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RESEARCH ARTICLE

SYNERGISTIC EFFECTS OF INTEGRATING DESIGN THINKING AND REGENERATIVE PRACTICES IN BUSINESS MANAGEMENT INNOVATION

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ABSTRACT

As the severity of environmental and societal concerns continues to rise, the limitations of traditional design management techniques become apparent. In this context, IDEO Design Thinking Model has emerged. This study aims to reflect on and explore how design thinking can drive the transformation of design management within the context of regenerative practices, which promote sustainability. The objectives of this study were: 1) To identify the supportive elements of regenerative practices based on the IDEO design thinking model from D.School; 2) To determine the challenges and solutions associated with integrating design thinking with regenerative practices. This study employs a qualitative research method based on the IDEO Design Thinking Model from D.School. Through semi-structured interviews with 15 stakeholders. Findings: 1) The specific elements of the IDEO design thinking model (Empathy, Definition, Envisioning, Prototyping, Experimenting) positively contribute to the implementation of regenerative practices. In the field of social innovation, the integration of design thinking with regenerative practices can create synergistic effects; 2) The innovative methods of design thinking can facilitate the implementation of regenerative practices, especially in solving complex issues, and addressing social and environmental challenges. This study introduces a novel conceptual linkage between creative design methodologies. This approach advances sustainability and inspires future business and innovation research.

1. INTRODUCTION

1.1. 1.1 Background of the Study

With the rapid development of IT and the internet, competition among products in modern society has become increasingly fierce (Kshetri, 2017). Traditional R&D models can no longer

adapt to new market demands, shifting the competitive landscape from a blue ocean to a red ocean (Alam & Islam, 2017; Christodoulou & Langley, 2020; Rahman & Choudhury, 2019). The transformation has exposed the limitations of traditional design management methods, which are function-oriented and follow a unidirectional process from need definition to product launch (Salinger, 2021). While this model offers clear structure and controllable progress, it often fails to adapt to rapidly changing market demands and complex user experiences (Cooper, 2019), resulting in insufficient innovation and poor responsiveness to market feedback and its potential to overlook users' actual experiences (Chang & Taylor, 2016), thereby impacting the final product's effectiveness.

As market demands diversify and user experiences become more complex, with user experience design and rapid experimentation, thereby shifting to a more user-centered and iterative Design Thinking approach to the redesign has gained increasing attention (Cai et al., 2023). In this context, Design Thinking faces some criticisms in both theoretical and empirical research. Researchers have pointed out that early enthusiasm for Design Thinking often relied on anecdotal evidence and lacked solid theoretical and empirical support (Bason, 2017; Kolko, 2015; Lobanov, 2017; Seidel & Fixson, 2013).

The importance of design as a source of value creation has been studied for decades. Design Thinking's theoretical foundation has lagged behind its practical adoption, the limitations of Design Thinking include its ability to address significant societal transformations (Brekke, 2019; Verganti et al., 2020). Design Thinking's strong focus on user needs and problem-solving may not be well-suited to address systemic challenges faced by contemporary businesses and societies. These challenges often require rethinking future frameworks rather than just solving past issues. Although design plays a core role in driving innovation and change (Liedtka, 2015), Design Thinking, as a formal creative problem-solving method, is still often associated with aesthetic dimensions related to product form, identity, and emotions (Verganti et al., 2021). This limitation places Design Thinking on the periphery of innovation research (Dell'Era et al., 2020). The introduction of Design Thinking was primarily to address this challenge by promoting innovation through systematic approaches (Liedtka et al., 2013), but it still faces issues in integrating its theoretical foundation with other innovation management theories (Dell'Era et al., 2025; Norman & Verganti, 2014). The disconnection hinders understanding Design Thinking's impact. Investigating its alignment with other innovation paradigms, especially in organizational change and leadership, is crucial. Clarifying its conceptual ambiguity through systematic research will enhance insights into its practical applications and value (Dell'Era et al., 2020).

