form ACADEMIC AKADEMISK
FORSKNINGSTIDSSKRIFT FOR DESIGN OG DESIGNDIDAKTIKK

ISSN 1890-9515 Vol 17, No 1 (2024), Art 6, 1–32 https://doi.org/10.7577/formakademisk.5695

Peer-reviewed article

Challenges in Malaysian Design Industry

Managing Design and Decision-making Processes

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Keywords
Designer roles, Strategic design, Decision-making.

Abstract

The Malaysian design industry follows a market-need-driven approach, where marketing-oriented managers guide designers to address anticipated high-demand markets. However, challenges persist in understanding designers' problem-solving approaches due to implicit practices. This research emphasizes the hindrance caused by insufficient communication and collaboration among managers, designers, and researchers, impeding a comprehensive grasp of innovation processes in the manufacturing sector. The paper advocates a pragmatic examination of designers' experiences, highlighting sensemaking, speculative imagination, and improvisation as crucial design activities. Results show Malaysian industrial designers face consistent challenges with management, impacting the development process. The study contributes to formulating a practical solution for fostering creativity among managers, designers, and stakeholders in the design industry.

Introduction

For 30 years, developed western manufacturing sectors have been utilising design as a means for study and fostering creative discovery to develop aesthetic and usability characteristics of products (Norman & Verganti, 2014; Han, Forbes, & Schaefer, 2021). Moreover, these manufacturing sectors are also increasingly capitalising on design to gain a competitive advantage through strategically developing new products, services, and markets. These changes, which made the design less subservient to marketing (Cooper & Press, 1995; Hira & Hynes, 2021), transitioned the field from being a player to a leader in versatile and multidisciplinary New Product Development (NPD) activities and processes. This implies that designers are being tasked with design management responsibilities (Kim, Bae, & Kang, 2008; Sun et. al., 2020), which means a shift from a product-centred to a strategy-centered discourse, (Aguiar, 2016), where designers´ traditional responsibilities and roles of creating artefacts have shifted to be more strategic.

To move beyond the horizon of Western design and manufacturing, diverse approachesrooted in different fundamental beliefs and assumptions regarding ontology (the nature of reality), epistemology (the nature of knowledge), methodology (the means of acquiring knowledge), and axiology (the principles and values we prioritise) should be investigated. According to Nayak et al. (2020), every paradigm has a tendency to shape our thinking and theoretical frameworks in specific ways, limiting other perspectives. Hence, it is imperative to study these paradigms in order to discern their unique views and possible contributions (Rylander Eklund & Simpson, 2020). Understanding the effectiveness of designers' management roles is crucial in the Malaysian context, which prioritizes innovation and industry growth (Lee, Rahman, & Doh, 2022). Critical success factors for implementing

design-build (D-B) projects in Malaysia underscore the need for effective coordination and collaboration—relevant to design management as well (Lee, Rahman, & Doh, 2022). Currently, only a few studies on this topic have been conducted on Malaysian industrial designers' roles in the design processes (Haizal, Marzuki, & Hariri, 2021; Omar & Rasid, 2019). However, these studies mainly focused on designers' methods, creativity, tools, and techniques. Practice literature on how designers engage in strategic design and development activities is still lacking. Furthermore, Sinoh, Othman, & Ibrahim (2020) identified critical success factors for building information modelling (BIM) implementation in Malaysian, highlighting important factors such as management, leadership, and coordination.

However, short-term intentions driven by present market forces, entice some Malaysian companies to be too overly dependent on mass media, mass marketing, and mass advertising, becoming mostly preoccupied by selling "existing" rather than creating "new" products (Candi, 2010; Hira, & Hynes, 2021; Sun et. Al., 2020; Beckman & Barry, 2009). Therefore, these companies must navigate the tension field between promoting existing products, meeting sales targets and fostering innovation. Presently, sales and marketing campaigns merely focus on persuading consumers to buy products based on superficial exterior qualities (Bruce & Bessant, 2002; Hart, Tzokas, & Saren, 1999; Maciver, 2016). Additionally, mass media and digital advertising shaped consumer expectations by promoting a demand for familiar products. For instance, online advertising, including search, display, and social media ads, now drives marketing efforts. In 2020, $120.8 million was spent on social media advertising in Malaysia, reflecting its growing impact on consumer behavior (Shien, Huei, & Yan, 2023).

