15). Epistemologically, Buchanan is a pragmatist in the tradition of Dewey (Buchanan 1992). Under a Deweyan pragmatism, concepts (such as design) are not intended to faithfully represent the world. Instead, concepts are just tools that helps us with purposeful actions (Garrison 1995).

Love (2000) on the other hand, argues against the uncontrolled forms of diversity in design. To Love (2000), the philosophy of design should order the chaos of design theory through the establishment of coherent meta-theoretical structures. Love's position has inspired a series of discussion about theoretical unity, or as Galle (2008) puts it, around "the problem of disintegration" in design studies. These academics of integration (Cash 2018; Galle 2008; Kroes 2002; Love 2000; Green, Southee, and Boult 2014), as we might call them, have sought to present a unified design essence. Underlying their arguments is the vision of design as regular scientific discipline with relatively porous but ultimately closed epistemic system. This has not classically been the epistemic of design, and this poses great dangers. As Cash (2018, 109) puts it: "we can no longer continue doing what has always been done." To the academics of integration, a unified ontology of the design process, through the creation of a hierarchical framework of concepts ought to be the basis for a shared understanding between designers (Green, Southee, and Boult 2014).

Design as an epistemologically open knowledge system

In his seminal work (Simon 1996) argues for the need of a design science. Nonetheless, this new science of the artificial is meant to be different than natural sciences. He stated that "the natural sciences are concerned with how things are. Design, on the other hand, is concerned with how things

ought to be" (Simon 1996, 114). In Simon's (1996) the epistemology of design is primarily ethical, axiological (concerned with values) and specifically deontological (concerned with duty, how things ought to be). In this epistemological stance, the central figure is the designer, who is defined not by his specific knowledge but by his impact. (Simon 1996, 111) claims: "everyone designs who devises courses of action aimed at changing existing situations into preferred ones". Under this definition, almost everyone designs. Therefore, designers are not bound to any particular knowledge system.

More precisely, for Simon (1996), design knowledge is not a specific theory or content, but rather an umbrella term for knowledge domains aimed at being useful and not accurate. Engineers, clinical practitioners, strategists and a whole lot of professionals may fall under the category of designers, at least in the broad sense of the concept. This approach may hazard the epistemological limits of design as taught in design schools, that is, as an independent and distinguishable discipline – at least to integrationist academics. Cross (1999, 5) argues that "our concern in design research has to be the development, articulation and communication of design knowledge. Our axiom has to be that there are forms of knowledge peculiar to the awareness and ability of a designer". Here designer means the professional designer. For Cross (1999), design knowledge is to be found in people (designers specially), processes and products. Ultimately, Cross (2001) mentions that design is defined by its intellectual history, even if this history was built by importing concepts from other knowledge cultures. It is this (open) history which has created "designerly ways of knowing, thinking and acting" (Cross 2001, 55).

Design's value is usefulness not accuracy. As Miranda (2013, 16) puts it: "its fuzzy theoretical condition creates a permeable epistemological knowledge system that is open to exchanges […] It is a community of practice that can lend its infrastructure to other disciplinary tribes […] this makes designers great drivers for multidisciplinary collaboration".

A Wittgenstenian approach to the meanings of design

Wittgenstein (1958) argues that to understand a concept (design) we must understand how is this concept explained. To Wittgenstein (1953) to understand a concept is to understand how this word is used in a particular context (a language game). It is concretely what people seek to achieve through

words, not some invisible transcendental meaning nor and internal/external object. So, the question: "What is design?" is for Wittgenstein a bad start. It is better to ask: "What do certain people try to achieve using the word "design"? What does it produce in different contexts?