Tim Brown, CEO of IDEO, has proposed that Design Thinking is a human-centered innovation method aimed at understanding customer needs, rapidly prototyping, and generating ideas to fundamentally transform the development of products, services, processes, and organizations (Kurakayev, 2020). IDEO Design Thinking model, which includes: Empathize, Define, Ideate, Prototype and Test, has been widely applied in product design, service innovation, and organizational transformation. Companies such as Apple, Google, and Microsoft have integrated Design Thinking into their product development and management processes, achieving a shift by a linear and sequential to regenerative practices (Zhou, 2024). Regenerative design practices, as an emerging design management method, emphasize continuous iteration and optimization during the design process, improving product quality and market adaptability

through real-time user feedback and design adjustments (Dervishaj, 2023; Fox, 2022). Many tech companies have continuously improved product design through rapid prototyping and user testing, achieving good results in practical applications (Lin, 2018). Moreover, linear design management, effective in early development, is now seen as inadequate for complex user needs and changing markets. It leads to longer development cycles, slow market responses, and overlooked user experiences, impacting product quality and adaptability (Anderson, 2020; Hagen et al., 2019).

Therefore, the use of IDEO Design Thinking model offers a comprehensive, user-centered innovation approach that significantly improves product design quality and market competitiveness through deep insights into user needs, optimization of the end-to-end experience, and integration of systemic factors (Rosa, 2017). This paper explores how IDEO Design Thinking supports regenerative practices in design management, analyzing its effectiveness and practical value in innovation, and offering insights for companies to boost competitiveness in dynamic markets.

1.2. Question of the Study

RQ1: How does IDEO design thinking model support the implementation of regenerative practices in design management?

RQ2: What are the main challenges in combining design thinking with regenerative practices?

1.3. Research Objectives

Specifically, the research objectives were:

RO1: To identify the supporting elements of regenerative practices based on D.School' s IDEO design thinking model.

RO2: To determine the challenges and solutions of combining design thinking with regenerative practices.

2. LITERATURE REVIEW

2.1. Design Thinking (DT)

Design thinking (DT) has become an accepted term in the Innovation Management (IM) discourse as an approach to creativity and innovation based on designers' practices (Auernhammer & Roth, 2021). Over the last years, various scholars investigated and conceptualized DT in teams and organizational settings (Knight et al., 2020; Liedtka, 2015). In this discourse, DT is often conceptualized as a process or set of activities incorporating various methods (Magistretti et al., 2021; Seidel & Fixson, 2013). Design thinking is maturing (Tschimmel, 2012). It's moving from a nascent practice to an established one, and with that comes interest and critique. People are debating its definition, pedigree, and value. Beyond its procedural representations, an emerging body of literature suggests that design thinking should be understood less as a standardized toolkit and more as a situated cognitive and social practice. While early studies emphasized its value as a structured innovation process that enhances creativity and user-centeredness, recent scholarship increasingly questions the assumption that DT can be universally transferred across organizational contexts. Critics argue that the

routinization and managerial appropriation of design thinking risk reducing it to a superficial innovation ritual, thereby undermining its original exploratory and abductive logic.

From this perspective, the maturation of design thinking signals not only wider diffusion but also conceptual tension. On the one hand, DT has gained legitimacy within innovation management by offering a common language for cross-functional collaboration and experimentation. On the other hand, its growing institutionalization raises concerns regarding methodological rigidity, loss of designedly sensibility, and the oversimplification of complex problem-solving processes. This suggests that design thinking's contribution to innovation may lie less in specific methods than in its underlying epistemological stance—characterized by ambiguity tolerance, iterative sensemaking, and reframing of problem spaces.

Accordingly, future research should move beyond assessing DT as a static process model and instead examine how it is enacted, adapted, and contested in practice. Understanding design thinking as a dynamic capability embedded in organizational routines and power relations may offer a more nuanced explanation of when, how, and for whom design thinking generates innovation value.

