QUANTIFYING THE ECONOMIC IMPACT OF DESIGN: ASSESSMENT TOOLS BASED ON DESIGN MATURITY LEVELS

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Abstract

This article explores the topic of assessment of design's economic impact within organisations, with a focus on tools developed in the past decade to assess and quantify such impact in business terms. Despite the growing interest in the strategic role of design, isolating and quantifying its effect remain difficult due to the evolving and varied nature of design practice. The article examines three prominent tools, each of which develops a matrix exploring the relationship between the design utilisation at various design maturity levels and existing business metrics. While these tools offer valuable insights for companies, they also reaffirm significant challenges, such as the expanding scope of design practices, the difficulty of distinguishing design's impact from other business functions, and variations in organisational forms of design utilisation. The article concludes that a more nuanced approach is needed to assess the impact of design at different maturity levels, particularly at the strategic level. Additionally, considering the increasing interest in design utilisation in the public sector as well, which prioritises the social and environmental impact of design, the article underscores the importance of enhancing the assessment capabilities of individual companies in both private and public sectors by developing appropriate tools and methods for evaluating the full spectrum of design's impact.

Keywords: *impact assessment, design, design thinking, design maturity, design ladder.*

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CULTURE CROSSROADS

Introduction

As the scope and depth of design utilisation in organisations increase, so does the interest in measuring its economic effect. However, isolating and quantifying the impact of design is a challenging endeavour due to the moving boundaries of design, which encompasses various types of practices, areas of expertise, business or contractual structures, and forms of employment [Kimbell et al. 2021]. The aim of this article is to present a review of prominent tools developed in the last decade to assess, quantify, and thus translate the economic impact of design into business terms within organisations. The development of such tools concurrently reveals gaps in existing approaches and metrics, which need to be redressed through new and more nuanced assessment tools, particularly when design is used at the strategic level in organisations. The second aim of this article is to elaborate on these gaps, pointing out directions for future studies on impact assessment in design.

The article begins with a review of the design management literature on the value and impact of design, in order to provide a background for the presented assessment tools. It then introduces the selected tools, explaining the research studies on which they are based. The article continues with a discussion on the challenges faced in evaluating design, and concludes by highlighting the key points and suggestions derived from the review.

Background to impact of design

The question of how to measure the impact of design has been a longstanding issue in design management for over three decades. In the 1990s, early arguments aimed at demonstrating the *value* of design, which refers to its potential or perceived benefits, focused on increasing design awareness among managers and promoting more strategic roles for designers within organisations [Gorb 1990; Oakley 1990; Cooper and Press 1995]. These arguments largely concerned the integration of design as a managerial and innovation capability within companies, emphasising its potential to enhance competitiveness, product development, and service delivery. As interest in design grew within national and regional economies, attention increasingly shifted from explaining its value to assessing its actual *impact* – the measurable effects that design has on business performance, economic growth, and societal outcomes. Particularly in the 2000s, there was a significant rise in the number of reports aimed at showcasing the broader economic impact of design, based on surveys conducted at the national or regional levels [Whicher et al. 2012; Julier 2014]. These efforts were primarily driven by government bodies and independent professional design associations, such as the Association of Dutch Designers (BNO), the Swedish Industrial Design Foundation (SVID), the Design

Council in the UK, the Research Institute of the Finnish Economy, and the Danish Design Centre (DDC) in Europe.

