

The role of Design in Business ROI: A Literature Review

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Abstract: *This paper reviews select literature that examines the role of design in shaping, influencing and affecting an organization's return on investment (ROI). It explores the meaning, context and application of the concept of "design ROI" across disciplines and sectors and provides an analysis of the most recent research on the subject of the economic value and performance of design. The bulk of this paper highlights the authors and organizations currently investing in research and proposing design value metrics. The vast inventory of research and methodologies infers the need for a linguistic typology -- a common and shared vocabulary -- to better communicate design's positive economic impact across economic and industry sectors. It concludes that good design is good for business and suggests research gaps to better understand the value of design in business. The purpose of this research is to broaden the understanding of the impact of design on business ROI and to present evidence on why design is good for business.*

Keywords: design ROI, business return on investment, design economics, design performance.

Introduction:

Design is central to every experience, product or service created and consumed. Successful companies such as Apple, P&G and BMW are often cited as corporate leaders that clearly understand the business value of good design. In today's economy, scholars and practitioners (Brown, 2009; Bryson and Rutsen, 2010; Kelley, 2005; Martin, 2009; Meinel, 2011) position design as a company's most critical competitive advantage. Their collective research provides evidence that the design process, design thinking and designed products matter, and make a major contribution to economic and national competitiveness.

This paper examines recent research on the value of design in business ROI and serves as the first inventory of published design-ROI oriented research. It aims to create a better understanding of the value of design through the business language of return on investment (ROI).

The methodology for this literature review took into account the current characteristics of design evaluation methods in the context of design as a discipline (Cross, 2001). The approach was discursive because the research examined on the topic came from a number of disciplines and cultures and has not been undertaken systematically or by economic sectors. The interpretations, observations and conclusions were derived from a variety of small-scale, well-organized, in-depth case studies, theoretical frameworks and industry surveys that illustrated good practice and provided useful insights into the understanding of design ROI.

During the review of the literature both academic and industry sources were accessed and the topic "design ROI" was searched across multi-disciplinary databases from the David Lam Management Research Library and included articles from science, technology, arts and sociology libraries. Industry reports were then sourced using the web's search engines and e-news media websites. The literature reviewed includes journal articles, books, news media, dissertations and industry reports and whitepapers. When identifying relevant literature, abstracts and/or full texts and chapters of the identified articles and reports were evaluated based on the criteria of

providing insights on the topic of design evaluation methods, based on the return on investment (ROI) model. The data gathering process uncovered information on typologies within design-oriented industries and gaps in linguistic typologies on the topic design evaluation and ROI in non-design industries. Linguistic typology challenges surfaced when initially searching for the term “design ROI”. To locate high-quality research studies, understanding the language and vocabulary used to describe the economic value of design was critical. Thus, with only a few studies resulting from the initial search, the subject and keyword phrase was extended to include “design performance”, “design evaluation”, “cost benefit analysis of design” and “design economics”, in order to yield greater and relevant research results.

During the analysis phase, themes emerged from the literature that could form the basis of a classification framework as an aid to better understand the economics of design. The classification framework themes were design as product, service, process, people, place and policy. Further research on design value metrics, by design theme across economic sectors is highly recommended.

The selected literature reviewed for this paper is presented in three sections: the first section explores the role of design in creating business value as described by scholars and practitioners, the second section provides a discussion on the concept of design economies with industry examples across the three economic sectors, and the third section examines the shared vocabulary, meaning and models of design ROI across disciplines. It concludes with a discussion on the gaps in the literature and areas for further research.

1. The value of design for business

Design has been recognized as one of the critical factors for business success (Yin, Qin and Holland, 2011). It is defined as the act of conceiving, planning and making products, services, systems, brands, or environments that serve users and/or organizations (Gajendar, 2003); as the interface between consumer behaviour and product development (Bryson and Rutsen, 2010); and as a process of innovation (Brown, 2009; Kelley, 2005; Martin, 2009; Whicher et al, 2010), a complex method that involves collaboration between participants from different disciplines leading to a specific outcome. Design’s value is often communicated based on the role it plays (Design Council, 2007) either as a process, product, service, person, policy or corporate competitiveness. For the purpose of identifying the breadth of design ROI research, this paper is examines “holistic” design (Guo, 2010), meaning design’s role in the widest sense, from the visual to the financial and strategic, and by the value it brings to commercial or business organizations.