According to Elsbach and Stigliani (2018) and Fayard et al. (2017), to separate working processes from cultural context and associated values may not be so straightforward. Complementary studies also found that the misalignment between designers' design activities, traditional working values, and expected behaviours of designers in typical managerial settings can hinder projects from achieving their maximum potential (Bason & Austin, 2019; Ben Mahmoud-Jouini et al., 2016; Björklund et al., 2020; Carlgren et al., 2016a; Elsbach & Stigliani, 2018; Kelley & Kelley, 2012; Kupp et al., 2017; Liedtka, 2018; Wrigley et al., 2020). Studies on the Malaysian design industry have revealed a significant misalignment between designers' design activities, traditional working values, and the expected behaviours of designers in typical managerial settings (Almomani et al., 2016), often failing to accommodate the unique needs and working styles of these designers (Ghazilla et al., 2015).

Some designers contend that the process undervalues their professional aesthetic expertise, honed through years of experience and training in drawing, building, and modelling (Mount

et al., 2020; Tonkinwise, 2011). Nevertheless, managers and researchers in the field of management have difficulties in comprehending and adapting to the creative practices employed by specific designers due to the limitations imposed by their specialised terminologies, perspectives, and convictions (Austin et al., 2018; Deserti & Rizzo, 2014).

Furthermore, non-designers often encounter challenges in discerning the potential impact on innovation when employing design thinking approaches. In particular, when it concerns transformative capabilities and the ability to significantly alter the status quo, experiential and cultural elements inherent in the creative process are not always considered. Moreover, existing literature lacks sufficient theoretical exploration of designers' 'creative practice,' hence hindering the comprehension of implementation difficulties arising from cultural conflicts between designers and managers, which may be attributed to their distinct epistemological and educational backgrounds (Barry & Meisiek, 2015; Kolb & Kolb, 2005; Rylander, 2009). Additionally, their differing 'paradigms of comprehension,' which shaped their approaches to conceptualisation and theorisation, contributed to these tensions (Nayak et al., 2020), especially in the Malaysian context. Therefore, distinct and diverging epistemological and educational backgrounds of these two groups will be elaborated in this article. Based on the study by Mayer & Louw (2012) and Lee, Rahman, & Doh (2022), designers rely on tacit knowledge, intuition, and aesthetic learning through practice and reflection, whereas their managers emphasise explicit knowledge acquisition, data-driven decision-making, and efficiency. Although designers are trained to think holistically, creatively, and interdisciplinary, a compliant and modest attitude is very much appreciated in a paternalistic society, such as Malaysia. Moreover, as "decision-making is perceived to be serious, and entitled to authorities with a certain status, there is, for example, no room for trial and error and playful prototyping. Therefore, managers seek structured goals, milestones, and measurable outcomes, which are supported by explicit knowledge, prioritise risk aversion, and comply with established processes.

Within the realm of management literature, the prevailing cognitive paradigm places design in the context of predictability, generalisability, and stability of outcomes through the utilisation of established procedures and methodologies (Deserti & Rizzo, 2014; Michlewski, 2008). It is regarded as a practice that is situated and embodied, aligned with pragmatism. This paradigm emphasises the importance of having the freedom to explore and pursue unexpected yet promising avenues, all while maintaining the overall vision as an implicit measure of the project's success (Michlewski, 2008, p. 365). However, professional Malaysian designers often need to navigate a complex environment where their contributions to strategy development can sometimes be encouraged but, at other times, discouraged (Haizal et al., 2021).

To summarise this introduction, Malaysian industry is gradually recognising the value of design management. However, trusting designers with management responsibilities requires improving internal and external communication, enhancing skill development, and cultivating an organisational mindset. As Malaysia's cultural context influences management's perception of 'what design is all about,' traditional values and hierarchical structures should be considered when encouraging and empowering designers to take up management roles. In Malaysia, organisations deeply rooted in conventional management paradigms might hesitate to fully entrust designers with strategic decision-making. However, on a positive note, instantly accessible information, extensive competition, and sophisticated technologies significantly contributed to consumers' knowledge and their ability to participate in co-creation activities (Kumar & Whitney, 2007; Bloch, 1995; Isa & Liem, 2021). Hopefully, as the discourse shifts from product-centric to strategy-centric, the role of designers continues to evolve, shaping the future of innovation in Malaysia.