The answers to these questions may be widely different. For instance, when people use the word design, they may use it to point at the discipline of design, at the action of designing, at the product or at a particular process. Even more, just the action of design may mean different things at different language games. When people say at marketing meeting "we have to design a commercial logo" they are pointing at a different activity to when people at a research meeting say "we have to design a new experiment". Wittgenstein (1953) says that language here is deceiving. Just because a word is phonetically and visibly the same in all contexts, it doesn't follow that they all mean the same. Figure 1 represents the "deception of language" according to Wittgenstein (1953). When we use a concept (e.g. design) in different context, we feel as if they must share a same meaning across contexts because they share the same letters and sounds. For example, if we use the word design when speaking about art & design, we are inclined to think it must share the same meaning across other uses, such as bio-chemical design or marketing design. We feel as if words always have a core meaning that defines them regardless of the context of use.
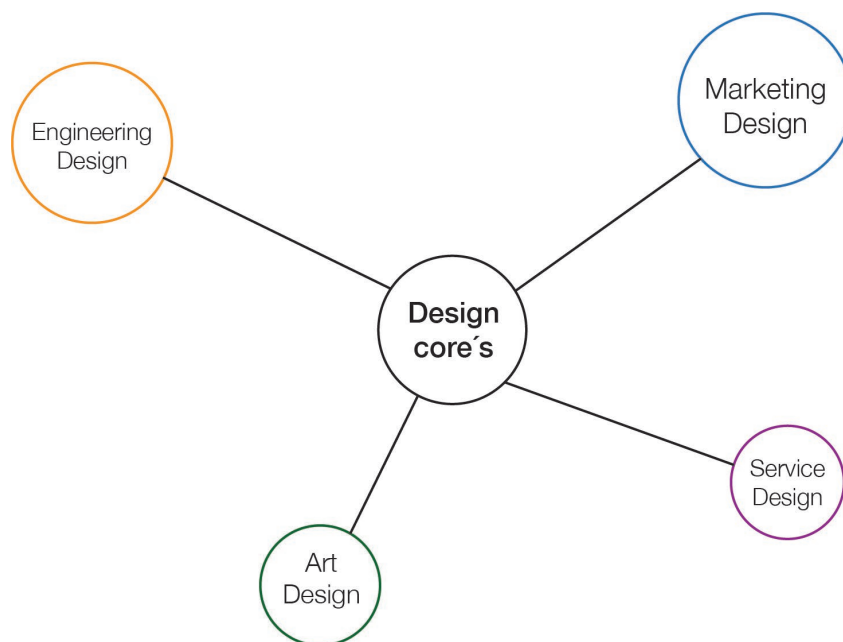

Figure 1. Example of language's deception to Wittgenstein (1953). Source: Authors

Of course, a Wittgensteinian (1953) approach wouldn't claim that all of the uses of design have completely different meanings. They may share what Wittgenstein (1953) calls "a family resemblance". When we examine these different word uses "we see a complicated network of similarities overlapping and crisscrossing: sometimes overall similarities, sometimes similarities of detail. I cannot think of a better expression to characterize these similarities than family resemblances." (Wittgenstein 1953, 66). Figure 2 represents the Wittgensteinian idea of family resemblances according to which some uses of a words may have resemblances with each other but there is no core of meaning at the centre of them all. For example, art design might be related to marketing design or service design in some aspects, but it has little to do with design in the context of engineering design. In other words, they do not share a core of meaning across them directly, despite that the use of the word design is correct in each particular context.
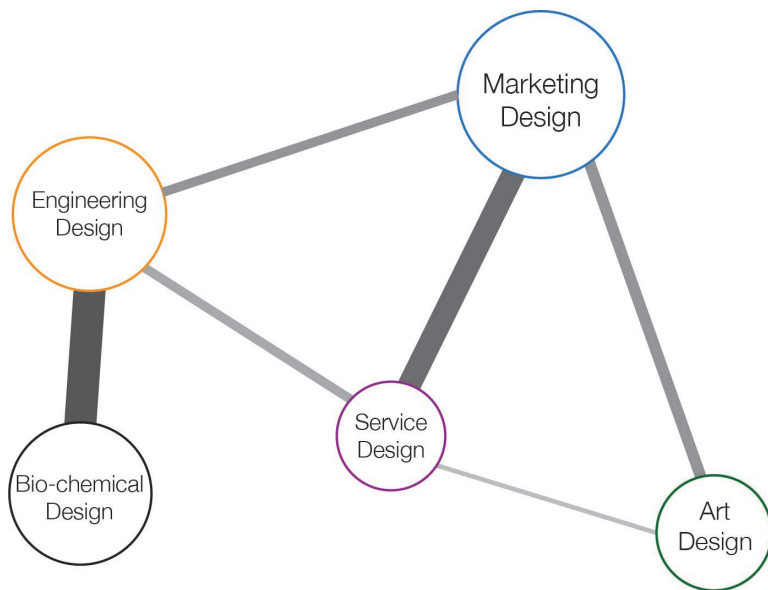

Figure 2. Example of family resemblances between meanings of design. Source: Authors

In sum, Wittgenstein's (1953, 1958) perspective could be useful to change our examinations about design. In practice, we shouldn't ask ourselves about the definition, impact or perceptions of design, as if, there was an underlying essence between all different uses. This sort of question may

produce more confusion than solutions. We propose initial distinctions to contextualize the different uses of design. These linguistic forms of design will mean different things in different language games, but we note that they are concrete differences between these uses of the word:

(1) **Design (with a capital D):** We can use the word "design" to point at the discipline of design. Following Cross (1999, 2001) we think that this discipline is best described by its intellectual history, by the knowledge of its people, products and processes.

