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Critical Design: A Tool to Challenge the Implicit Values behind the Fourth Industrial Revolution.

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ABSTRACT

The Fourth Industrial Revolution is transforming human civilization in its scale, scope and complexity leading to a new landscape of uncertainty never faced before. This paper argues that the practice of Critical Design can help designers to face this uncertainty introducing a new conceptual space of debate. In this new social landscape of uncertainty, new emerging technologies are being implemented without a comprehensive or global view of how these technologies could affect human civilization in the future. Today the practice of design focuses more on exploring and identifying presumably positive applications of these emerging technologies, that it is on identifying and investigating their future adverse consequences. Both the positive and negative impact of these technologies need to be addressed in an integrated way if we are to face the immense challenge of the fourth industrial revolution. This paper addresses the question: What role can the practice of Critical Design play in challenging the values embedded in the technologies of the fourth industrial revolution? The purpose of this paper is to investigate how the practice of Critical Design can be used to create a greater awareness on the impact of decisions designers are taking today. I argue that the practice of Critical Design can be used as a tool to challenge the values embedded in the technologies of the fourth industrial revolution, providing a new conceptual space of debate for designers to test their decisions before they are fully implemented. Depending on how these decisions are addressed, the future of human civilization could be brighter rather than unfortunate.

Key Words: Fourth Industrial Revolution, Values, Critical Design, Human civilization

1. INTRODUCTION

One of the main challenges human civilization is facing today, is how to comprehend the Fourth Industrial Revolution - driven by the evolution of sensors, computers, and robotics - which is leading to a transformation of humankind in its scale, scope, and complexity. (Schwab, 2016, p7) Within society, there is a shift in the way people work, communicate, inform and entertain themselves. Similarly, governments and institutions as well as education, transportation, and healthcare systems are also being reframed. While the implications concerning the development and adoption of the emerging technologies of this revolution i.e Artificial Intelligence, remains uncertain, their complexity and interconnectedness across different areas of knowledge are demanding society as a whole – including designers – to take the responsibility of having a better understanding of how these technologies might evolve before they are fully implemented within society.

This paper argues that, in this new social landscape of uncertainty, new emerging technologies are being implemented without a comprehensive or global view of how these technologies could affect human civilization in the future. Today the practice of design focuses more on exploring and identifying presumably positive future scenarios of these emerging technologies, than it is on identifying and investigating their future adverse consequences. However, if we are to face the immense challenge of the fourth industrial revolution – meaning: distributing the benefits fairly, managing externalities and ensuring a human-centered future (Schwab, 2018)- both the positive and negative impact of these technologies need to be addressed in an integrated way. In order to do so, first, designers as well as all the members within the disciplines involved in the design, development and adoption of new emerging technologies, must be clear about the values that are implicit in these technologies. This values are considered critical as they have the power to determine which kind of future society is being created.

This paper proposes a new approach towards Critical Design that could lead to a new role of Critical Design within the design process. The suggested role, emphasizes and increases the awareness of the values that are already being embedded in the new technological adoptions and developments of this revolution. The purpose is to provide designers with a tool that will allow them to understand how and where human values are embedded within these new technologies. The aim is to help designers to take decisions that assure this values remains truly human-centered enhancing the future of human civilization. Depending on how these decisions are addressed, the future of human civilization could be brighter rather than unfortunate.

2. The fourth industrial revolution

Starting at the beginning of this century, the Fourth Industrial Revolution has been defined as a technology revolution built upon the digital revolution. (Schwab, 2018) This shift is characterized by a much more accessible and mobile internet, smaller, cheaper and more powerful sensors that are allowing the continuous development of Artificial Intelligence and Machine Learning as well as, new breakthroughs in a wide range of areas such as genetics and nanotechnology. The fusion of these technologies and their interrelationship between physical, digital and biological worlds is fundamentally what it makes this revolution different from the previous technological shifts. (Schwab, 2018)

2.1. Main challenges

The Fourth Industrial Revolution is currently evolving and emerging in ways that are creating new challenges and concerns within human society. This paper main interest relies on managing the externalities of the Fourth Industrial Revolution in terms of the risks and harm it causes as well as it is concerned in assuring that this revolution remains human led and human centred. To address these challenges of the Fourth Industrial Revolution, emerging technologies should not be viewed as "mere tools" that are completely under our conscious control, nor as external forces that cannot be guided. (Schwab, 2018) Instead, we should seek to understand how and where human values are embedded within new technologies, and how these can be shaped to enhance the future of human civilization.