The aim of this study is twofold: (1) to investigate mindsets, practices, and working relationships among Malaysian designers, their superiors, and other stakeholders within the context of the Malaysian manufacturing sector, while emphasising cultural values and personal experiences, as well as creative and decision-making processes; and (2) to provide a pragmatic approach to strategic and industrial design practices by elucidating the significance of embracing critical perspectives and by delving into the underlying rationales that drive management's decision to either endorse or dismiss these perspectives.

This has led to the following research questions, set in a Malaysian context:

> RQ1: What are the roles played by designers in the design development processes and what are their personal experiences with involving managers during their design activities?
>
> RQ 2: What are the primary challenges designers face when dealing with managers in the design development process, and vice versa?
>
> RQ 3: How can collaboration and communication be improved between management and designers when aiming for innovation?

Design thinking and strategic design in the Malaysian context

To gain a collaborative and competitive advantage, 'strategic design' and 'design thinking' principles were introduced to encourage companies to acknowledge the value of design in the early front-end stages of the innovation and design process (Bucolo & Matthews, 2011; Doherty et al., 2014; Nessler, 2016; Boeddrich, 2004; Buijs, 2003). More than a decade ago,

design became an important strategic tool in the corporate world for strategic planning and innovation (Boztepe, 2016; Buchanan, 2001). Moreover, design has been instrumental in forming and transforming businesses so that they can gain a competitive and collaborative advantage (Boztepe, 2016; Brown, 2009; Liedtka, King, & Bennett, 2013; Martin, 2009; Ravasi & Lojacono, 2005). The emergence of `design thinking` in 2000 contributed significantly to strategic planning and creativity (Collins, 2013; Brown, 2009; Wrigley, 2013). This means that to achieve successful ideation, managers and designers need to collaborate and support one another, given a predetermined organisational structure.

According to Allio (2008) and Hamel (2008), the current management practice is akin to an antiquated technology that merely results in incremental operational and product/service innovations. They proposed recommendations for effectively leading management innovation and attracting innovative leaders by arguing that many organisations are constrained by their prevailing management model, which is characterised by bureaucratic procedures, hierarchical decision-making, centralised power, and a lack of receptiveness to dissenting perspectives (Allio, 2008). Companies can take years to achieve disruptive innovation as a strategic imperative for, but once established, competitors face a high threshold to replicate it (Chen et al., 2020).

During the mid-1970s, Malaysia emerged as one of the newly industrialising countries (NICs) in the global economic landscape. During this particular era, there was a notable shift in economic growth from predominantly agricultural pursuits to industrial endeavours (Ali et al., 2008). Several prominent multinational corporations (MNCs), including Sony, Siemens, Intel, Motorola, National Semiconductor, and Panasonic, have chosen to establish their manufacturing and assembly facilities in the country. Several factors, including the country's proficient English language comprehension, highly productive workforce, cost-effective labour pool, and a politically stable environment, contribute to this decision. The rise of local small and medium industries (SMIs) has been stimulated by these industrial advancements, serving as a complementary factor to foreign direct investments (FDIs).

The Third Industrial Master Plan (IMP3), 2006-2020, was projected to improve industrial elements to a higher level of attractiveness globally (Tay, Alipal, & Lee, 2021). Therefore, the Third Industrial Plan outlines effective strategies and policies that can enhance competitiveness within designated industries. Hence, in order to enhance their global competitiveness, manufacturing enterprises must prioritise their efforts on improvement initiatives. In this view, the Malaysian Industrial Design ecosystem needs to encourage their designers in manufacturing companies to become more competitive (Omar & Rasid, 2019). This can be done through a managerial invention pattern that is market-need-driven. In addition, the marketing-orientated managers can also attract investors by stimulating and

motivating markets with predictable high-demand innovation sources that prioritise customer satisfaction.