National studies conducted by these associations in the first decade of the 2000s sought to demonstrate the relationship between design and economic performance of companies. Among these, the first study by DCC [2003] analysed the economic effects of employing design. The study consisted of a survey based on 1000 telephone interviews with private Danish companies, and examined their total investment in design, turnover, job provision, and export share of turnover, comparing companies that invest in design to those that do not. The survey results identified a 22% higher growth in turnover among the former compared to the latter. Additionally, companies with consistently increasing investments in design had an additional 40% turnover growth compared to the companies with constant or declining design investment. DDC's study also ranked the companies on the Design Ladder, a framework developed by DDC in 2001 to rate companies' use of design. The Design Ladder consists of four steps, each describing a maturity level of design utilisation within organisations: (1) non-design, lacking systematic use of design; (2) design as form-giving to merely improve the appearance; (3) design as an integrated development process; and (4) design integrated into the company's strategy. By placing interviewed companies on the Design Ladder, the survey indicated a correlation between high economic performance and high design maturity. Companies at steps three and four achieved more favourable turnover and export shares than those at steps one and two. The greatest differences were observed in the share of exports out of turnover [DDC 2003].

Another national study conducted in Finland by the Research Institute of the Finnish Economy in 2005 adopted quantitative methods, drawing on key figures provided by individual companies. The study found out that companies that had invested in design showed better sales growth, export shares and market value compared to the companies that had invested less [Pitkänen et al. 2012]. Likewise, the Design Council [2007] carried out the *Value of Design Factfinder* study, drawing on a number of sources, primarily two surveys: the *Design Council National Survey of Firms 2005*, and *Added Value Research 2007*. The former, based on phone interviews with 1500 companies, evaluated the tangible impact of design on business by examining companies' attitudes towards design and an its application in their operations. The latter, based on phone interviews with 503 companies, assessed whether companies had observed a direct impact from of design on several business performance measures, including new products and services, new markets, market share, and competitiveness, as well as direct performance indicators, such as profit, turnover, and employment. The study suggested that design directly and significantly improves sales, profits, turnover, and growth. In numerical terms, it

showed that for every GBP 100 invested in design, companies' turnover increases by GBP 225. In 2010, BNO conducted a similar study, in which the factors that influence design efficiency were examined through telephone interviews with directors of 163 Dutch companies [Gandi and Gemser 2012]. These factors include freedom offered to the designer in the product development process, innovativeness of the project, and client participation. The study concluded that investing in design, along with the involvement of designers in the product development process, increases a product's chance of success and improves the company's image, both of which contribute to a positive impact on the company's financial performance.

As the importance of design for national and regional competitiveness has been recognised at the European Union (EU) level, design has entered the European policy agenda [European Commission 2009; 2013], becoming part of national innovation policies across Europe [Whicher 2017]. The recognition of design's role in economic competitiveness raised the question of how to measure the impact of design in quantifiable and comparative ways. In particular, the Design Ladder model proposed by DDC, and the studies undertaken by the Design Council – two leading professional design organisations in Europe – have formed the basis for various impact assessment tools and frameworks developed in the last decade [see, for example, DDC 2018; Kimbell et al. 2021; Costa et al. 2020].

The growing efforts to develop frameworks and tools, however, have concurrently underlined the difficulty of quantifying the impact of design activity. A review of the existing literature identifies three key challenges. First, due to the expanding scope of design, traditional classifications of design professions, such as product, graphic, and interior design, are increasingly insufficient to capture contemporary design work. Emerging digital and interdisciplinary fields, such as UX and service design, have created hybrid practices and opened new economic sectors to designers, including finance and public services [Ramoğlu and Coşkun 2017]. This expansion complicates the alignment of designers with national occupational classification codes, which are used in impact assessments [Kimbell et al. 2021]. While traditional design roles could be easily matched to established categories, identifying appropriate classifications for designers producing more intangible outcomes has become increasingly difficult. Secondly, design has always been a practice that closely interacts with other disciplines. For example, in manufacturing companies design departments often collaborate closely with marketing and production departments. Because the design function cannot easily be separated from such a network of expertise, measuring its disciplinary contribution and impact becomes challenging [Kimbell et al. 2021]. The third key challenge concerns data gaps regarding design and designers. For example, measurement of the capability of national design sectors typically relies on indicators such as the number of design graduates, designs

registered, and design firms, as well as employment statistics in the design services sector [Moultrie and Livesey 2009]. However, the availability of such data is closely related to the maturity of a national design culture. In contexts with slower design maturity, design information is often scattered, and institutional databases are unreliable, as they do not focus solely on design [Costa et al. 2020].