Therefore, under the uncertainty brought by the Fourth Industrial Revolution developing a new mindset towards new emerging technology that addresses their values, ideas, and beliefs becomes critical.

2.2. New mindset

(Schwab, 2018) in his book *Shaping the Fourth Industrial Revolution*, introduces four principles that are particularly useful to develop such a mindset. First of all, he suggests that instead of focusing in technology, people should concentrate on developing systems that deliver well-being which include technology. Secondly, he highlights the importance of considering human decision-making and agency, designing systems that constrain technology in a way that people have more freedom and control. According to him, this is critical given the way in which new emerging technologies are setting the ground towards machines more capable to taking decisions without any human input. Influencing human behaviours in both direct and indirect ways. In third place, he argues that society shouldn't resign to the inevitability sometimes proposed by technological development. Instead, he suggests that using Design Thinking – with its human centred approaches- as well as developing new systems of thinking could be useful to understand the structures behind the development of new technologies and how these might change new technological systems into new configurations.

Finally, (Schwab, 2018) indicates that all technologies have implicitly embedded different values into them. Since the initial idea until how they are developed and implemented.

Therefore, (Schwab, 2018) encourages people – including designers - to recognize and debate these values at all stages of innovation before unexpected or undesired outcomes arise. According to him, these four principles together form a new framework or mindset for understanding, evaluating and shaping the ways that technologies are influencing the present while shaping the future of human civilization.

2.3. Implicit values within new technologies

Values are abstract, intangible and vary among different societies and individuals. Similarly, is technology. Therefore, the relationship between technologies and values cannot be easily be defined. Recently, two misleading perspectives regarding this relationship have emerged. The first one recognizes technology above and outside the control of society, while the second separates social responsibility from the influence technology brings to bear. They both miss the point that technologies and societies shape each other. (Schwab, 2018)

Understanding that technologies embody specific social attitudes, interests and goals gives us greater power to initiate change. Accepting this means dealing with three main duties: Identifying the values embedded within technologies, understanding how technologies impact our choices and decision-making and determining how to best influence technological development within society. (Schwab, 2018) Accordingly, fostering awareness of the broader impact of technologies and setting societal values as priorities can be only achieved by recognizing that taking a stand on values and their relationship towards technology is where conviction is put into action. Therefore, it becomes essential to leverage the inflection points where values can become effective tools for shaping technologies and their development within society. (Schwab, 2018)

Consequently, in this paper, the Fourth Industrial Revolution rather than just a description of technologically-driven change, it is considered as an opportunity to suggest a new approach to Critical Design. This new approach emphasizes and increase awareness of the implicit values embedded in technology within the design process; recognizing Critical Design competences to engage designers in a different kind of thinking that could lead to more conscious use values towards the adoption and implementation of new technologies within society.

4. Critical design

Critical Design, is a field that questions, critique and challenge the way technologies enter people's lives and the limitations they place on them through their narrow definition of what is to be human. (Dunne & Raby, 2013) Its main

concern is related to the "lack of critique" behind technological progress. Being extremely critical when technology is considered the main solution to diverse problems within human civilization.

Critical Design main interest is in questioning human assumptions to offer an alternative to how things are being conceived creating new spaces for discussion. It believes that change is possible and that things can be better; it is just that the way of getting there is different. Ultimately it is an intellectual journey based on challenging and changing values, ideas, and beliefs. (Dunne & Raby, 2013)

4.1. Benefits

Critical Design is a discipline that focuses on the future with the objective to motivate people to consider their own preferable futures, raising awareness of people's capacity to influence in it. Critical Design it also provides a critical thinking that allow people to liberate themselves from diverse ideological boundaries empowering their abilities to take more informed decisions. (Jakobsone, 2017)

4.2. Criticism

The most frequent reaction to critical design is the claim that it is a useless practice. This accusation is grounded in the idea that design is a problem solving activity; and in the notion that one of the inherent properties of design is functionality; a common misconception in which critical design is considered to lack of functionality besides it has been rebutted. (Jakobsone, 2017)

As a result, in order to capitalize the benefits of Critical Design as part of this paper's main argument a new approach to Critical Design has been proposed.