(2) **(to) design:** We can use the word "design" to point at the broad action of designing. In the sense of Simon (1996) a designer can be anyone who purposefully devises an action plan aimed at creating better situations. It is important to note that in organization there is an important amount of "silent design" (Gorb and Dumas 1987), that is design by non-designers who are not aware that they are participating in a design activity. Also, the verbal form of "design" can be used to differentiate and compare actions plans: "Should we design it this way or another way?".

(3) **(the) designs:** We can use the word "design" to talk about the specific artefacts created by design. Artefacts is here understood in the broad sense (Ulrich 2011), which can encompass art through physical products and processes. Extending (Russell 2002) definition, designs produce differences in the material possibilities of the world. Of course, more often than not, the actual uses of an artefact is different than the intended plans of the designer (Bredies, Chow, and Joost 2010).

(4) **(the) designer:** We can use the word "design" to talk about the person behind the act of designing. Usually, the word "designer" is used to describe people who studied design or who are explicitly design professionals.

This initial distinction is helpful in the pursuit of a more contextualized and practical understanding of design from a linguistic standpoint. The aforementioned review conducted by (Hernandez et al. 2018) already shed some light into the uses of design in the academic language 'game'. Nonetheless, there is still a need to understand how design is understood and used in industry. This article seeks to inquire into the uses and meanings around design in the context of different companies in the UK. An inquiry

into the industrial definitions and perceptions of design will help to identify not only if the diversity and confusion of design is present beyond academic institutions, but also, if found, how this diversity is explained, managed and problematized.

Methodology

As part of an UK Arts and Humanities Research Council (AHRC) funded project called "The Value of Design Innovation" we undertook in-depth interviews with 15 individuals in 15 different companies in the UK to investigate and unveil their understanding on the design practice. The contact with these companies was made in collaboration with Innovate UK, a governmental agency in charge of the implementation of innovation incentives for industry across the UK. We targeted companies in four industrial sectors: urban living, transport, digital economy and manufacturing.

It was in our intention to complement this qualitative information, with a thorough literature review that typified definitions of design and its uses (Hernandez et al. 2018) and data obtained from a national survey that explored the same aspects (Hernandez et al. 2017).

We carried out a qualitative research design involved semi-structured interviews (Russell Bernard 2006) to address what are the uses and meanings of "design" to the UK industry and how companies measure its impact. The purpose was to compile multiple perspectives in industry with people engaged with design activities at different levels. Figure 3 lists the companies' sectors and interviewees (informant).

Figure 3. Company and interview informants

The national survey (Hernandez et al. 2017) served to develop the interview protocol and to define particular questions. The focus of the questions was not to validate or interpret the general academic definition of design, but to generate evidence of the definition of design in practice. The overarching research question could be summarized as "how do companies perceive the design contributions to innovation and what are the practical definitions that they give to its application".

Data Collection and Analysis

Data collection involved semi-structured interviews that lasted from 50 to 120 minutes. Each interview was carried out by two researchers on the premises of the companies. The interviews were audio recorded and then transcribed in full length. During the phase of analysis, we used Grounded Theory (Bryant 2002; Charmaz 2006; Corbin and Strauss 2008; Glaser 1978; Glaser and Strauss 1967) to code and discover recurrent themes in the data. We used intercoder reliability to converge into final codes. These were triangulated with results from the previous literature review and survey to

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reveal five major themes.

Findings

The findings revealed a high variety of perceptions of design and how it is used in industry practice. We found remarkable differences between the understanding of small firms in comparison with the perceptions of large companies. We also found that in small companies the definitions used to describe what design is and how it is used, was reflected in large measure, by the overall organisational perception, while in large firms there can be two different views, one personal/individual view and another aligned with the organisational culture and vision. The interviews exposed that even in one company different views can coexists and there is not necessary a common language in relation to how people understand and use design. In the following subsections we present the main issues found during the interviews. In Appendix A specific quotes from the companies that help to illustrate the findings are shown.

Design is understood and used in multiple ways

According to the respondent interviewees design is not 'one thing', and it is more than just styling. Some companies even claim design is embedded in almost everything the company does.

 "[Where the company uses design]...pretty much in everything we do because if you are creating anything, whether it's a project or a service you need to design it. You need to design it so that it's suitable for the purpose you are designing it for." CEO, Company 8.

It is referred as something transversal, embedded in a variety of activities and functions in the company. In these large and abstract definitions there is a positive view of the role design plays and how important it is for the organisation, but it is hard to apply specific definitions and perceptions when they are presented broadly.

One positive insight in these broad definitions is the connection informants acknowledge between design and the user. They think in design in some sense as the link between what they make as

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companies and what the market needs to satisfy their demands. In some sense these broad definitions present a strategic view of design.

"As I said, when I talk about what I do, my role is about integrating considerations into design but I approach it from the perspective that design is more than drawing something, it's the process by which we decide what we're doing." Engineer, Company 5.