2.2. Origin and Evolution of IDEO Design Thinking

Design thinking, as an innovative methodology, was applied to business problems by the globally renowned design consultancy IDEO, with its core principle always being to place "people" at the center of every process (Dell'Era et al., 2025; Irbīte & Strode, 2016). In 2004, IDEO founder David Kelley established the D.School (Hasso Plattner Institute of Design) at Stanford University and began teaching design methodology courses, further advancing the application of design thinking. The design thinking process at D.School includes five steps: first is "Empathy," where the goal is to understand the user's needs and feelings; second is "Define," where user needs are analyzed and refined to clarify the problem to be solved; next is "Ideate," where brainstorming generates creative solutions; then comes "Prototype," where tangible models are created to showcase design ideas; and finally, "Test," where prototypes are put into real use, gathering user feedback and evaluating the results. It brings innovative solutions to life based on how real users think, feel and behave with human needs to explore innovative solutions from multiple perspectives, aiming to create more possibilities. The core element of the IDEO design thinking model is shown as Figure 2.1.

IDEO's design thinking model has evolved from traditional product design fields. According to the research by Auernhammer and Roth (2021), design thinking at Stanford University originated with IDEO, and its concepts and methods have significantly transformed practices in product design and innovation management. They emphasize that IDEO not only introduced design thinking into innovation management but also advanced it from a mere product design method to a comprehensive innovation management tool. Hassi & Laakso (2011) further explored the application of design thinking in management discourse, noting that the core elements of design thinking include: Empathize, Define, Ideate, Prototype and Test. These elements have been widely applied in IDEO's practices and have gradually formed a systematic design thinking methodology.

Figure 2.1: IDEO Design Thinking Model (Dell'Era et al., 2020)

2.3. Application of IDEO Design Thinking in Design Management

According to the research by Hassi & Laakso (2011), the application of design thinking in design management has brought about significant changes. Traditional linear design management models often lack flexibility and adaptability, making it difficult to respond to complex and dynamic market environments. In contrast, IDEO design thinking enhances adaptability and innovation through systematic steps and iterative processes, which is crucial in addressing contemporary challenges in business management and social innovation. Lugmayr et al. (2013) examined the application of design thinking in media management education, demonstrating its effectiveness in practice. They argue that the tools and methods of IDEO design thinking help educators and managers better understand user needs, thereby improving the design quality of courses and projects. This reflects how design thinking can be applied to enhance business management practices and educational programs by aligning them more closely with user requirements and market demands. Regenerative design practices represent an important application of IDEO design thinking in design management. Tschimmel (2012) discussed key factors in regenerative design practices, including how continuous user feedback and design iteration can optimize the design process and product quality. This approach helps design teams remain flexible and adaptable when facing complex problems, which is essential for fostering innovation and sustainability in both business and social contexts.

3. METHODOLOGY AND PROCEDURES

This study is based on the IDEO design thinking model and utilizes a qualitative research approach, specifically employing unstructured interviews to gather relevant data. A total of 15 interviews will be conducted with experts in design management, advocates of regenerative practices, and other relevant stakeholders. These interview subjects include members of design teams, senior managers, consultants, and key figures from companies that have achieved notable success in implementing regenerative practices, such as Apple, Google, and Microsoft. These individuals possess deep insights and experience regarding the application of design thinking in regenerative practices.

The interviews aim to collect perspectives and experiences on how design thinking supports regenerative practices. The study will explore the effectiveness of design thinking, the challenges encountered, the key factors for success, and suggestions for improvement, as outlined in the interview questions presented in Table 3.1.

Table 3.1: Research Interview Design

IDEO design thinking model Stage	Interview Questions	No.
Empathize	In regenerative practice, the “Empathize” stage of design thinking helps to deeply understand the needs and challenges of users.	Q1
	The “Empathize” stage can effectively collect and analyze user feedback information.	Q2
	The “Empathize” stage enhances the team's sensitivity to social and environmental issues.	Q3
Define	The “Define” stage can clearly define the problem to be solved and set clear goals.	Q4
	In regenerative practice, the “Define” stage helps to identify key issues and develop effective strategies.	Q5
	The “Define” stage effectively transforms user needs into specific design challenges.	Q6
Ideate	The Ideation stage promotes creative solution generation and helps break through the limitations of traditional thinking.	Q7
	The brainstorming process in the Ideation stage is crucial to innovation in regenerative practice.	Q8
	The Ideation stage supports the team to explore multiple possibilities to deal with complex problems.	Q9
Prototype	The Prototype stage can effectively transform design ideas into testable models.	Q10
	The Prototype stage helps the team verify the feasibility of the design concept in actual operation.	Q11
	Through the Prototype stage, the team can quickly obtain user feedback and make adjustments.	Q12
Test	The Test stage effectively verifies the performance and user experience of the design prototype.	Q13
	The “experimentation” phase provides valuable user feedback for design improvement.	Q14