5. New approach to critical design

5.1 Critical Design as part of Design Thinking

Thinking about the future, speculating about it and creating for it, is not exclusive to Critical Design practice. In fact, according to (Tonkinwise, n.d) it has always been the core of any design practice. (as cited in Jakobsone, 2017, p8). However, while Critical design uses speculative design as a mean to suggest different alternatives about the future without any preferences in particular, other design practices i.e Industrial Design actually see the future as "fixed trends" adjusting their designs to the most feasible trend of the future. The main point to be highlighted here is that unlike critical design, other design disciplines i.e Industrial Design are indeed creating the future. Regardless of whether it happens as a deliberate act or simply as consequence of a certain action. (Jakobsone, 2017, p8). In this sense, (Jakobsone, 2017, p8) suggests that "including the principles of

speculative design thinking in any design activity, would raise awareness of design's potential to influence future towards the preferable, and thereby noticeably benefit to the whole practice of design".

Following this trains of thoughts, and equally to the theory proposed by (Jakobsen, 2017), I suggest that considering Critical Design as part of the Design Thinking not only will help raise awareness of design's potential to influence the future but also would encourage designers to critically reflect about how the values already embedded within technology are also influencing the future through their design decisions within the design practice.

5.2 Critical Design purpose as "Reflecting" rather than "Provoking".

(Sanders & Stappers, 2013) in their book "*Convival Toolbox*" they describe that design practice is now moving from making objects towards focusing on making things for people in their everyday contexts. In this sense, they argue that design disciplines are shifting from the realm of the object, focusing on the purpose of designing. I argue, that this approach could open the door for Critical Design Thinking to be considered as part of the design discipline with the main purpose of "reflecting" how the values that are encoded in new technological developments are already influencing the contexts of people's everyday life in the future.

To support this idea, I propose a modification of the original diagram (fig.1) introduced by (Sanders & Stappers, 2014, p13) used to represent some of the purpose of different design disciplines which at the time already included Critical Design.

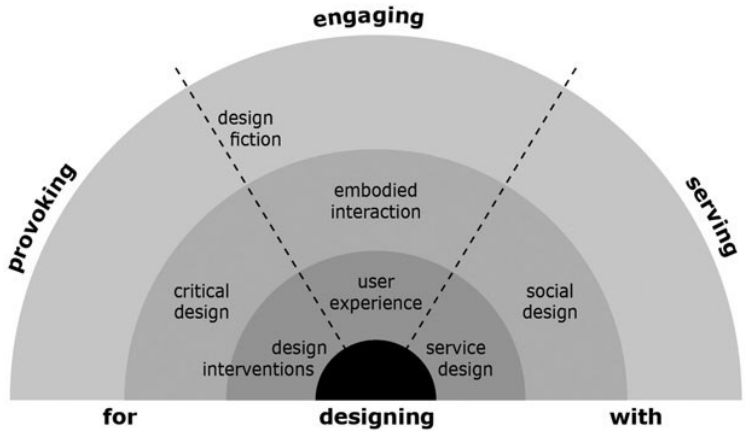

Figure 1: Movements of design emerging across time scales: the world as it is (inner ring), the near future (middle ring) and the speculative future (outer ring). (Sanders & Stappers, 2014, p13)

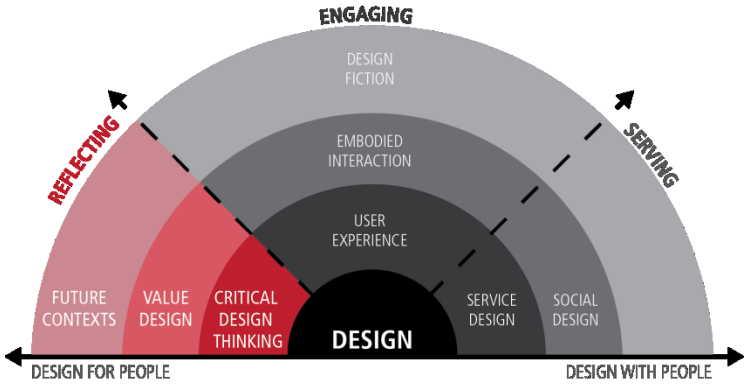

Figure 2: Critical Design purpose proposal (red) (Carrasco, 2018)