In the companies testimonies it is possible to see design as an important vector in their decision process. Design is not linked to one particular activity, instead it is a force behind their business strategy.

Another view of design was presented by a CEO of a start-up in the digital service sector. It was an integrative view of design.

"Design, very interesting. I read your first question and I suppose in my mind I ended up, rather stereotypically probably, splitting it into stylistic stuff, graphics, style, how things look but I also quite quickly in my mind surfaced the theme of what, perhaps – I think you've used it somewhere else in here, it's more about process which is more about the principles and the ideas: how do you bring people together, how do you pursue an idea, how do you develop an idea." Owner and CEO, Company 1.

This view also relates to one of the groups founded in the literature review (Hernandez et al., 2018). Design is presented as an integrator of ideas, people, and actions (concepts, people, and functions). It is described as the ability to bring certain things together. In that sense it is more the capability of a person to trigger a process than any particular task.

Design is also defined by its functional uses, especially for large engineering and manufacturing companies. Design is usually related to technical activities at specific points of their production process. We found design was a word used to refer to drawings, plans, technical representations of a product and its parts.

Another interesting perception of design presented by a large engineering firm was identifying design as part of their research and development (R&D) process. Again the literature (Hernandez et al. 2018) confirms that for certain companies actually design is the "R" in the research and development process. In this case companies use design as the source of the knowledge to translate market needs into products and services.

Finally, design was also defined as an interface with the user. It was related to specific tasks done to create a physical or virtual interface with the user. In this case design was seen by its potential to create useful and meaningful experiences for the users. Design aligns the different means by which companies transmit a clear and a consistent message to the users. In this case design makes products and services available and intuitive for the users, dealing with technical details as well with aesthetics.

> "My understanding of design is it's an interface between how effectively how our business and our service and a user and if it's well designed and it's intuitive then people will use it. And if it's not well designed and it's not intuitive it simply will fail." CEO, Company 15.

Design can mean different things in the same organisation but in different contexts

We also found that design could have different meanings even for people in the same organisation. There are frequently different perceptions of design at different levels of the same company.

> "So, we've got good people around the maybe more style side and they would regard themselves at good at that, from a marketing and communications perspective. But much fewer that would recognise my kind of human-centred design idea, the idea that design is really an iterative process of bringing people together around opportunity and idea issue." Owner and CEO, Company 1.

Differences between perceptions of what is design in the same company can be a result of personal knowledge and training, but also illustrates that a common organisational culture around design could be absent. For example, it is often identified in the literature that engineers tend to see design as a technical activity whilst other people in the organization relate design to styling or even a strategic

perception, this resonates with our data.

The differences in the definition of design in the same organization was indeed linked to personal views and experiences. CEOs' show in general a wide strategic view of design and how it can be used, whilst they recognised employees at other levels in their organizations might not share their view. Some of them perceived this dissonance as problematic.

 "Absolutely and I would be very comfortable with abductive, deductive, inductive type reasoning, we would literally play those all off but again, not necessarily many of my colleagues would be comfortable in that language set, they are highly experienced but they are not necessarily comfortable in this sort of language set." Owner and CEO, Company 1.

There is still a lot of silent design

Design seems to be a discipline that takes place in companies without being recognized as such. The idea of silent design, introduced by Peter Gorb and Angela Dumas (Gorb & Dumas, 1987), is still very valid and relevant to describe what happens in some organisations in the relation to the use of design.

"Well we go through a very clear process of how we progress development. So, when we have a new use case what we do is we start with what we call a video challenge. A video challenge is basically we go into that environment and we film. And then we bring the video back and we analyse it to see if we can find in that video the information we want, the heart rate, breathing rate etc. So that's a non real-time exercise and the reason we do that is if we can't make it work in that environment then there's no signal there. So something (needs) to change, that doesn't necessarily mean it's impossible." CEO, Company 10.

It is clear that anyone familiar with the design process would classify this activity as part of the first

stages of a conventional design process: discovering the context and defining the design space (Design Council 2007). However, these are not recognized by this company.

Design and innovation are strongly related, but hard to explain

Companies perceive innovation as the ability to change, to respond to customers with better products and services. Despite the fact that incremental improvements are recognised as important, in general, companies relate innovation to more radical transformations.

Regarding the drivers to innovate, some companies mentioned being ahead of the competitors as the major trigger for their innovation process. Not all companies see innovation strictly attached to product development. There were some companies that recognised also innovation in their production process.

In general, it was hard for companies to define a relationship between design and innovation. Companies recognise that having design involved is necessary to be innovative, but they couldn't explain easily the link.

> "I'm just thinking if you do – innovative is just doing something differently to what is normally being done. If it's innovative it means it hasn't been done before so you need to do something differently, to do something differently requires design" CEO, Company 8.