While existing studies redress significant gaps in demonstrating design's impact at the national level, similar efforts within organisations have been lacking. However, measuring the effect of design on the business success of individual companies is just as important as measuring the impact of national design policies. In fact, the two are interrelated [Whicher 2011]. Previous research has attested that most companies do not measure the impact of design, even when they perceive its effects, often due to a lack of necessary resources [Scmiedgen et al. 2016; Mayer 2021]. Despite compelling arguments for design's impact on business performance, the specific role of design, separate from other disciplines, such as marketing and engineering, within organisations remains open to question. Motivated by this challenge, design management scholars have started to develop tools for internal use by organisations. There are significant parallels between these tools, especially in terms of the analytical models they draw on, i.e. design maturity. However, the design management literature lacks an effort to compile, discuss and establish links between them. The current article addresses this gap by reviewing and comparing these tools.

Tools to assess the economic impact of design in organisations

Two criteria determined the selection of the tools reviewed in this article: first, a focus on examining design as a separate function, and second, an attempt to quantify the impact of design within the organisation via the use of business metrics. Thus, studies that consider design an aspect of innovation, such as European Commission's *Innobarometer* [2016] and the report by The Bureau of European Design Associations [2017], both of which compile various surveys about the impact of design on innovation, were not included. Likewise, studies that offer ways to measure design's value and impact without proposing a structured methodology, such as Lockwood's [2010] well-known paper defining 10 categories of design measurement, were not incorporated into the review.

Tools that are implemented externally by professional organisations are also excluded from the study. One example is the *Design Delivery* study by DCC [2018], which investigates various contributions of design to an organisation's bottom line at different levels of the Design Ladder. Since the survey primarily aims to establish a broad, national picture of design's value and impact from the perspective of the companies, it quantifies the perception of design's potential or expected

contribution to business success, regardless of whether systematic and quantified impact assessment activities are actually carried out in the surveyed companies. Moreover, the review draws on the studies from the second decade of the 2000s to set an up-to-date picture of impact assessment efforts.

In the design management literature, three tools that match these criteria were identified, each of which develops a matrix exploring the relationship between the design utilisation level of organisations and existing business metrics. These tools are, first, the Design Value Scorecard by the Design Management Institute (DMI); second, the Design ROI Tool developed through the collaboration of the Finnish Design Business Association, Aalto University, and the Finnish Funding Agency for Technology and Innovation; and third, the study by Björklund et al. [2018], which builds on an extensive review of the relevant metrics. Examining these tools in detail, the analysis comparatively explores their conceptual and structural characteristics, underlying assumptions, and methodological limitations.

1. Design Value Scorecard by DMI [Westcott et al. 2013]

As a key design organisation in the US, DMI initiated the *Design Value Project* in 2012, in response to the ongoing debates about how to assess the economic value and impact of design in businesses. An outcome of this project is the Design Value Scorecard, an assessment tool for design managers to determine how and where design creates value in their organisations. The scorecard identifies five levels of design maturity: 1) initial/ad hoc; 2) repeatable; 3) defined; 4) managed; and 5) optimised. It is structured in the form of a matrix, which tracks the organisation's level of design maturity on the vertical axis against three zones of design utilisation on the horizontal axis:

- Zone 1. Development and delivery of aesthetics and functionality of products/services;
- Zone 2. Creating organisational value by connecting and integrating customer experiences with the organisation;
- Zone 3. Creating design-driven organisational strategy and business models.

In each zone, as the maturity level increases from 1 to 5 (from ad hoc towards optimised and proactive utilisation of design), the design team becomes more productive, and the quality of design outcomes improves. As design utilisation extends beyond the value created through aesthetics and functionality towards strategy and business models, the influence and impact of the design team on the business broadens.