By introducing this diagram (fig.2), I re-consider the purpose of Critical Design in proposed in (fig 1) from "Provoking" to "Reflecting" dividing its scope of action in 3 main steps, critical design thinking, value design and future contexts. Critical design thinking challenges the values that are already embedded in the new technologies of the Fourth Industrial Revolution. While value design's job is re-framing the values challenged by critical design thinking in order to be tested through the imagination of people's everyday life future contexts. The purpose of which, is to reflect how shaping the values embedded in technology could be used as a powerful strategy towards enhancing the future of human civilization. I also argue that changing the purpose of Critical Design from "Provoking" to "Reflecting" could lead to a better appreciation of the practice which could open the door to a future introduction of critical thinking towards values in new technologies within the realm of the marketplace. However, first, the role of Critical Design needs to be defined.

5.3 Critical Design new role: Challenging & reflecting the values of the Fourth Industrial Revolution.

In order to define the new role of Critical Design suggested in this paper, a new diagram based on the reference outlined by (Malpass, 2012, p89) in his PHD thesis "*Contextualizing Critical Design*" is presented. (fig.3) The diagram shows how Critical Design is positioned between the realms of traditional design (Design core) and the emerging design disciplines focused on the purpose of design. In this context, the role of Critical Design is defined in two steps. The first one is to challenge the values and assumptions about new technologies inside the design core. The second, is to reflect the results of the first towards the purpose of design and beyond as new future values.

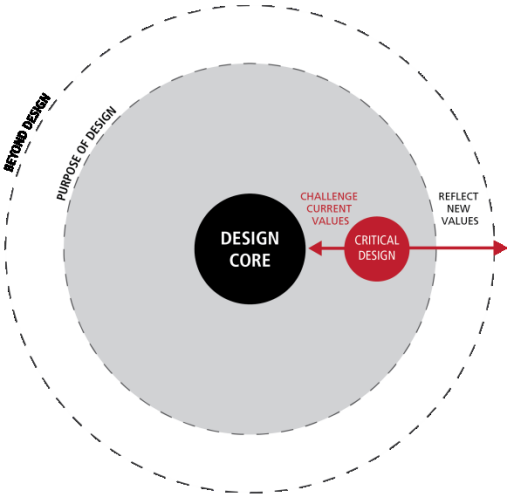

Figure 3: Critical Design new role proposal (Carrasco, 2018)

I argue that having defined the role and position of critical design could lead to a better understanding of the possibilities of Critical Design as part of the marketplace realm in order to make the critique meaningful. According to (Koskinen et al. 2011) "to make critique meaningful, it must be directed at those who contribute to the culture that is being critiqued". (as cited in Malpass, 2012). "This would, however, necessitate a movement out of the gallery, and the perception of critical design as intellectual debates 'by designers for designers'. Meaning that it would also shift the role of debate from an end to a means". (Malpass, 2012, p82)

5.3 Critical Design as part of the marketplace realm

Regarding the application of Critical Design in the technology industry, so far, Phillips is the company that is leading the way. In 2006, Paul Gardien introduced the design-led framework (fig.4) called "Horizons for innovation" into the Phillips design department. This framework allows Phillips's designers to think in short, medium and long term futures divided in three types of "horizons" accordingly. (Malpass, 2012, p83). Of all the horizons, the number three is the one that is most important for the purpose of this argument. The reason is that Horizon three is about radical innovation and transformation that creates a space in which critical design might have a commercial application due to the ability to provoke debate in order to test societal expectations. (Malpass, 2012). Deliverables could range from scenarios to the creation of experience prototypes