Their answers exposed their difficulties and even their own recognition that they were not able of producing a good explanation.

> "I mean, back in my lazy answer of I think design is pretty much everything, I almost can't see one happening without the other. I don't know how you would innovate on something without using design to execute that innovation." CEO, Company 7.

For some companies the way they saw design contributing to innovation was strongly related to their own view of design. The CEO and Founder of one consultancy defined design as a set of principles

that he brings to the table in every project, and when he was interrogated about the relationship between design and innovation he said:

"For me design represents a set of ideas, principles, that I can bring pretty much to any activity and if I'm not seeing those principles being applied then I'm thinking in my mind 'we're not going to get a good outcome here, we're not going to get a good design' because if I'm not involved in my stakeholders who have actually got the problem, the issue, the opportunity, if I'm not involving a group of people who can bring a diverse set of ideas to the table to evaluate and test and explore, you just don't get the innovation." Owner and CEO, Company 1.

It is difficult to measure the impact of design

Companies exposed multiple difficulties in measuring the value of design. According to the interviewees, indicators like the return on investments associated with design activities were not easy to calculate. Some of those difficulties are related with the fact that there is a significant amount of silent design. Design activities not recognised as such and in consequence not evaluated as design contributions. On the other hand, companies report difficulties in separating design from other functions and operations in the organisation.

"Em…it would be hard to split off design because it would be almost inconceivable to take anything to market which hadn't had design in it." CEO, Company 10.

Design is even compared to other functions in the organization for example marketing, and it was explained that it was easier to calculate financial returns of a marketing campaign than in activities related to design. It seems companies found hard to separate design from other functions, if they cannot isolate design and define it as a separate construct, then it is difficult to measure its specific value.

"It's really interesting. I have a background that takes me into things like benefits and benefits realisation, big project stuff where you have to do a formal benefit tracking and all that.

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So, all that kind of stuff, it's easier for marketing. When you come to design though, design permeates all the way through that, design ought to play a part in your marketing, it ought to play a part in your delivery, it ought to play a part in your requirements gallery or whatever. So, it's quite hard to draw that thread out and give it the same status, almost, as you would marketing or sales or after-sales support or whatever it might be." Owner and CEO, Company 1.

Despite the difficulties, there are alternative ways companies use to measure the impact of design. Companies recognise the positive contributions design make to their businesses and they are very creative finding ways to evaluate it. Even if it is not in monetary value, companies assess the use of design in terms of the benefits it brings to the table during the dynamics of a project.

"If you don't bring the principles to the table then – so somehow there is a difference, bring the design principles to the table, measure the benefits, don't bring them and you are going to get less benefit. But I'm not sure I'd know how to…measure that, that will be a challenge, yes." Owner and CEO, Company 1.

They also rely on users' insights. If the end market has a good response or not, depends on their design strategies. Similarly, companies consider sales against financial plans as a good method to evaluate design activities:

"I guess when you get design right, when we're coming up with the design and getting quotes for (tooling) and how many we think we're going to sell for that year you have a kind of prediction and you say, 'right, the product that's in the market at the moment, this is going to replace…it's selling five hundred a year' and if you get your design right and it's popular and it gets good reviews then you are going to do better than that so I guess it's almost against that initial estimate of how well you predict it's…so if it's a good design." Design Director, Company 13.

Benchmarking against competitors is another way companies described evaluating return on

investment. Testing their products with potential users and getting their feedback was also recognised as way to know if the design was successful.

Discussion

Design is open, porous, pragmatic and therefore quite clearly a means to help companies to engage with innovation in different forms. However, a problem remains for the design profession and design academics. Design seems to be hard to define, measure and value. Openness and flexibility, which are some of its strongest assets for practice, are also one of their most important challenges for management. This gives us little evidence to convince policy makers, economists and industrialists of its enormous contribution to society. Perhaps not all aspects of design or not all designers have gone under the radar because of the challenge to talk about design, but at least some aspects and designers have, at least in the cases we have presented in this article. We should aim to make the tangible and intangible contributions of design visible. In this context we want to propose a way that might help researchers, academics and professionals to talk about design and how it is used. This process sometimes requires an effort of clarification and distinction making in order to make communication a more orderly game. We might feel the temptation to shrug our shoulders and simply say "Design can be many things to people". But, of course, to state that the meaning of a concept is contextual does not imply that no order can be given to its use.