Westcott et al. [2013] define the measurable impact for each zone, and propose corresponding metrics. In Zone 1, where design is involved in the aesthetic and functional development and delivery of products and services, the impact of design

can be demonstrated through the assessment of the return on investment (ROI). For example, if the redesign of a product leads to an increase in sales, design can be recognised as a major factor in generating that new revenue, and the cost relative to the return can be assessed. Using cost-related metrics, companies can track efficiency gains and cost savings that result from design utilisation, shortened time to market, and streamlined product development cycles [Liedtka 2018].

In Zone 2, design's contribution to creating organisational value is assessed by evaluating improvements in customer experiences, especially in areas where the organisation previously lacked a connection with customers. Westcott et al. [2013] provide an example of a financial services company, where design, marketing and sales elements of a software product (e.g. the software itself, sales descriptions, customer service scripts, and marketing materials) are integrated into a cohesive, user-centred narrative. The impact of design utilisation in offering a better-integrated, customer-focused experience can be measured by using metrics such as customer conversion rates [e.g. Schmiedgen et al. 2016], lifetime customer value [e.g. Kumar and Rajan 2020], brand loyalty [e.g. Kuchinke et al. 2019], and market share.

In companies where strategic design practices of Zone 3 are present, design, often in the form of design thinking, is recognised as a core competence. Westcott et al. [2013] suggest that in such design-led companies impact assessment should draw on larger metrics, such as profit margins and stock performance, while considering the fact that design investments at the strategic level have long-term effects. Using these larger metrics, as expected, requires companies to gather longitudinal data over time.

The main promise of the Design Value Scorecard as an impact assessment tool can be interpreted as providing practical guidance to managers, helping them, first, to identify the design maturity level in their organisation, and second, to select the appropriate metrics to evaluate the contribution of design at the relevant maturity level, answering what metrics are possible and most practical for them to measure. The scorecard answers the question of which metrics are possible and most practical for them to measure. It should be viewed as a starting point for managers who have not previously engaged in formal or structured evaluations of design's effects in their organisations.

On the other hand, the scorecard is one component of a broader initiative, the *Design Value Project*, whose goal is "to reveal the best practices of design-led companies and offer tools and models that can be used as guideposts within DMI member organisations" [Westcott et al. 2013: 12]. Thus, it focuses on design-led organisations where a structured progression of maturity is assumed, which can be considered a limitation in the scope. Such a focus also tends to overlook informal

design practices that may exist in less mature companies, where design activities are often embedded within other functions such as marketing, engineering, or product development, without formal recognition or management structures. Moreover, the scorecard's linear model of maturity implies that organisations advance predictably from ad hoc to optimised design utilisation, an assumption that may not apply in practice, as design integration often develops iteratively and non-linearly depending on contextual factors such as leadership support, market dynamics, or organisational culture [Erichsen and Christensen 2013].

From a methodological perspective, the scorecard relies largely on qualitative assessments of maturity and assumes that appropriate metrics can be readily identified for each level and zone. However, empirical validation of these relationships remains limited, and the applicability of the proposed metrics, especially those at the strategic level (Zone 3), depends on the organisation's capacity to collect longitudinal data and to isolate design's contribution from other business variables. Consequently, the effectiveness of Design Value Scorecard depends heavily on managerial interpretation and contextual adaptation. Two other studies, which proposed the Design ROI Tool [Pitkänen et al. 2012] and the matrix of organisational maturity and metrics classifications [Björklund et al. 2018], provide a more comprehensive categorisation of metrics for different design maturity levels. The following two sub-sections will review these frameworks.

2. Design ROI Tool [Pitkänen et al. 2012]

The Design ROI (Return on Investment) is a digital platform developed to provide a set of metrics for measuring the return on investments in design projects. It is the outcome of a collaborative project involving the Finnish Design Business Association, Aalto University, and the Finnish Funding Agency for Technology and Innovation. The tool was intended to be used by design agencies to demonstrate the financial benefits of design to their target groups, in both qualitative and quantitative terms [Pitkänen et al. 2012].