	Through the “experimentation” phase, the team can evaluate the effectiveness of the design solution in actual application.	Q15
Comprehensive evaluation	The comprehensive application of the five core stages of design thinking (empathize, define, imagine, prototype, and experiment) in regenerative practice has played a positive role in the transformation of design management.	Q16
	In regenerative practice, the application of the five core stages of design thinking helps to solve complex social and environmental challenges.	Q17
	These scale questions are designed to evaluate the actual application effects of each stage of design thinking in regenerative practice, challenges, and its contribution to design management and social innovation.	Q18

This study has conducted a comprehensive analysis of the application of IDEO design thinking in regenerative practices by transcribing and thematically analyzing interview data collected from January to March 2025. It has evaluated the impact of the core steps of design thinking on design management, examined the challenges faced, and provided theoretical and empirical support for the practical value and effectiveness of design thinking in both business management and social innovation.

The study’s framework is shown Figure 3.1.

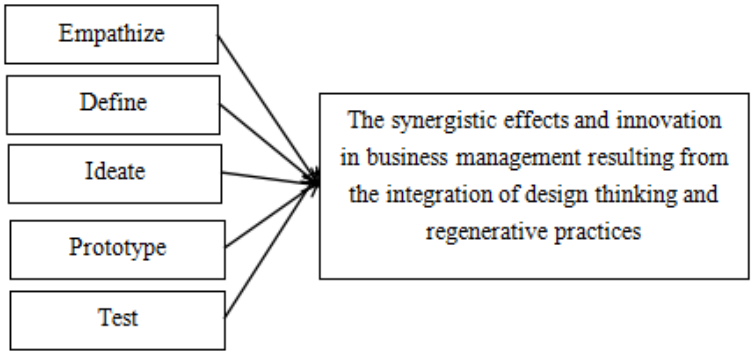

Figure 3.1 Theoretical Framework of IDEO Design Thinking Model

4. RESULTS AND DISCUSSION

4.1. Reliability and Validity Analysis of the Scale

Since the interview questions were designed according to the purpose of the study and the IDEO design thinking model, a reliability and validity analysis is needed to ensure the high quality of the considered dimensions and the credibility of the results.

Table 4.1 displays the results of the reliability analysis for the interview scales utilized in this study, as measured by the Cronbach α coefficient, which indicates the internal consistency of each scale. Here is a detailed breakdown:

Table 4.1: Reliability Analysis of the Interview Scales

Variables	Cronbach α Coefficient	Items
Empathize	0.697	3
Define	0.702	3
Ideate	0.708	3
Prototype	0.696	3
Test	0.689	3
Comprehensive evaluation	0.713	3

Empathize: The Cronbach α coefficient is 0.697, with 3 items. This value suggests a moderate level of internal consistency for the scale assessing the “Empathize” stage of design thinking, indicating that the items are relatively reliable in measuring this variable.

Define: The Cronbach α coefficient is 0.702, with 3 items. This reflects a moderate internal consistency for the scale evaluating the "Define" stage. It implies that the items effectively capture the essence of problem definition in design thinking.

Ideate: The Cronbach α coefficient is 0.708, with 3 items. This value demonstrates a moderate level of internal consistency for the scale measuring the “Ideate” stage, suggesting that the items reliably assess the process of generating ideas.

Prototype: The Cronbach α coefficient is 0.696, with 3 items. This indicates moderate reliability for the scale evaluating the “Prototype” stage, suggesting that the items consistently measure the creation and testing of design prototypes.

Test: The Cronbach α coefficient is 0.689, with 3 items. This coefficient shows moderate internal consistency for the scale assessing the “Test” stage, reflecting that the items are somewhat reliable in evaluating the testing processes.