A growing body of research, from practitioners and scholars, provides evidence of the positive association between design and business value. Business Week’s Helen Walters in her article *The Value of Design* (Walters, 2011) writes IDEO’s Diego Rodriguez makes the case that good business arises from a design-centric process that incorporates marketing, research, and ideas while RKS Design’s Ravi Sawhney and Deepa Prahalad outline four specific areas in which design can create value: understanding the consumer, mitigating risk, boosting marketing and branding, and driving sustainable business practices. Walters’ also mentions angel investor Dave McClure’s belief that design and marketing are more important than engineering for the firms with which he works, and highlights how Dr. Jay Parkinson, a pediatrician and preventive medicine specialist, believes the role that design through disruptive innovation can play in retooling the U.S. health-care system. (Walters, 2010)

The value of design and design thinking is demonstrated through case study research by IDEO's Tim Brown and Tom Kelley, who present findings on Fortune 100 companies such as Steelcase, P&G and McDonald's, that have organically and/or systematically incorporated design thinking into their culture and processes, resulting in positive correlation between human-centered design and economic success (Brown, 2009; Kelley, 2009). Roger Martin adds the business value of design is through integrating design thinking into the corporate culture which leads to new business models, breakthrough innovations, market demand and business sustainability, as illustrated in his research on Cirque du Soleil and RIM (Martin, 2009).

Research on product design and Norwegian manufacturers (Bryson and Rutsen, 2010) also provide evidence that good design does not just enhance the profitability of a company producing the product, but can also enhance the profitability of business partners. A complimentary study on design management performance (Chiva and Algere, 2009) finds good design does not emerge by chance or by simply investing in design, but rather is the result of a managed process.

While the case-study based research asserts a design approach is positively linked to business success (Walters, Brown, Kelley, Martin et al), it also suggests only a fraction of global organizations, across economic sectors, are applying design strategies, activities and thinking into their business modeling and practice. The level of corporate adoption of design strategies and activities may be linked to a lack of a universal understanding of design and its role in creating business value across disciplines and sectors.

2. Design Economies: measuring the impact of design by economic sector

Academics, policymakers and business leaders increasingly recognize that design is a both an inherently creative activity that sits at the intersection of art, business and technology (Vinodrai, 2011), and an economic driver (Design Council, 2007) for the production and commercialization of goods and services for traditional and emerging sectors.

This section provides evidence on design's impact on ROI within the three economic sectors theorized by economists Colin Clark and Jean Fourastié (1950s). The three sectors are defined as the *primary sector* (businesses focused on the extraction of raw materials, such as mining, agriculture and forestry); the *secondary sector* (businesses focused on manufacturing, the conversion of raw materials provided by primary industry into commodities and products for the consumer); and the *tertiary sector* (businesses focused on providing services, including both profit and non-profit making organizations). The select literature provides the basis of who is leading, publishing and investing in research studies on the topic of design ROI, however it also exposes knowledge gaps, suggesting a classification framework may be required to better navigate and understand the meaning and value of design economies' research within and across economic sectors.

a) Primary Sector

Only one in 20 businesses in the UK's primary sector think design is crucial to their success, yet two out of three businesses agree that design is integral to the UK's overall economic performance and believe there's a link between design and profitability (Design Council, 2007). This UK study might explain the lack of research observing design activities and performance in the primary sector in other nations.

The Netherlands shipping industry is one industry investigating design ROI. A study analyzing the relationship between technical specifications, services provided and earnings potential (Veenstra, 2006), outlines a framework for ship owners to measure the costs and benefits (aka earnings potential) of three design factors critical to their business: cargo carrying capacity, speed and versatility (Veenstra, 2006).

In a sector that makes use of natural resources to generate wealth, and could benefit from evaluating design's value in operational efficiencies, and R&D of new technologies for harvesting and transportation, design ROI research is completely underexplored.

b) Secondary Sector

In the manufacturing sector, where production process and product are critical for survival and growth, design is highly valued – from a requirements perspective to ensure the right product is being developed, to the manufacturability and cost of the product (Wynn and Clarkson, 2009).