The background for the tool stems from previous surveys with the Finnish industry, as well as the surveys and meetings conducted with the clients of design agencies involved in the project. The research team concluded that the companies measured business profitability using various tools and metrics such as key performance indicators (KPIs), sales and profit figures, and software such as Excel and SAP (System Applications and Products in Data Processing). However, it was less common to track the profitability of design activities, although companies expressed their interest in tracking the effect of design in projects [Pitkänen et al. 2012]. To address this need, the tool was developed to offer a structured approach for

evaluating the impact of design, providing businesses with a clearer understanding of the value that design brings to their bottom line.

In order to define what is to be measured, the study begins by preparing a comprehensive list of the benefits achieved through design. A *design benefit* refers to the positive impact of a design activity that generates value, such as creation of new markets, differentiation, eco-friendliness, among others [see Pitkänen et al. 2012: 91 for the full list]. The identified benefits are classified based on the organisational level at which design is utilised: operational, tactical and strategic. For example, on the strategic level, measurable benefits include brand strengthening, access to new markets, and expandability/repeatability; on the tactical level, benefits include increased process efficiency, shortened time to market, and differentiation; and on the operational level, benefits include usability, life cycle optimisation, and increased occupational health and safety. These classified benefits are then placed into a matrix, where they are matched with the qualitative, quantitative, and financial indicators that can be used to measure each benefit.

For example, for the design benefit of *increased efficiency of external communications* (at the operational level), the qualitative metrics could be customer feedback/satisfaction survey; the quantitative metrics might include sales development, number of customer service contacts, and website visits/registrations; and the financial indicators could include sales development. Making use of the tool's matrix, a company can determine, for example, what benefits a service design project implemented at the strategic level might bring, and what indicators might be used for tracking the achievement of those benefits.

The Design ROI Tool operates in five stages: initial data entry, background calculations, forecasting, monitoring, and database maintenance. At the first stage, the user specifies the benefits they seek and provides information about the company (e.g. level of design competence, sector classification, target market) and the project (e.g. degree of novelty, context of use, object of design). At the second stage, the tool offers a calculation of the expected results of the project as well as a list of factors that may influence the results. The calculation includes estimate changes in margin, turnover, operating profit, and market share. Thirdly, the tool guides the user in selecting the most suitable metrics for tracking the intended benefits. The forecast also lists typical benefits achieved in similar past projects stored in the tool's database. The fourth stage provides the user with the evaluation of the project using financial key figures such as sales, operating profit, return of investment, and a comparison of these outcomes with the initial goals. At the final stage, results are recorded in the tool's database.

The primary users of the Design ROI Tool were intended to be design agencies, which would benefit from a tool that quantifies the benefits of design services to their clients. The design of the tool was therefore targeted to meet the needs of these agencies. Additionally, managers in small and medium-sized enterprises (SMEs) were considered another user group, as they often lack a comprehensive understanding of how design can enhance their companies' financial performance. In this sense, the promise of the Design ROI Tool parallels that of the Design Value Scorecard. However, one major difference between the two tools is that the latter considers design-led companies, whose best practices would be invaluable sources to learn from, as an essential target group and stakeholder. In contrast, The Design ROI Tool is likely to be less relevant for the companies that already have functioning in-house design tracking systems and mature design management practices. Pitkänen et al. [2012] acknowledge that such companies might find it challenging to integrate this external, database-based tool to their internal systems. Moreover, as the tool primarily relies on user-entered data and database comparisons, its methodological robustness depends heavily on the quality, consistency, and representativeness of the stored project data. Furthermore, by foregrounding ROI calculations, the tool implicitly privileges short-term, tangible results over longer-term or more intangible benefits of design, such as organisational learning and cultural change.