Comprehensive Evaluation: The Cronbach α coefficient is 0.713, with 3 items. This indicates a relatively higher level of internal consistency for the scale assessing the overall application of design thinking stages. It suggests that the items reliably capture the comprehensive impact of design thinking.

In summary, all scales exhibit moderate internal consistency, with Cronbach α values ranging from 0.689 to 0.713. These results suggest that the items within each scale are reasonably reliable for measuring their respective design thinking stages and the overall impact of design thinking practices.

Table 4.2: KMO and Bartlett’s Test

Kaiser-Meyer-Olkin metric	.857
Approximate chi square	5021. 101
The sphericity test of the Bartlett	506
Bartlett’s sphericity test	

	df	
	Sig.	.000

Table 4.2 reports that the Kaiser-Meyer-Olkin (KMO) value is 0.857, indicating a high degree of sampling adequacy and confirming that the data is suitable for factor analysis. Additionally, Bartlett's test shows a chi-square statistic of 5021.101 with a significance level of 0.000, suggesting that the correlation matrix is significantly different from an identity matrix and supporting the appropriateness of conducting factor analysis.

4.2. Post-Interview Results

Interviews with design management experts and stakeholders from successful companies such as Apple, Google, and Microsoft reveal that design thinking significantly enhances regenerative practices by facilitating a transition from traditional linear processes to dynamic, iterative approaches, effectively addressing complex social and environmental challenges, though it faces challenges such as organizational resistance, resource limitations, and technology adaptation, with success depending on effective use of its core stages, adaptability, and continuous feedback.

4.3. Findings: A Content Analysis of Design Thinking in Regenerative Practice

This section presents the findings derived from a qualitative content analysis of semi-structured interviews designed around the five-stage IDEO design thinking model. The analysis aims to explore how each stage of design thinking is enacted in regenerative practice, the perceived value and limitations of these stages, and their broader implications for design management and social innovation. Interview data were coded thematically, following an iterative process of open coding, axial coding, and selective coding. The findings are organized according to the five core stages of design thinking, followed by a comprehensive evaluative theme that captures cross-stage dynamics.

4.3.1. Empathize: Understanding Users Beyond Functional Needs

Across interviews, the Empathize stage was consistently identified as foundational to regenerative practice. Interviewees emphasized that empathizing extends beyond collecting surface-level user requirements to understanding deeper social, cultural, and environmental contexts.

Interviewee 1 highlighted that empathizing "is not just about listening to what users say, but about observing how they live and how they interact with ecological systems." This reflects a shift from traditional user-centered design toward a more systemic and relational understanding of stakeholders. Similarly, Interviewee 3 noted that regenerative projects often involve "users who are not fully aware of their own long-term needs," requiring designers to interpret latent expectations rather than rely solely on explicit feedback.

However, perspectives diverged regarding the effectiveness of current empathizing practices. Interviewee 2 argued that while empathy tools such as interviews and observations are widely used, they are sometimes applied "in a checklist manner," leading to shallow insights. In contrast,

Interviewee 5 viewed the Empathize stage as a space for ethical reflection, suggesting that it "raises the team's sensitivity to social and environmental responsibilities, which is critical in regenerative contexts."

Overall, content analysis indicates that the Empathize stage is perceived as valuable when it enables designers to engage with complexity and uncertainty. Its effectiveness depends less on specific tools and more on the team's willingness to embrace ambiguity and ethical considerations.

4.3.2. Define: From Ambiguous Insights to Strategic Problem Framing

The Define stage emerged as a critical transition point between exploration and action. Interviewees largely agreed that regenerative practice benefits from a clear articulation of problems; however, they also stressed that "clarity" should not mean simplification.

Interviewee 4 stated that defining the problem "helps align stakeholders and prevents the team from jumping into premature solutions." This view was echoed by Interviewee 6, who emphasized that problem definition in regenerative practice often involves "negotiating conflicting goals between economic viability and environmental impact."