To provide a roadmap for meeting this imperative outcome in our current study, we need to integrate designers´ multi-dimensional perspectives on design as well as their experiences with disruptive innovation to meet the contextual requirements of the Malaysian industry. This study suggests that design thinking and creative concepts are closely linked to the design function and may have substantial contributions to make when applied more broadly to business management and strategy development.

Roles of designers in the design and development phases

Designers actively engage in the process of obtaining design clarifications, drawing upon their expertise, prior knowledge, creative thinking, past experiences, sources of inspiration, and problem-solving capabilities. According to the scholarly works of Jones (1992), Isa & Liem (2020), and Yee (2007), designers engage in a series of three essential steps within the design process, namely analysis, synthesis, and evaluation. They play a crucial role in the design process by engaging in four key processes: formulation, evaluation, transfer, and reaction (Press and Cooper 2017); alternatively, problem identification, conceptual design, prototype development, and solution formulation (Parsons and Campbell, 2004).

However, a majority of Malaysian (design) managers misinterpret the designers' roles in the design process as being limited to those of someone who produces artistic representation. In reality, this is only a minor contribution from designers to the final product presentation.

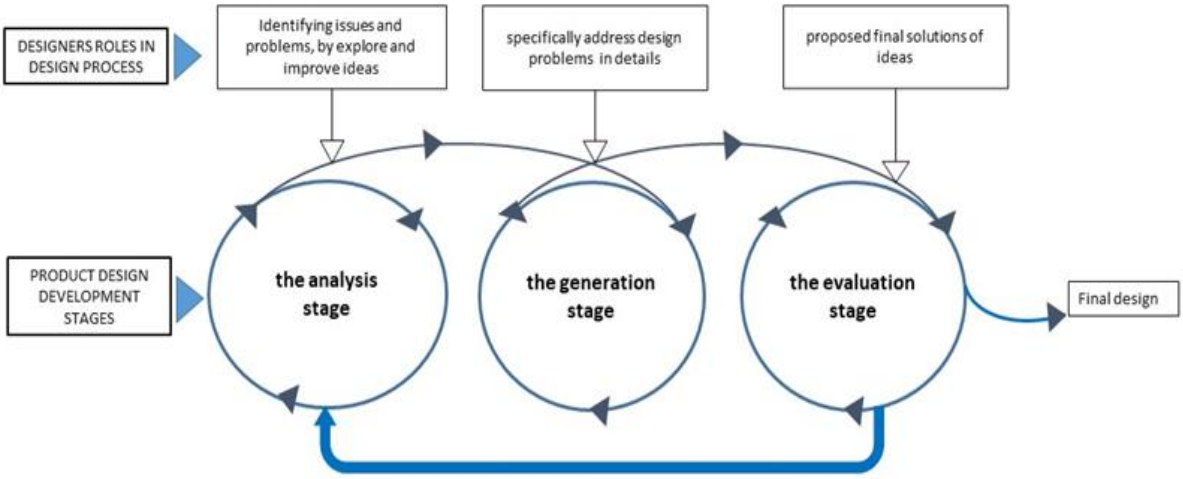
When adopting a more conjectured mode of design, the following stages can be identified (see Figure 1): (I) the explorative stage, also known as early idea development, involves designers swiftly exploring and refining ideas through the use of free-flowing sketches, 3D soft models, and CAD drawings. In this stage, designers generate merely loose visual representations of transformative ideas (Press and Cooper, 2017; Brown & Wyatt, 2010; Isa & Liem, 2024). The process was based on an interactive way of gradually addressing design challenges through constructive thinking. In the (II) generation stage (idea development), early stage ideas were further developed and refined, specifically addressing design problems referenced to the requirements. At this stage, the emphasis is on developing as many solutions as possible for common and localised problems (Haizal et al., 2021; Press & Cooper, 2017; Isa & Liem, 2024). (III) During the evaluation phase, which is the final step of idea development, more comprehensive iterations of product mechanisms, components, user interfaces, aesthetics, and ergonomics were proposed prior to the selection of the most favourable concept. Each component was meticulously created based on the most

appropriate production technologies, incorporating comprehensive specifications, including materials, sizes, and adherence to standard standards (Jones, 1992; Howard, Culley & Dekoninck, 2008; Press & Cooper, 2017).