From a methodological perspective, the Design ROI Tool provides a structured, data-driven approach to assessing design impact; however, its prescriptive format may limit flexibility in capturing context-specific or emergent dimensions. While the tool effectively supports agencies and SMEs in communicating design's economic contribution, it risks reinforcing a narrow understanding of design impact that may not resonate with organisations employing design as a strategic or transformative capability.

3. Matrix of organisational maturity and metrics classifications [Björklund et al. 2018]

The study by Björklund et al. [2018] is grounded in the increasing use of service design and design thinking within organisations, where the complexity, interdisciplinarity, and intangibility of design call for new ways to measure its impact separately from other functions. The study is based on a literature review, and follows several steps. First, it reviews existing metrics used in the context of design in general, using keywords such as "impact", "metrics", and "measurement". Next, the identified metrics are mapped onto the four levels of the Design Ladder [DCC 2001], namely, (1) non-design; (2) design as form-giving; (3) design as process;

and (4) design as strategy. For each level on the Design Ladder, corresponding metrics are divided into two categories: external and internal metrics, depending on whether the performances or operations they assess are internal or external to the organisation. These internal and external metrics are then further grouped thematically based on the business aspects they measure. This results in two groups of external metrics, which are (1) financial performance and valuation of the company; and (2) customer-related metrics; as well as four groups of internal metrics, which are (1) indicators of the extent of design usage within the organisation; (2) evaluations of the project outcomes; (3) development process metrics; and (4) employee outcomes. The outcome of the analysis is the matrix of organisational maturity and metrics classifications [Björklund et al. 2018: 506].

On the first maturity level (non-design), where there is no systematic use of design, its impact is not likely to be assessed. Instead of assessing the company's own benefits from design, impact measurement at this level primarily focuses on benchmarking companies that have already invested in design and have higher levels of design maturity. For example, studies on the business performance of design-centric organisations, such as the 16 companies analysed in DMI's 2015 Design Value Index [DMI 2015], provide quantified evidence showing how design positively impacts on the turnover growth, amount of innovations, etc. of these companies.

On the second level (design as form-giving), where design is used primarily to improve the styling of products and services, it becomes relevant to compare the use of design with specific financial key performance indicators (KPIs). Both external metrics groups are used to compare existing KPIs within the company between products and services that have utilised design and those that have not, assessing the change in sales, revenue, ROI, customer satisfaction and feedback. External recognition in the form of design awards is also considered an indicator of impact at this level. Internal metrics related to the extent of design usage and project outcomes are suggested to be relevant for this level of maturity. With regard to the design usage, for example, the ratio of designers to developers, and the growth in the design can be measured, while with regard to project outcomes, calculating cost savings and reductions in time-to-market through redesigns can quantify the impact of design utilisation.

On the third level (design as process), design becomes an integral part of product and service development processes, where designers are involved from the beginning, and customer experience is a central focus. While traditional KPIs from the second level are still applicable, new financial measures such as market valuation, market share, and growth profitability become apposite at this level. As the significance of the customer's point of view increases, so does the variety of customer-related metrics. Relevant external measures include lifetime customer value, net promoter

scores, brand loyalty, brand perception, brand equity, and conversion rates. Internal metrics linked to customer satisfaction are also used at this stage (under the second group, evaluations of the project outcomes, and third group, development process metrics) to measure customer the amount and frequency of contact with users (e.g. number of days without interaction with user, users and user categories interacted with, etc.), value and novelty of resulting service or product, and usability. As design utilisation shifts towards design thinking within the organisation, metrics related to the number of projects, concepts finished, or people trained in design become crucial to understanding the internal impact of design thinking.

On the fourth level, design is integrated into company's strategy. Design (thinking) is utilised to identify new business opportunities or models and reshape the organisation's structure to be more customer-centric. The focus of design thus expands beyond just products and services. As a result, the metrics relevant to the previous three levels do not provide much insight into the effect of design at this strategic level. Although the authors suggest that external metrics such as entering new markets may be linked to strategic design, and that the seniority of design positions within the company can indicate a shift in the status of design, they note that at this level it becomes difficult to isolate the impact of design. They recommend internal metrics to assess the impact of design thinking on employee satisfaction, motivation, engagement, team collaboration, and effectiveness. While companies may be ready to connect design to employee engagement and satisfaction at this level, the lack of appropriate metrics makes it challenging to explore this connection comprehensively.