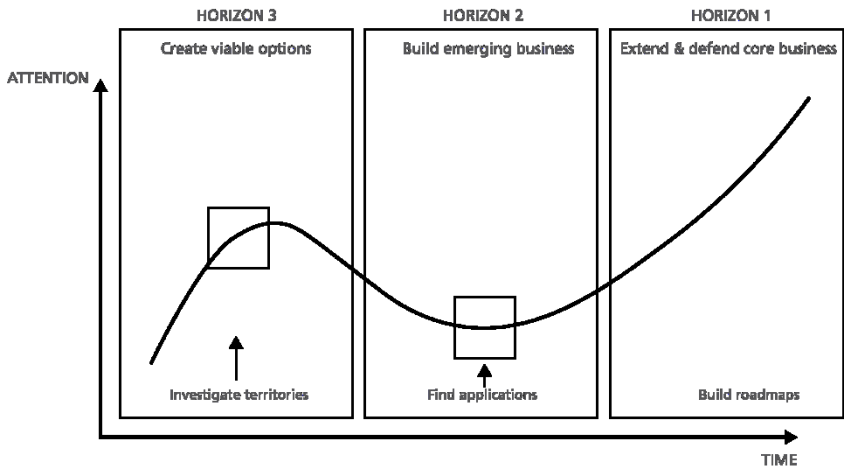

Figure 4: Paul Gardien, Design-led horizon innovation model, 2006. Critical design activity facilitated in horizon 3 (as cited in Malpass, 2012, p83)

5.4 Critical Design new design process: towards values and future contexts.

Following the argument along this paper and using as reference the Gardien's diagram (fig.4), an initial draft of the design process to implement the new approach of Critical Design has been proposed. (fig.5). Essentially, the process is divided in 3 stages: Critical design thinking, design values and future contexts. Each stage deals with values embedded within new technologies of the Fourth Industrial revolution in different ways. The first step challenges these values, the second one re-frame them as new and the last stage use the new values and the power of imagination to create new contexts that reflects these values in the future of people's everyday life.

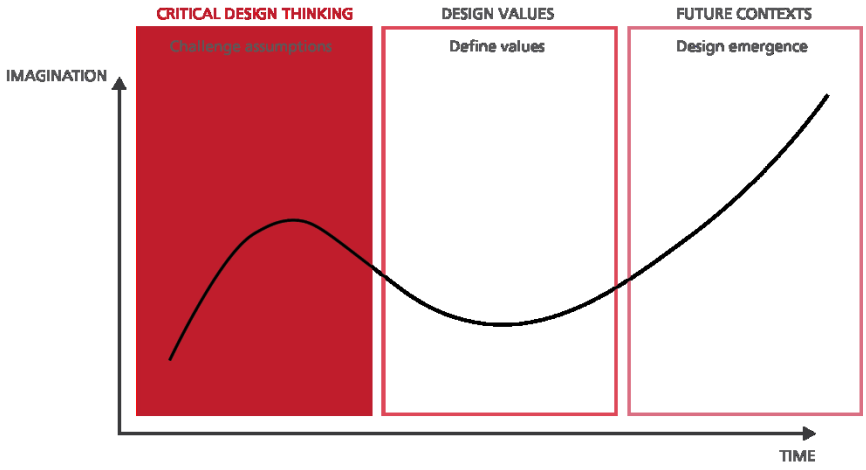

Figure 5: Critical Design new design process draft (Carrasco, 2018)

6. Conclusion

The Fourth Industrial Revolution and its technologies are evolving and emerging in ways that are creating new challenges and concerns within human

society. This paper main interest relies on managing the externalities of the Fourth Industrial Revolution in terms of the risks and harm it causes as well as it is concerned in assuring that this revolution remains human led and human centred.

To address these challenges this paper argues that society should seek to understand how and where human values are embedded within these new technologies, and how these can be shaped to enhance the future of human civilization. As a result, I argue that developing a new mindset towards technology is critical. A mindset that challenges the values that are already embedded in the new technologies of the Fourth Industrial evolution in order to reframe them towards the greater benefit of human civilization.

In order to do so, this paper suggests a new approach to Critical Design divided into four main steps. The most relevant is considering the practice of Critical Design as part of the marketplace realm. Unlike the traditional critical design approach, I consider that being part of the industry is a key step for critical design to be considered useful. Finally, it has been proposed a first draft of a possible Critical Design process (fig.5) that follows the approach discussed along the argument of this paper.

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