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IDEASQUARE COFFEE PAPER

Are your dimensions transformative?

Not everything at IdeaSquare is about excitement and creativity. The self-appointed innovation team also takes on more "mundane" tasks, such as cleaning and organizing the space. On this occasion, that meant moving furniture—tables, chairs, cupboards, and the like. A task requiring an especial focus on physical dimensions. However, as often happens with serendipity, this seemingly routine activity sparked a deeper question: Might dimensions have anything to do with innovation? If so, how?

To tackle this daunting question, the IdeaSquare innovation team started considering History from a perspective based on dimensions. The addition of new dimensions has always unfolded novel and transformative possibilities in almost any realm of humankind's theoretical and practical cognitive landscape. The consequence has been transformative innovations.

For example, within the realm of economics and business, the introduction of the double-entry book (vs. single entry which is one dimensional) is a first excellent example. It could be dated to the 15th century Italy, where it was used by merchants to keep track of their financial transactions. Before it, accounting records were kept on multiple books which, however, did not have the formal and methodical rigor necessary to control the business economy. The system was formalised by Luca Pacioli, a Franciscan monk and mathematician, in his book "*Summa de Arithmetica, Geometria, Proportione et Proportionalita*" published in 1494. Today, the double-entry system remains the standard method of accounting used by businesses and organizations around the world. Although it has evolved over time incorporating new technologies and methods, the basic principles remain the same. Luca Pacioli's legacy and his ground-breaking work by incorporating a two-dimensional accounting system continues to be felt.

As unconceivable it might look today, for many centuries the Earth was considered to be flat[1]. Only the firm believe about the (proven) existence of a third spatial dimension led Christopher Columbus embarking into the seemingly unthinkable and impossible[2]. His discovery of the Americas in 1492 marked the beginning of global exploration leading to profound changes in politics, economics, and culture worldwide. Columbus' voyage paved the way for unprecedented trade, which laid the foundation for the modern global economy. The exchange of ideas and people across the world resulted in the spread of new dimensions related to foods, technologies, languages, cultures, religions, etc.

Another of the most significant impacts of adding new dimensions was the introduction of time as the fourth one, besides the three spatial ones, by Albert Einstein in his theory of special relativity which revolutionized our understanding of the universe and ultimately ourselves. In mathematics, complex numbers, which can be represented by adding an extra dimension to the real ones, led, among others, to the formulation of quantum mechanics, and with it, transformative technologies such as the transistor, the integrated circuit, and the computer, among many others, which today are the backbone of our global economy.

Today's dawn of the upcoming technological revolutionary paradigms such as virtual reality, machine learning and artificial intelligence relies on the use of multiple dimensions in the form of mathematical vector spaces to create immersive, lifelike experiences.

Although the IdeaSquare innovation team explored numerous examples, the ones highlighted effectively illustrated their point: Transformative innovation—the kind that profoundly changes humankind—requires the

[1] Maybe some people still believe that… who knows.

[2] In fact, Christopher Columbus knew that the Earth was round when he proposed to reach India by sailing west from Spain. As early as 200 BCE, the Greek mathematician Eratosthenes already calculated the circumference of the Earth to within a few percent of its actual girth. However, in making his own calculations, Columbus preferred the values given by the medieval Persian geographer, Alfraganus, which contained a metrological error, which ultimately led to Columbus' discovery of a new continent. See for example, S. E. Morison, *Admiral of the Ocean Sea: A Life of Christopher Columbus*, Little Brown and Company, 1991.

discovery and exploration of new dimensions[3]. This realization naturally led the team to consider various "ways to innovate," with one approach standing out as the seemingly most powerful: Design Thinking.

Although Design Thinking roots could be traced back to the Arts and Crafts movement of the late 19th and early 20th centuries, with designers such as William Morris and John Ruskin, only relatively recently has gained widespread recognition as a working methodology for problem-solving[4].

Arguably, its modern history starts in the 1980s, when the consultancy firm IDEO began using a user-centric approach to design, which involved research and prototyping to better understand user's needs for developing solutions[5]. The 1990s saw the concept gaining momentum in the business world. Scholars such as Peter Drucker, among others, in his book "The Age of Discontinuity" highlighted Design Thinking's potential for driving innovation and competitive advantage[6]. Business leaders such as Steve Jobs also emphasized its importance in product development and branding. The early 2000s marked another turning point for Design Thinking with the establishment of Stanford University's d.school[7]. It focused on teaching it to students and professionals, emphasizing aspects like collaboration and prototyping. Its methods became widely adopted by businesses, non-profits, and government agencies, further cementing the importance of Design Thinking as a valuable tool.