We recognize the relationship between design and innovation is very complex, and concepts like dominant design, appropriability, and complementary assets (Teece 1986; Anderson and Tushman 1990; Murmann and Frenken 2006; Soh 2010; Srinivasan, Lilien, and Rangaswamy 2006; Suárez and Utterback 1995; Tegarden, Hatfield, and Echols 1999; Utterback and Abernathy 1975), are central to the discussion. We did indeed carry out a robust review about those concepts, but for a limitation of space and to be rightful to the scope of this paper we do not present it here. The purpose of this paper is to present what we found companies think about design and how they use design in their daily operations. We also do not aim to say if the way companies use the word design is wrong or right. We want to acknowledge the different ways companies understand and use design, and share it with other

practitioners that might feel represented by those views.

In the interviews we realized that one of the problems asking the companies what is design for them, was the precise meaning of the question itself. Were we asking to define design as a discipline, or as a process, or were we asking about design as an artefact? Actually, when we asked companies what is design for them and how they use it without giving them a more accurate context of what were we asking, we introduced complexity to the question and possibly implicit misunderstanding. We were asking the wrong question.

If we want to compare definitions and uses of design between companies, we have to be sure there is shared understanding about what design can be. In the theoretical framework, we introduced the idea of defining the use of the word design according to four distinctions: design as a discipline; design as a process; design to mention an artefact or tangible result from the process of design, and finally when we talk about the contributions of the designer as professional. Conceptual frameworks such as Storvang, Jensen, & Christensen (2014) have shown the different organizational levels at which 'design' can add value. Nonetheless, our distinction shows that different uses of design (discipline, process, artefact & professional) produce different outcomes regardless of the organizational level.

The immediate benefit this study could bring is to break the complexity of the task of trying to define design as one entity when it is really a multidimensional concept. It means that the first benefit of acknowledging these four distinctions is to assure that everyone is talking about the same concept. Therefore, if we would like to ask companies for their understanding of design as a process to develop their products and services, we should ask what is their design process, expecting a set of phases, steps or actions leading to make a product or service.

In the final part of the interviews we asked businesses how they measured the value of design in their organizations. Most of them recognized they do not have a particular indicator to measure exclusively the value of design, instead they use some alternative ways that we think are a great point of departure to propose a set of indicators to measure the impact of design depending on the use of design. In Figure 4 we present a proposal of those alternative methods to measure the value of design in relation to the four distinctions made about design and presented previously.
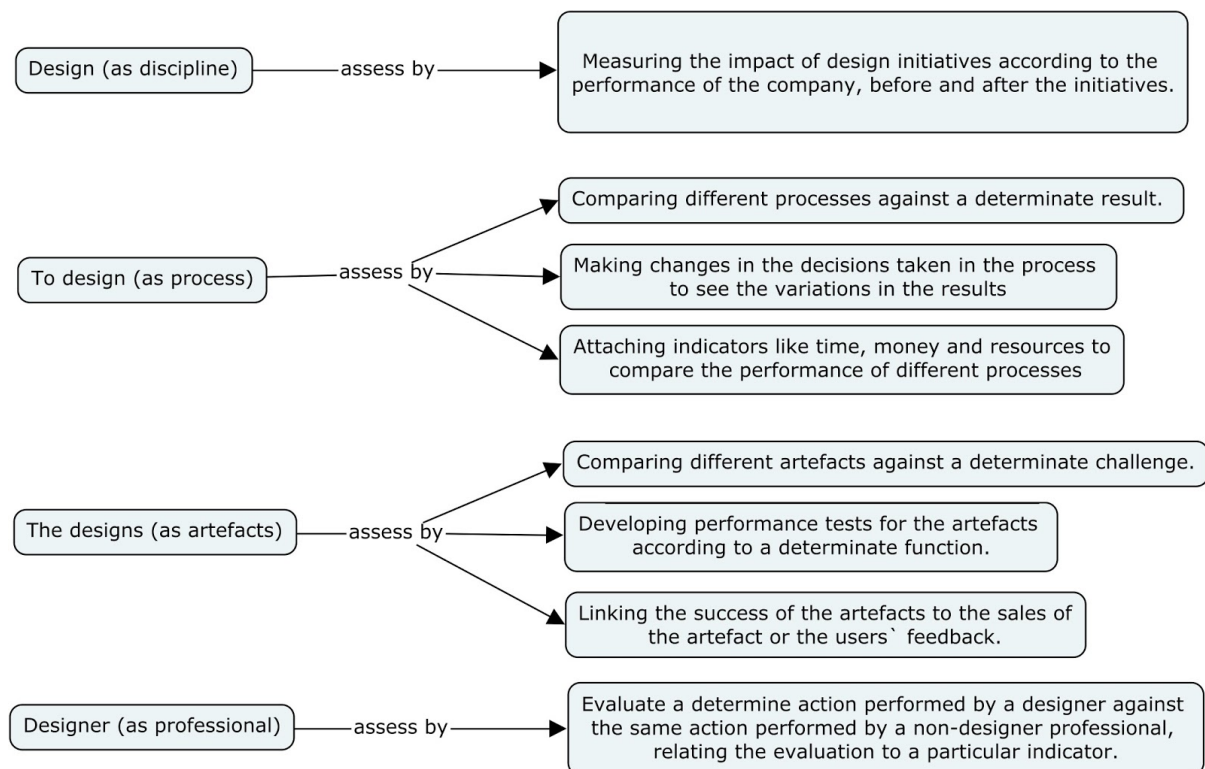
Figure 4. Design as a multidimensional concept