The process outlined in Figure 1 shows iterative design cycles throughout the analysis, generation, and evaluation stages, as well as the designers´ roles in the process.. Each iterative cycle aims to develop a greater understanding of the data and explore multiple interpretations before transitioning to the next. Iterations enabled designers to continuously reassess and refine their ideas, as well as contribute to the body of knowledge within the design scope.

Figure 1.

Designers roles in product design development process.



Note. Adapted from Jones (1992); Isa & Liem (2020) and Yee (2007); Press and Cooper (2017); Brown & Wyatt, 2010; Isa & Liem, 2024; Haizal, et al. 2021; Howard, Culley & Dekoninck, 2008; Press and Cooper, 2017.

Research methodology

Approach

A qualitative research approach has been adopted, using semi-structured, in-depth face-to-face interviews to understand industrial designers' personal experiences in their design and development activities. Through face-to-face interviews, a deeper understanding of the responsibilities and creative processes of Malaysian industrial designers was researched. According to Guba & Lincoln (1998), Isa & Liem (2023), and Seidman, (2013) the applied method is 'understanding and reconstruction' of people's opinions that led to new

interpretations. As in-depth interviews are relevant for understanding lived experiences and the meaning people make from those experiences (Seidman, 2013), questions on designers´ personal experiences with their managers were posed during the interview sessions.

This approach further comprehended experiences and challenges that arise when designers interact with their managers, with aims of mutually understanding how they can develop processes and strategies to improve communication and product development. It will also facilitate the researcher's exploration and conceptualisation of fundamental social patterns and structures within the domain of interest, employing constant comparison techniques.

Participant's selection

13 industrial, product, automotive, and furniture design designers aged between 28 and 52 years took part in this study. The pool of participants was comprised of nine males and four females with 5 to 30 years of experience in the related fields (see Table 1). Designers were selected from various fields of industrial design in Malaysia. They voluntarily participated in this research study to share their experiences and design activities.

Table 1.

Details of the Participants.

Participants	Position	Age	Company	Working Experiences	Education Level
In-house designer 1	Head of Designers	46	Malaysia's national applied research and development center	25 years	Master Degree
In-house designer 2	Design Specialist	44	Malaysia's national applied research and development center	23 years	Master Degree
In-house designer 3	Design Specialist	43	Malaysia's national applied research and development center	23 years	Degree
In-house designer 4	Product Designers	43	Product design company	10 years	Degree
In-house designer 5	CAD Designer	32	Automotive Company	10 years	Degree
In-house designer 6	Furniture Designer	44	Malaysia's furniture technology centre	22 years	Master Degree
In-house designer 8	Furniture & Interior Designer	28	Furniture design company	11 years	Degree
In-house designer 9	Furniture & Interior Designer	34	Furniture & Interior design company	11 years	Degree
In-house designer 10	Product Development Designer	33	Product design company	24 years	Degree
Independent designers 11	Consultant project manager	52	Own company	30 years	Degree
Independent designers 12	Consultant project manager	34	Own company	13 years	Degree
Independent designers 13	Consultant project manager	33	Own company	10 years	Degree

Data Collection

The research study involved the utilisation of semi-structured interviews at the designer's office, which took approximately one and a half to two hours each. Some of the questions were formulated in advance, and more in-depth related questions were asked to provoke the designers to share more about their design experiences. To facilitate data access and transcription, the interview sessions were video recorded. This tool was used to record the conversation dialogue, the sketching demonstration, and the designer's behaviour during the interview sessions. Given that this study was carried out in Malaysia, the majority of the designers preferred opted to explain their design activities using the Malay language, while others employed live sketching to respond to questions related to their design process.