Broadly speaking, Design Thinking is a problem-solving approach emphasizing empathy, collaboration, experimentation, and iteration with a user-centric slant. According to it, for a design solution to be successful, it must be feasible, viable, and desirable. Those are the three fundamental dimensions configuring the Design Thinking framework[8].

In general terms, feasibility refers to whether a solution can be realistically implemented by building on core operational strengths. Viability concerns about its economic possibility for implementation, and desirability refers to whether it meets the needs and desires of users or clients.

Those are potentially interesting dimensions when considering solution spaces around problems that, in principle, are prone to be framed in such concrete and stringent axes. In other words "problems with a limited number of dimensions".

One might though legitimately formulate the question: What about complex, or even worse, wicked problems? Or in other words, what about problems with a large number of dimensions that are interrelated and entangled?

A classical definition of wicked problems refers them as those ones that prove challenging or even impossible to resolve due to its incomplete, contradictory, and ever-changing requirements, which additionally are often not easily identifiable. Precisely, the term "wicked" indicates a resistance to resolution rather than any connotation of malevolence[9].

It turns out that the main challenge that all of us face today and in the coming decades, meaning Global Sustainable Development is a wicked problem to say the least[10].

Therefore, the doubt is also legitimate: Is Design Thinking, at least in the form it is conceived, taught, and practiced today, an adequate approach for wicked problems? More importantly, are we content about educating and training the future generations within the boundaries of what is simply feasible, viable and desirable?

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[3] The IdeaSquare innovation team makes a clear distinction between transformative and breakthrough innovation. Transformative innovation, in their view, is not merely a significant advancement but one that marks a turning point in human history—creating a distinct "before" and "after." As a result, only a few innovations truly deserve the label "transformative". The team drafted a tentative list of them, which they jotted down on the kitchen whiteboard: Fire, Agriculture, the Wheel, the double entry Bookkeeping, the Printing Machine, the Steam Engine, Water Sanitation, the Transistor (and integrated circuit), the Computer, the Internet, the WWW, the Mobile Phone, AI (to be seen).

[4] R. P. Blakesley, *The arts and crafts movement*, Phaidon, 2006.

[5] https://www.ideo.com/about

[6] P. Drucker, *The Age of Discontinuity*, Harper and Row, 1968.

[7] https://dschool.stanford.edu/

[8] https://designthinking.ideo.com/

[9] J. Lönngren and K. van Poeck, *Wicked problems: a mapping review of the literature*, International Journal of Sustainable Development and World Ecology, 28, NO. 6, (2021) 481–502.

[10] S. Kereke, *Chasing the Impossible. Sustainable Development Is a Wicked Problem, but It Can Be and Should Be Tamed!*, World Futures (2021) 1–12.

The self-appointed IdeaSquare innovation team dared to give a "no" to the previous questions although it conceded that Design Thinking should, at least, be redefined with new dimensions for enriching its excessively limited perimeter.

Several criticisms have been raised regarding Design Thinking[11]. Far from providing, in this brief coffee paper, a fully-fledged alternative for the current Design Thinking paradigm and its dimensional framework, the IdeaSquare innovation team would like to propose just a first, and perhaps novel, flavour of it along the lines discussed. Let's denominate it "Frontier Design". Its main philosophy, agreeing with previous criticism, should be challenging existing assumptions and status quo[12]. It means challenging at least what is feasible and viable. The new three-dimensional axis the IdeaSquare innovation team proposes are the seemingly unthinkable, impossible and the transformative, summarised as:

- Beyond the Feasible awaits the Unthinkable.
- Outside the Viable stands the Impossible.
- Past the Desirable comes the Transformative.

It is no secret that we, as humankind, are facing unprecedented challenges at a planetary scale. Climate change, destruction of both terrestrial and marine biodiversity and habitats, increasing inequality between rich and poor, scarcity of water resources, are just but a few of them. Their direct and non-linear systemic consequences defy any model and certainly a "business as usual mindset".

Therefore, it is also no secret that we all should start thinking and developing solutions way beyond what is feasible, viable and desirable.

[11] N. Cross, *Design thinking: What just happened?*, Design Studies 86 (2023) 101187.

[12] N. Iskander, *Design Thinking Is Fundamentally Conservative and Preserves the Status Quo*. Harvard Business Review, September 5, 2018.