Overall, the matrix of organisational maturity and metrics classifications shows that, as companies progress through the steps of the Design Ladder, a shift from using external to internal metrics is needed. On the first two levels of the ladder, the main goal of impact assessment is to legitimatise investments in design, first, by benchmarking against external companies, and then – by tracking the benefits gained through initial design investments. However, at the third and fourth levels, metrics are required to evaluate organisational transformation via design thinking. An important conclusion derived from the matrix is that while showing the impact of design is possible to a considerable extent at the lower levels of design maturity, once design becomes an integrated element of the organisation's processes and strategy, existing metrics fall short of isolating its impact. Thus, significant gaps remain at the most advanced levels of design utilisation, where design is deeply embedded in the organisation.

The matrix by Björklund et al. [2018] differs in two key ways from the two previously reviewed matrices, Design Value Scorecard and Design ROI Tool, both of which also analyse the relationship between design maturity levels and existing

business metrics. Firstly, unlike the other two, this matrix does not aim to be a practical tool to be used by design managers. Instead, it serves as an analytical framework for design management researchers interested in developing new tools and metrics for impact assessment. Despite this, it remains useful for companies, as it provides a thorough and well-discussed overview of the metrics suitable for different levels of design maturity, comparing the needs of each level in terms of what can and should be assessed about design to advance design utilisation further within organisations. Secondly, the matrix highlights the significant gap between existing business metrics and the assessment of design at the strategic level. This gap remains implicit in the previous two tools, and it points to a future research direction focused on to developing new tools for assessing the impact of design at the highest levels of organisational maturity, as will be discussed in the conclusion section.

The strength of the matrix proposed by Björklund et al. [2018] lies in its comprehensive synthesis of existing metrics across different maturity levels. By systematically mapping internal and external metrics to the Design Ladder, the framework makes explicit indications how the focus of measurement must evolve as organisations advance in their utilisation of design, from externally oriented, performance-based measures to internally oriented indicators of organisational transformation. However, the framework does not fully capture the diversity of design adoption pathways across industries and organisational cultures. Furthermore, because the matrix is derived from a literature review rather than empirical testing, it remains largely theoretical and unvalidated in practice.

Methodologically, the matrix exposes a significant limitation in the current field of design impact assessment: the inadequacy of conventional business metrics to evaluate design's strategic and systemic contributions once it becomes embedded in organisational processes and culture. As such, the study by Björklund et al. is best understood as a meta-framework, an analytical foundation that articulates the problem space for future research, rather than a prescriptive tool for practitioners.

Challenges involved in the systematic impact assessment of design in organisations

While the reviewed tools intend to inform and guide companies in selecting the most relevant metrics matching their level of design utilisation, they concurrently highlight various challenges in implementing systematic and sustainable assessment practices, some of which have previously been acknowledged in the literature, as discussed earlier in this paper. One major challenge is the expanding scope of design, covering various types of practices and areas of expertise [Kimbell et al. 2021]. The multiple definitions of design practice are further complicated as companies

progress through the steps of the Design Ladder and thus "design" becomes "design thinking", with its scope expanding from designing products and services to delivering strategies and supporting organisational transformation [Schmiedgen et al. 2016]. Assessing the success of design thinking in organisations usually relies on validation from external experts, empirical evidence from success stories, and context-specific project-based metrics. Moreover, individual perceptions of managers based on their experiences differ on the effects of design thinking in achieving the strategic direction, organisational change, and market innovation goals [Magistretti et al. 2022]. Therefore, as organisations progress from traditional design to design thinking, obtaining measurable evidence of design's impact becomes an increasingly challenging endeavour [Carlgren and BenMahmoud-Jouini 2022]. This challenge was encountered in the studies by Pitkänen et al. [2012] and Björklund et al. [2018], when trying to identify the most relevant metrics for assessing the impact of design at the strategic level.