Half of the manufacturers surveyed in a UK's Design Council study (Design Council, 2008) suggest design has an either integral or significant role to play in their business and are convinced it has a vital impact on UK economy. The majority agreed that design is integral to UK's future economic performance and recognize the link between design and profitability (Design Council 2008). Canadian manufacturing companies are aligned with the UK study, and are changing the way they conduct product design and development and innovation practices to stay competitive (Industry Canada, 2010). Studies show those who invest more in product design and development, generate additional business benefits from new or significantly improved products, increased client satisfaction, increase revenues and improved access to new export markets (Industry Canada, 2010). Over the last two decades, Japan, Taiwan, Korea, and Hong Kong has used design to move from manufacturing to producing well-known branded products resulting in a transformation from "Made in China" to "Designed in China" (Guo, 2010). This strong commitment to product design will help China reap some of the success of its western competitors.

Design as manufactured artefact (product) has deep roots in history across the globe, yet it is only since the last century that its role in distinctive product development and Intellectual Property ownership, has it been identified as impacting the world's economy. Iconic product designs, manufactured in large volumes are protected through patents, trademarks, and trade dress, thus play a crucial role in business success (Ratner, et al, 2006). Design ROI through product development is just starting to be researched by copyright and intellectual property lawyers, who use product designs to illustrate that protections provided by patents, trademarks, and trade dress, lead to business success (Ratner, et al, 2006).

An automobile industry study (Pauwels, et al, 2004) analyses the economic importance of new product introductions and sales promotions to the bottom line and finds new product introductions have a positive short and long-term impact on the firm's top-line bottom-line and stock market performance, and have a positive correlation to the level of product design and innovation (Pauwels, et al, 2004).

Scholars (Guo, 2010; Ratner et al, 2006; Pauwels et al, 2004; Wynn and Clarkson, 2009) recommend that companies in the manufacturing sector focus on process and new product introductions to generate business value and resist relying on sales and marketing.

c) Tertiary Sector

The tertiary or service-oriented sector, which represents an extensive global network of design-industry associations and design as service companies, is the most prolific sector publishing dROI research. Service industry studies on Small Medium sized Enterprises (SMEs) suggest they see design as very important, having a positive correlation with brand image, improving the quality of the services and increasing profits/performance (Design Council, 2007; Larsen, Tonge and Lewis, 2007). Businesses in the real estate, finance and business services industry were the most positive towards design investment with four out of five businesses thinking design has a role to play in their operations and business profitability. The majority agreed that design is integral to the wider economic context and future economic performance of the UK (Design Council, 2007).

Design oriented and technology service industries invest in User Experience design ROI research. Recent studies (Marcus, 2002; Mayhew, 2012; Momentum Lab, 2009) provide businesses with the language and evidence to articulate value of design thinking, process and application to new technology products. (User-experience is a design process that is simple to measure since the quantitative metrics are captured directly from digital consumer behaviour, such as click-through rates, website visits, app downloads, purchases, etc.) Apple's iPod is the archetype of a product for UE dROI as it delivers exceptional user experience and positive ROI (Mayhew, 2002).

Organizations from the service sector understand the value of design from a human resource point of view. There is a belief (Kesler, 2010) that to reap the benefits of investments in talent, a company needs an organizational environment that inspires and supports employees from the front line to the CEO to do their best work. Kesler (2010) discusses characteristics, aptitudes and thinking styles relating to design as a person/function as “organization design” which enables effective business decisions leading to sustained success (Kesler, 2010).

Geographically, the most active service sectors researching design evaluation models are located in Denmark, Finland and the UK (Sorvali and Nieminen, 2008), where government supported design-industry trade organizations reside. Their interest in design research is reflected in their policy-making programs and promotion of design (Design Council, 2007; DTI, 2005; Danish Design Centre, 2003; Raulik et al, 2009). Other countries publishing design research reports are listed below (figure 1) in the Global Watch 2008: Digital and Innovation report (Sorvali and Nieminen, 2008):