Another important insight from the companies` descriptions was to see the differences between the understanding and use of design between small and large companies. This has a lot to do with the capacity small firms have to integrate design into the organization, against the lack of that capacity in large organizations due to hierarchical levels, size of the companies, operations in different locations and the strength of personal views.

It is not in the scope or interest of this paper to make a taxonomy of design or to pretend those are the only four distinctions one can make about how to conceptualize design. Nonetheless, we believe it is a step in the right direction towards a better understanding of design as a multidimensional concept. In the end we share the view of Papanek (1985) when he said "any attempt to separate design, to make it a thing-by-itself, works counter to the fact that design is the primary underlying matrix of life".

During the interviews we saw a remarkable difference in the conceptualization of design between companies in the digital sector against companies for example in engineering and manufacturing. In general, for the later design was understood and explained in the process level regarding specific actions in the development and manufacturing of a product, while for companies in the digital sector the conceptualization of design navigates different levels recognizing design as a discipline, as a process and as a tangible result. We also identified similar differences between how small and large companies understand and use design. Those differences are one of the most valuable outcomes of this research. The descriptive nature of the paper aims to be a referent for other businesses and researchers doing similar studies. With the normal considerations we need to have about the context, we think some of these results can be very useful in other contexts and countries.

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Figure 1. Example of language's deception to Wittgenstein (1953).

Figure 2. Example of family resemblances between meanings of design

Figure 3. Company and interview informants
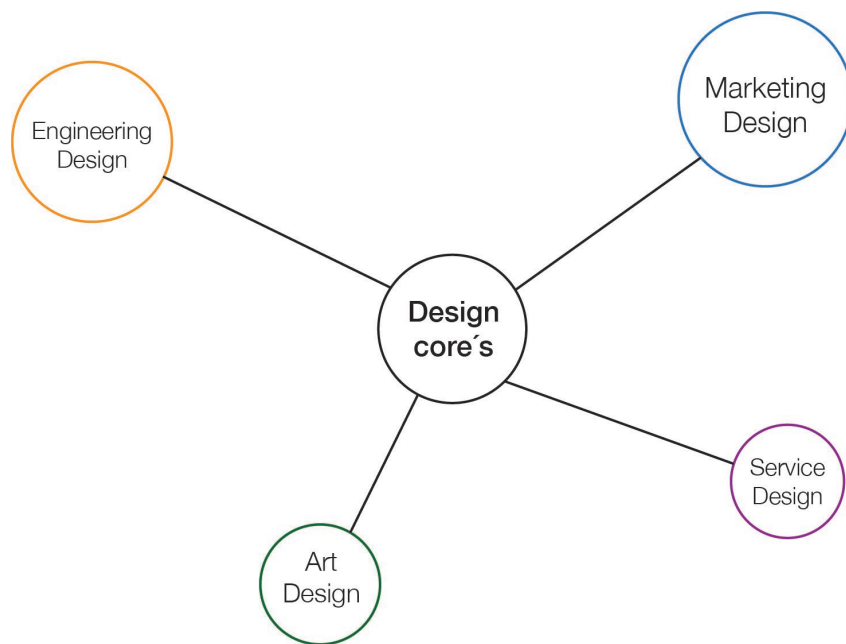
Figure 4. Design as a muldimensional concept

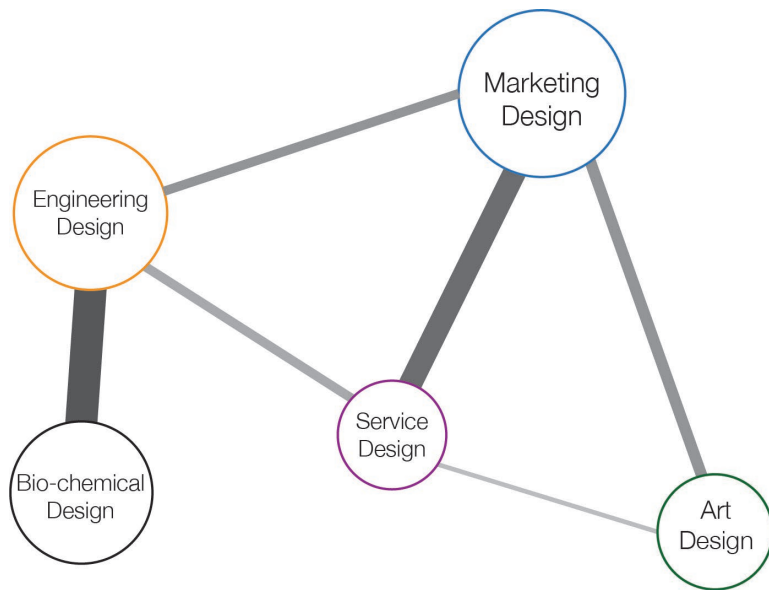Figure 1. Example of language's deception to Wittgenstein (1953). Source: Authors