Data analysis

This study adopted a Thematic Analysis (TA) approach by Terry et al. (2017) and Braun & Clarke (2022) to systematically explore and identify patterns or themes within the data. Thematic analysis is a flexible and rigorous method that allows for a detailed, nuanced analysis of qualitative data, making it particularly well-suited for understanding complex social phenomena like designers' roles in the design process. In-depth interview scripts were analysed and coded to identify underlying themes and capture new insights into the design process. Thematic analysis entails a careful and systematic review of data to develop themes that are directly relevant to the research questions. By using thematic analysis, the researcher was able to identify themes that are not only theoretically significant but also practically relevant to address real-world scenarios and prospective design challenges. After the data was transcribed and translated into English, a structured 4-stage analysis was conducted as outlined by Charmaz (2014), Glaser & Strauss (1967), Isabelle Walsh (2015), Terry et al. (2017), and Braun & Clarke (2022):

Stage 1: Reading and re-reading the transcripts and noting initial notes to allow for deeper understanding and preparation for detailed analysis.

Stage 2: Systematically coding of the data

Stage 3: Identifying the data and features that appeared relevant to the research questions. This process was entirely data-driven, and the codes emerged naturally from the participant's perspectives. Following the open coding, the researcher collated the codes into potential themes

Stage 4: Examining how different codes could be grouped to form broader patterns of meaning. Throughout the coding process, the researcher engaged with reflective

memo-writing techniques to gain deeper insights and understand connections between different data elements (Bryant & Charmaz, 2007).

The outcome of this thematic analysis was a set of well-defined themes that provided a better understanding of the designer's role in the design process.

Emerging themes

Four primary themes emerged from the in-depth interviews. These themes were categorised into: (i) decision level, (ii) responsibility, (iii) involvement, and (iv) problem solving. The interviewees were classified according to the following profiles: (A) in-house designer: designers who work with a design firm; (B) self-employed consultant designers, running their own design practice. Table 2 illustrates the decision-making activities and contributions of designers, as they interactwith managers at certain stagesof generating new or enhancing existing product solutions.

The decision-making in design development

The manager, in-house designer, and independent designer contributed differently in terms of decision-making within the design development phase. In a typical scenario, as shown in Table 2, top management authorises decision-making in early-stage strategic planning and is actively involved in operational processes from design development until production and product launch. For some organisations, strategic decision-making is the director`s responsibility when determining the production of seasonal designs and concepts. A study by Adil and Zulkifli (2018) shows that in the Malaysian cultural context, the in-house designer directly reports to the management on every step of the design phase, while the independent designer engages in the same decision-making process as management when dealing with clients. Moreover, research on design students' mindsets shows that personality traits and cultural factors affect decision-making and planning activities during the design process (Hamat et al., 2020). They are typically influenced by cultural norms and governmental structures, which indirectly impact how designers interact with authorities (Marzukhi et al., 2019).

TABLE 2.

The role of decision-making in design development process.

Design Phase	The management	In-house designer	Independent designer
Early stage	Decision on : • the project's screening / what is the project brief • the market and user research result fro the marketing department • hires the professional researcher or marketing department for complex research.	Decision on : • Selection of proposal for initial concept to be presented to the management. • Type of presentation to the management	Decision on : • Design brief together with management • What to design
Development stage	Decision on : • decides the selection design concept. • decides what technology, system or mechanism to use in the product.	Decision on : • the design method in design development • the design tools for idea development • Proposal of material and system	Decision on : • Decides with the management the selection design concept and what technology, system or mechanism to be use in the product.
Final stage	Decision on : • the final design for production • the final prototype and controls the production. • planning for the product launch.	Decision on : • Design minor changes to suit production and budget	Decision on : • the early stage until the production. • Planning the product launching

According to the interview conducted with In-house Designer 1, a former designer at the automotive company,

> […] When it comes to design development, automotive design and product design are different. A car design project is long-term. The development takes about 3 to 7 years involving many departments. Management needs to lead decision-making. We rely on the management to decide the phase and design during development […]

From the above statement, automotive research and design is long-term and spans from three to seven years, involving many stakeholders and specialised skills to create a new model. Strong strategic management and decision-making are necessary to manage a complex and extensive design and development process. Depending on the marketing research, management usually determines the type of model concept or the facelift for a particular season. This statement implies a top-down approach where management makes decisions primarily based on marketing research with no explicit mention of a participative process or the involvement of designers in decision-making. The voice of the designers appears to be secondary to management directives. Meanwhile, another in-house designer from a different automotive design company, identified as In-house Designer 2, said:

> […] for a start the management brief our target market supposed to be the single female, but when they received an updated brief from marketing, which also indicated that males are interested in pink colours, known to reinforce femininity. When everyone followed the pink colour trend, management immediately directed us to shift our target market for both genders […]

In-house Designer 2 was asked to unquestionably produce designs based on the management's decision when they received the survey results from the marketing department. For instance, this 'followerattitude' on colour preferences among males and females shows that management often places more trust in marketing research results because of the perception that data-driven insights from large consumer samples are more reliable and justifiable for making business decisions. Designers´ inputs, which may be trendsetting, are often treated with scepticism and perceived as subjective and less credible because they can be personally and artistically biassed and not justified by empirical data.