The second challenge lies in how to isolate the impact of design, as design is not a distinct activity that can be easily separated from other business functions such as research, marketing, and production. Within the broader organisational context, design is often seen as an aspect of innovation, making it difficult to differentiate from traditional innovation metrics [Scmiedgen et al. 2016]. Furthermore, as design operates differently in various industries and organisations, its boundaries with other functions also change [Mesa-López and Ruiz-Arenas 2023]. As a response to this challenge, Westcott et al. [2013: 13] suggested that impact assessment activities in organisations should begin by answering the following questions to clarify how the contribution of design can be measured for specific business outcomes:

Step 1: What are business's strategy and priorities to compete? What does business track to monitor its progress?

Step 2: What is design's role in delivering the results? How does design create value?

Step 3: Based on the activities design does, what could be tracked?

Step 4: Which metrics are most important and feasible to track?

Step 5: How to implement the metrics system?

A third challenge is that design is utilised in various organisational forms, including consultancy, in-house teams within companies, and combinations of both. As a result, there is no unified approach to assessing the impact of design on the projects within a single organisation, let alone across organisations and sectors [Kimbell et al. 2021]. Pitkänen et al. [2012] established that when design services are external to organisations, access to the necessary data is often limited. For instance, since the Design ROI Tool was primarily developed for design agencies, the authors encountered situations where agencies lacked access to information on investments

and costs related to the other parts of the project, leaving them with partial data to evaluate the impact of design.

Conclusion

One major conclusion derived from the review of the three tools is that assessing the impact of design requires the development of distinct tools for lower levels of design maturity and for strategic level. Each tool provides a more accurate proposal of what is measurable and through which metrics at the lower levels, although the Design Value Scorecard does not present a comprehensive list of metrics as the other two tools do. However, when it comes to the strategic level, which obviously refers to design-led organisations, the tools offer general suggestions about what to assess regarding design's contribution, and in what ways. In the case of the Design ROI tool, these suggestions may be less relevant, as the tool primarily addresses design agencies and managers in SMEs, who often lack experience in linking design utilisation to business success.

Therefore, evaluating the impact of design at the strategic level necessitates a focus on the unique needs and processes of this level, alongside the development of more nuanced assessment tools and methods. In other words, a distinction should be made between the "impact of design" and the "impact of design thinking" in organisations, recognising that the "how" and "what" of the latter remain unclear [Mayer and Schwemmle 2024]. As design thinking has gained popularity as an innovative mindset and approach not only within organisational studies but also in fields like education and engineering, numerous studies have been concerned with its measurement, the definition of design thinking constructs [Schweitzer et al. 2016; Dosi et al. 2018; Nakata and Hwang 2020], and the development and validation of design thinking scales [Blizzard et al. 2015, Vignoli et al. 2023]. This growing body of work can serve as an inspiration and a solid ground for efforts to create impact assessment tools that enable design managers to quantify and demonstrate the impact of design thinking at the strategic level in their organisations.

This article has primarily focused on the economic impact of design in private-sector organisations, typically measured using economic indicators, which has been the central concern in design literature regarding the value and impact of design since the 1990s. However, there has been a more recent recognition of the need to assess design's impact beyond economic measures, with efforts expanding to include social and environmental domains [see, for example, Design Council 2020; 2021]. This broader perspective places the evaluation of design investments in the public sector in policymakers' agendas. Consequently, this shift implies the development of new measures to capture social and environmental changes, as well as the need to isolate design's contribution to creating change within the wider context. As a future

research direction, it underscores the importance of enhancing the assessment capabilities of individual companies in both private and public sectors by finding appropriate tools and methods for evaluating the full spectrum of design's impact.

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