National/regional:	Sources:	Accessible at:
Australia / Victoria	the State of Design – Future Directions (Victoria state government, 2004)	http://www.business.vic.gov.au/busvicwr/_assets/main/lib60040/06_design_future_directions.pdf http://www.dia.org.au
Denmark	Denmark in the Culture and Experience Economy — 5 new steps The Danish Growth Strategy	http://www.oem.dk/publication/dk-culture/experience_economy.pdf http://ddc.dk http://www.danishedge.dk http://www.indexaward.dk
Estonia	Establishing the basis for the elaboration of the Estonian design policy measures. 2003.	http://www.mkm.ee/failid/Disainiuuringu_loppraport.pdf
Finland	Report of the monitoring group of the Design 2005! programme	http://www.minedu.fi/julkaisut/kulttuuri/2004/tr11/tr11.pdf
Germany	German Design Council IF design awards red dot award The Design Zentrum Nordrhein Westfalen The Design Award of the Federal Republic of Germany	http://www.german-design-council.de http://www.ifdesign.de http://www.red-dot.de www.designpreis.de
Hong Kong	The DesignSmart Initiative	http://www.designsmart.gov.hk http://www.info.gov.hk/info/hkin/innovation.pdf http://www.hkdesigncentre.org http://www.innocentre.org.hk
India	National Design Policy	http://nid.edu/download/national_design_policy.pdf
Ireland	ICSTI Statement Design and Development	http://www.forfas.ie/icsti/statements/0304_des_dev_strmt/030414_icsti_design_development_statement_s.pdf
Italy / Lombardy, Milan	POLIMI Verganti, Roberto, Design as brokering languages, the role of design in the innovation strategy of Italian firms	http://www.polimi.it
Japan	Design as the Short Route to Brand Establishment —A Design Policy Renaissance— 2003	http://www.meti.go.jp/policy/human-design/downloadfiles/revised_press(point).pdf http://www.jidpo.or.jp/en/ http://www.idcn.jp/
Netherlands	Shaping New Attitudes, policy plan 2005-2008	http://www.premisla.org/pdf/policyplan2005-2008.pdf
New Zealand	Success by design, Better by design program	http://www.nzte.govt.nz/common/files/design-strategy.pdf http://www.betterbydesign.org.nz/
Norway	Design som drivkraft for norsk næringsliv. Rapport fra Utvalget for Næringsrettet Design, 2001. Period: 2002-2010. Norwegian Design Council	www.norskdesign.no
Singapore	The DesignSingapore established in 2003	http://www.mica.gov.sg/mica_business/attachment/ERC_SVS_CRE_Chapter3.pdf?sid=131&cid=1300 http://www.designsingapore.org
The Republic of Korea	3rd Five Year Plan	http://designdb.com/english/kidp/policy/down/The3rdFiveYearPlan.pdf http://www.gd.or.kr/eng/index.jsp
Sweden	Design för innovation Långsiktig satsning på design som utvecklingskraft för Sverige Förslag till verksamhetsinriktning för SVID, 2006-2010.	http://www.svid.se
United Kingdom	The Good Design Plan 2008-2011 The Department of Trade and Industry, The Design Policy Unit Design Council British Design Initiative	http://www.designcouncil.org.uk/en/Design-Council/1/What-we-do/The-good-design-plan/ http://www.britishdesign.co.uk http://www.dit.gov.uk/design http://www.globaldesignonline.com
United States	Design Management Institute (DMI) Corporate Design Foundation Industrial Designers Society of America, IDSA Policy Manual - June 2007	http://www.dmi.org http://www.cdf.org http://www.idsa.org

Figure 1. Global Design Watch 2008: Design and Innovation Centres (Sorvali and Nieminen, 2008)

Generally, the industrialized nations are exploiting design as an asset for their economic advantage and for the international promotion of their image (Ralik, et al, 2008). In contrast, developing countries - with very few exceptions - have disregarded design as a tool for economic and social development (Ralik, et al, 2008).

Despite the evidence that design is critical to the competitiveness, innovativeness and prosperity of firms, communities, cities and nations (Brown, 2009; Kelley, 2009; Martin, 2009; Whicher et al, 2010) design is not particularly prominent across all three economic sectors. The primary sector has invested the least in dROI research while the secondary or manufacturing sector shows a growing interest in dROI models in order to meet changing consumer needs and sustain market growth. The majority of dROI research is being led by the service-sector, especially the design-oriented and new technology industries, driven by market competitiveness and profitability. It is worth noting that the cultural industries are also researching dROI models (Vinodrai, 2009) with a focus on industry investment and policy-making.