Figure 2. Example of family resemblances between meanings of design. Source: Authors

■ Company 1, Urban Living, Founder and Partner

■ Company 2, Transport, Chief Engineer

■ Company 3, Urban Living, Co-Founder and CEO

■ Company 4, Manufacturing, Business Development Manager

■ Company 5, Transport, Manager Sustainable Development & HS Design

■ Company 6, Manufacturing, Chief Operating Officer

■ Company 7, Digital Services, Founder and CEO

■ Company 8, Digital Services, Founder and CEO

■ Company 9, Manufacturing, Founder and Managing Director

■ Company 10, Digital Services, Managing Director

■ Company 11, Manufacturing, Co-Founder and Director

■ Company 12, Digital Services, Managing Director

■ Company 13, Manufacturing, Marketing Director and Senior Design Engineer

■ Company 14, Transport, Business Startegy Manager

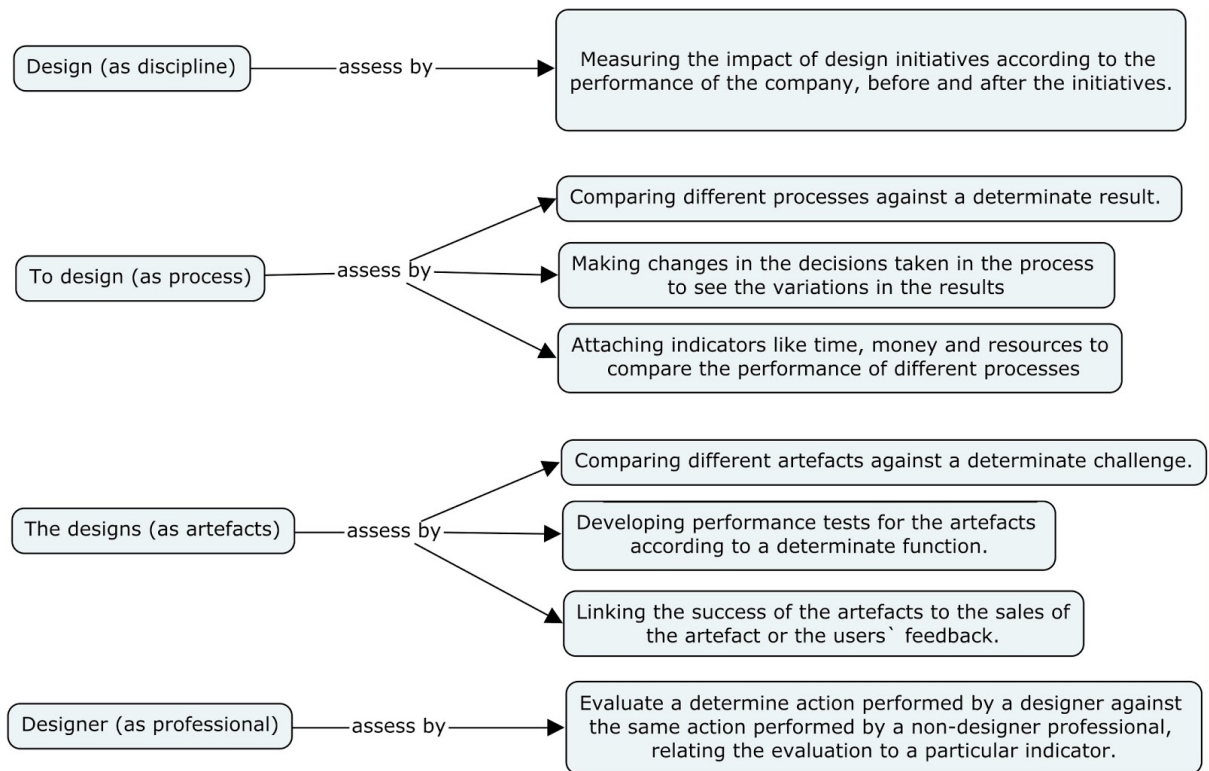■ Company 15, Digital Services, Founder

Figure 3. Company and interview informants

Figure 4. Design as a multimensional concept