At the same time, some interviewees expressed concern that traditional problem-definition approaches may constrain innovation. Interviewee 1 noted that "over-defining the problem too early can lock the team into narrow solution spaces." This tension reflects an ongoing challenge in design thinking: balancing structure with openness.

Importantly, several participants highlighted the role of the Define stage in translating user insights into actionable design challenges. Interviewee 3 described this process as "sensemaking," where qualitative data are synthesized into shared narratives that guide decision-making. The findings suggest that effective problem definition in regenerative practice is iterative rather than linear, often revisited as new insights emerge.

4.3.3. Ideate: Creativity as Collective and Iterative Practice

The Ideate stage was widely associated with creativity, experimentation, and the breaking of conventional thinking patterns. Interviewees emphasized that ideation in regenerative practice is inherently collaborative and benefits from interdisciplinary participation.

Interviewee 2 described brainstorming sessions as "spaces where engineers, designers, and community representatives can temporarily suspend hierarchy." This supports the view that ideation fosters psychological safety and inclusivity, which are essential for addressing complex sustainability challenges.

Nevertheless, interviewees also acknowledged limitations. Interviewee 5 cautioned that ideation sessions sometimes produce "conceptual abundance but strategic confusion," especially when ideas are not grounded in contextual constraints. Interviewee 14 added that creative freedom must be balanced with feasibility considerations, particularly in resource-constrained regenerative projects.

The content analysis reveals that ideation is most effective when framed as an iterative learning process rather than a one-time creative event. Successful teams reportedly revisit ideation after prototyping and testing, reinforcing the non-linear nature of design thinking.

4.3.4. Prototype: Learning Through Making and Testing Assumptions

Prototyping was consistently described as a turning point where abstract ideas become tangible. Interviewees viewed prototypes not merely as representations of final solutions but as "thinking tools" that enable learning.

Interviewee 6 emphasized that "prototyping allows teams to test assumptions about social behavior and environmental impact before full-scale implementation." Similarly, Interviewee 1 noted that low-fidelity prototypes are particularly valuable in regenerative practice because they "encourage feedback without creating attachment to a specific solution."

However, challenges were also identified. Interviewee 3 pointed out that some organizations lack the resources or institutional support to engage in rapid prototyping. In such cases, prototyping becomes symbolic rather than experimental, limiting its learning potential.

Overall, findings suggest that the Prototype stage contributes significantly to feasibility assessment and iterative refinement, provided that organizations view failure as a learning opportunity rather than a risk to be avoided.

4.3.5. Test: Experimentation, Feedback, and Adaptive Learning

The Test stage was framed by interviewees as an extension of learning rather than a final evaluation. Most participants emphasized the importance of real-world testing, particularly in regenerative practice where outcomes are context-dependent.

Interviewee 8 described testing as "dialogue with users and ecosystems," highlighting that feedback often challenges initial assumptions. Interviewee 5 added that testing can reveal unintended consequences, which are especially relevant in environmental and social innovation.

Despite its value, several interviewees noted practical constraints. Interviewee 4 mentioned that time pressures and funding cycles sometimes limit the depth of experimentation. As a result, testing may focus on usability while overlooking long-term sustainability outcomes.

The analysis indicates that effective testing requires longitudinal thinking and openness to adaptation. Rather than confirming success, the Test stage often reopens earlier stages of the design thinking process.

4.3.6. Comprehensive Evaluation: Design Thinking as a Systemic Capability

Beyond individual stages, interviewees reflected on the integrated application of design thinking in regenerative practice. Interviewee 1 argued that "the real value lies not in any single stage, but in the ability to move back and forth between them." This systemic view was shared by Interviewee 6, who described design thinking as a "capability that reshapes how organizations approach complexity."

Several participants highlighted positive impacts on design management, including improved cross-functional collaboration and enhanced strategic alignment. Interviewee 3 noted that adopting design thinking encouraged organizations to "legitimize experimentation and user involvement at the managerial level."

At the same time, critical perspectives emerged. Interviewee 15 warned that

institutionalizing design thinking risks turning it into a rigid framework, potentially undermining its regenerative ethos. This reinforces earlier critiques in the literature regarding the managerial commodification of design thinking.