3. Shared vocabulary, meaning and models of design ROI

Research has firmly established that businesses that use design effectively will be those who survive and prosper in increasingly demanding world markets (Design Council, 1998; 2007). Yet it is suggested (Trueman and Jobber, 1998) that companies must see a tangible benefit showing where and how design is associated with improved business performance, before taking design seriously (Larsen, et al, 2007). Thus, it is important to communicate design's tangible benefits in a way that most businesses can understand and ultimately adopt. This section explores design ROI across disciplines and sectors in an effort to communicate design's tangible benefits. It presents the first published inventory of design ROI-related research studies and suggests the need for a linguistic typology -- a shared vocabulary and meaning -- of design ROI models.

The most common approach to measuring the business value of new and improved processes and/or product offerings is the Return on Investment model or ROI. It is defined as the simple arithmetic ratio of benefits to costs, measured in dollars and cents. If benefits returned are above costs (and expenses), profits are achieved and the value of an investment, along with actual benefits, cost savings, and efficiencies are obtained (Rico, 2005). Since the ROI model is concerned with benefits and costs, the literature reviewed explores how this model (benefits to costs) is being applied to design activities.

Gregory (1966) first expressed the concept of design "as a pattern of behaviour employed in inventing things of value which do not yet exist". Cross (2001) then suggested the science of design could improve our understanding of design through scientific (aka systematic) methods of investigation (Cross, 2001; 2006). Baldwin and Clark (2002) then provided a design valuation methodology based on hypothesis that every artifact has a design, and thus designs are an important class of information goods and called it "The Fundamental Theorem of Design Economics" (Baldwin and Clark, 2002).

For this paper, design economics is interpreted by a design ROI (dROI) models which are most prevalent in design-oriented industries. Studies on User Experience Design affirm positive return on investment on user-centric activities, especially within the software development process (Momentum Design Lab, 2009). The dROI of UE in software companies is measured by lowered development costs, fewer missed deadlines, more cost-effective maintenance, improved customer satisfaction and loyalty directly contributing to business success (Smith, Reinersten and Marcus, 2002). the usability or UE returns many benefits (ROI) to products developed for either internal use or for sales. Package design ROI models (Wallace, 2001) measure impulse purchasing at shelf against production costs. Wallace's study (2001) illustrates over two thirds of consumer product purchase decisions are made at the point of sale correlating brand identity and package design investment drives a positive ROI value (Wallace, 2001). Design ROI as a cultural investment tool has recently surfaced through the value of "signature architecture" (Plaza, 2006). One notable study argues the positive ROI of the Guggenheim Museum in the city of Bilbao can be analyzed by statistical data analysis: the visitor rates (over 7 million between 1997 and 2004); the increase of overnight hotel stays; the effects on the employment and tax income generated by extended tourism activities (Plaza, 2006).

Design evaluation models simulating the ROI model also suggest that companies that invest in design tend to be more innovative, more profitable and grow faster than those who do not

(Whicher, Raulik-Murphy and Cawood, 2010). Examples of design performance models in chronological order include:

- The *Product Archeology Approach* (Ulrich and Pearson, 1998) measures design performance through an analysis of physical products, cost estimation and manufacturing environment. The approach references the cost of the industrial design products, a theoretical model combined data collected through observation in the marketplace of an artifact's design attributes that drive costs, with public financial data.
- *The Design Ladder* (Danish Design Centre, 2003) evaluates design and economics benefits through a linear regression analysis model, measuring economic effects of design against the effects of other factors, such as company size and the number of staff university graduates, etc. *The Design Ladder* is now being adopted as a performance tool by other European countries, including Austria, Ireland, Sweden and Switzerland.
- The *Design as Element of Innovation* model (Candi, 2005) provides a basis for isolating and evaluating design along three dimensions visceral, behavioural and reflective design to evaluates its performance in operationalizing a firm's activities, methods and efforts.
- The *structural equation model* (Chiva and Algere's (2009) provides a methodological contribution to design management's role in enhancing a firm's performance as observed through Italian and Spanish ceramic tile industries.
- The *Design Structure Matrix* (Wynn and Clackson, 2009) is a modelling tool that connects product to systems and components and/or people to project teams and has a great bearing on an organization's operations efficiency and effectiveness. It is an adopted ROI method within the engineering design-oriented sectors such as aerospace, automobile, architecture and construction
- The *European Innovation Scoreboard* model (Hollanders, 2009) measures a country's performance of creativity and design using 35 indicators. The scoreboard ranks Sweden and Denmark as Europe's top performing design-led innovative countries while Bulgaria, Poland and Romania are ranked the lowest.
- The *10 ways to measure design's success* model (Lockwood, 2010) proposes a framework for effectively measuring the value of design through success criteria. The success criteria includes purchase influence, building brand image, improved time to market; securing new markets and creating valuable intellectual property.
- *The Five Milestone Model* (Kesler, 2010) measures outcomes against the organizational design process, which includes smart, practical judgments rooted in a business case, supported by facts, and often developed through a series of tested hypotheses and is typically crafted in a roadmap format.
- *Digital Dividends* (Vinodrai, 2011) is a dROI model for the cultural economies whereby both cultural and economic value is generated through a "design dividend" for a city-region.
- *Design for X* (DfX) (Industry Canada, 2010) is an approach to product design and development directed at maximizing the production requirements demands (such as assembly, quality, disassembly, manufacturability, safety and environment friendliness) while simultaneously minimizing costs. *Design for Environment* (DfE) is an applied example of DfX for firms seeking to meet changing consumer preferences with a concern for the environment.
- The *Design Performance Measurement model* (Yin, Qin and Holland, 2011) measures key factors of success and failure of a new product development process, such as market share, investment return rate, and customer feedback. The tool supports a design

manager's method to measure and improve collaborative design performance and development, the design team's strengths and weaknesses, team communication, and suitable responsive actions.

The dROI and simulated evaluation models provide theoretical evidence that the use of design has a positive impact on the performance of a company, measured in terms of profitability, share price, employment or exports. Industry analysts (Souza, 2001 and Bevan, 2005) suggest providing cost benefit analysis models and simple spreadsheet tools for companies to calculate their own cost benefit analyses of design ROI. A framework may be required to determine common success metrics for design investment since ROI varies based on product or service type, industry vertical, company size, production process and client type. Further research is recommended on adopting and experimenting with these models.

A new and growing area of research is design as innovation practice with design ROI models increasingly being observed through the perspective of how it is applied to innovative strategies, business models and organizational structures and processes (Leavy, 2012; Zott, 2007). Instead of thinking about "what to build," prototyping is about "building in order to think," and the prototyping process itself "creates the opportunity to discover new and better ideas at minimal cost" (Leavy, 2012). From business model design, to incorporating different kinds of people, prototyping and iteration, design is intrinsically linked to innovation across all sectors (Zott, 2007 and Osterwalder, 2010).

4. Conclusion

This paper presents an analysis of select published research on the topic of design ROI (dROI) and affirms good design is good for business (Brown, 2009; Kelley, 2009; Martin, 2009; Walters, 2010; Whicher et al, 2010 et al). This research contributes to existing design research literature by aggregating and examining dROI and dROI-related studies into one paper, with the aim to better understand the impact of design practices in business ROI. It also attempts to bring the reader up to date on the most recent research on the subject.

The research corroborates a positive association between investments in design and economic performance in terms of employment, sales, growth and profitability, however a limitation of this literature review was in adequately sourcing and qualifying the most important research. Many gaps were observed that include: a lack of research examining the complex relationship between design and superior economic performance within and across economic sectors, and within business structures (i.e. Enterprise vs SMEs); lack of shared citations and foundational theories between the numerous and varied methods and models examining design's business performance within industry sectors; and differing perspectives and vocabulary from domain dependent studies in both academic disciplines and industry sectors, on design's business value and ROI.

One approach towards better understanding design's role in providing superior benefits over costs is through a classification framework that could index key design disciplines and practices -- such as product, service, process, people, place and policy -- against their value metrics (ROI) and across economic sectors. Further research on developing such a design ROI classification model is recommended.

Of note, the limited research specifically defined as “dROI” may itself be, by design. If design’s value could be proven and universally recognized, business leaders would be challenged to ignore the evidence and forced to evolve their businesses. With dROI knowledge, companies will be able to justify adding the much needed design resources, feel obligated to review current management processes; enhance production budgets; and redefine compensation structures (Tim Brown, 2009).

Finally, further research on developing a linguistic typology for design ROI is also suggested as a way of conversing about design that is both interdisciplinary and disciplined, leading to a common understanding and adoption of design practices and valuation.

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