In sum, the findings suggest that design thinking supports regenerative practice when enacted as a flexible, reflective, and ethically informed approach. Its contribution to social innovation and design management depends on how deeply its principles are embedded in organizational culture rather than how faithfully its stages are followed.

4.4. Discussion

Design thinking enhances regenerative practices by fostering a dynamic and iterative approach to design management. The core stages include: Empathize, Define, Ideate, Prototype, and Test, to handle synergistic effects in regenerative practices to create adaptive and responsive solutions for complex challenges. Empathize leads to designs that better align with real-world needs by deeply understanding user requirements. Define provides clarity in problem-solving and goal-setting, transforming user insights into specific design challenges. Ideate stimulates breakthroughs by encouraging creative solutions to complex issues, while Prototype facilitates iterative testing and refinement of design concepts. Finally, Test validates design performance and user experience, ensuring practical applicability. Despite these advantages, integrating design thinking with regenerative practices faces several challenges, including resistance to change within organizational cultures, limited resources that may restrict iterative and experimental processes, and difficulties in adapting technology, especially in organizations with legacy systems. Understanding and addressing these limitations is crucial for effective implementation, and by overcoming these challenges and leveraging design thinking's strengths, organizations can more effectively address complex social and environmental issues through innovative solutions.

5. CONCLUSION AND SUGGESTION

This study explores how IDEO design thinking model supports the implementation of regenerative practices in design management. Through a detailed analysis of the core steps of design thinking (Empathize, Define, Ideate, Prototype and Test), it reveals the key role of these steps in regenerative practices. The study demonstrates that design thinking, particularly through its core stages, significantly supports and optimizes regenerative practices. While it offers notable advantages in transforming design management and addressing complex challenges, the approach also faces limitations that require careful consideration. The interviews provide valuable insights into the effective application of design thinking in regenerative practices and offer practical suggestions for overcoming the identified challenges.

In terms of contributions, this study provides new perspectives for academia, enriching the theoretical framework of design management and advancing the integration of design thinking with innovation management theory. For practitioners, the research offers concrete guidance and strategies for implementing regenerative practices, helping businesses enhance competitiveness and achieve commercial success in a dynamic market environment. However, the study's limitations include a focus primarily on interviews, which may lead to sample bias and incomplete data. Future research could explore additional industries and regions to further validate the applicability and effectiveness of design thinking across different fields.

Despite the transformative impact of design thinking on design management, it still falls short in terms of stability and control compared to traditional methods. This study explores the application of regenerative practices in design management through the establishment of the IDEO model, combined with qualitative interview analysis. This approach significantly enhances user experience and market adaptability (Gwangwava, 2021). By incorporating real-time user feedback and design adjustments, companies can better understand user needs and make optimizations, thereby improving product market adaptability (Anderson, 2020). The integration of design thinking and regenerative practices provides companies with a competitive edge, helping them maintain a leading position in a competitive market and achieve commercial success.

To further improve the effectiveness of design management, it is recommended that companies focus on the following aspects when implementing the IDEO design thinking model:

Enhance Data Objectivity: Use multiple data collection methods to reduce subjectivity, ensuring the comprehensiveness and accuracy of feedback.

Optimize Problem Definition: Ensure accurate and comprehensive problem definitions, and regularly adjust them to adapt to dynamic market and user needs.

Validate Creative Applications: In the creative generation phase, test and validate ideas through practical testing and market validation to ensure their feasibility and practicality.

Improve Prototype Feedback: Expand the sample size for prototype testing to ensure feedback is representative, and accurately interpret feedback to guide design improvements.

Increase Stability and Control: Incorporate stability and control mechanisms in the implementation of design thinking to ensure effective management and adjustment of the design process.

By addressing these recommendations, the synergy between design thinking and regenerative practices can significantly benefit the transformation of design management and address complex challenges. Implementing these strategies will enhance an organization's ability to innovate and achieve sustainable success.

CONFLICT STATEMENT

The authors declare no conflict of interest.

COOPERATION STATEMENT

Author contributed equally to this work and approved the final manuscript.

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