Participants from the furniture design training centre were also design specialists providing design services to the government sector and involved in supplying furniture through selected vendors and open tenders. Although the organisational structure of a design training centre is expected to be flat and informal, management practices are somewhat hierarchical. This hierarchical approach is to keep the project team on track and to avoid unwelcome surprises (Bonner, Rueckert, & Walker, 2002). Top management did most of the decision-making, following the design guidelines and specifications from the government, which were set for contract manufacturing of furniture, whereas in-house designers focused more on the product design and development process, from design conceptualisation to design detailing. As an in-house designer, In-house Designer 6 said:

> […] When the head of the department decides to make the residential furniture, then we identify what products we want to produce, or want to design. They decided the type of furniture to create based on the standard requirements for contract furniture, set by the government. After that, we identified the target user. Based on demographic data, we did the analysis. Either through our own research or by hiring a professional researcher to gather data. Then, after we analysed the data, we sought approval from the head of department to proceed with design and prototyping activities […]

In-house Designer 6 states that the department head's design brief initiated the involvement of the in-house designer. The management took the initiative to conduct a design department meeting and informed the designer of the standard design guidelines that applied to a typical contract furniture project. If detailed research was needed, professional researchers were hired to provide the additional data. Usually, the designer conducts fundamental research to gain knowledge of the project.

According to table 3, the in-house designer was not involved or played a significant role in (a) decision-making during the early stages of strategic planning, (b) developing the design brief, and (c) conducting market research. The non-involvement of in-house designers indicates

that the company has a hierarchical structure where decision-making and strategic planning are dominated by upper management, leaving little room for in-house designers to participate in early stages after the key decisions have already been made. Moreover, when making decisions during design development, they needed approval from top management. The management also determined the design concept . As an example, In-house Designer 3 explained his experiences with top management at his organisation following their subjective design preferences:

> […] based on my experience, where most of those final design or final says come from the top management such as the boss, CEO or the Director. Usually, I will come up with a design, which I have to tune into to their preferences […]

Another statement from In-house Designer 1, head of designer at the same organization, added that:

> […] during meeting on the project brief, the management will gather the input from marketing department to align the concept of the product "criteria" and the designer will do the design research and develop the design according to the proposed concept, the management will monitor the progress […]

In the statement above, the head of design clarified that marketing defined the criteria for management for concept development. The new product creation and the in-house designer need to create the design according to the strict criteria. Indirectly, this is a one-way, top-down decision-making process controlled and guided by management. It is noteworthy that the interviewee from the marketing department employs the term "concept" rather than "brief" or "information". Perhaps this shows that marketers also see themselves as designers, or even strategic designers. Further study needs to be done to explore this assumption.

However, the relationship between independent consultant-designers and top management differed during the early stages of project screening, particularly in decision making. The consultant-designer was perceived as an expert and was given the legitimacy to influence management in strategic design and decision-making processes because of their reputation in the design industry and track record of successfully completed projects. Moreover, they can prove their specialised skills and knowledge that are not available in-house. The statement from Independent Designer no. 12 (see table 1) demonstrates that the independent designer (in a private company) usually decides on what products should be produced for the client. Moreover, the client entrusts him with design research to forecast and define strategic design directions:

> […] When I created this project, the director did not know what kind of furniture office system that they want to produce. They ask me what they should produce? So,

> I asked them "What's the problem I'm solving? and Who's the user I'm serving?" Then, I started to propose concept designs that is not similar to the typical office system to offer new direction to the director of the company so that they can recommend to their clients." after that I asked them "How do you think this is going to help you? […]

The responsibilities of design development

In the design development process, the management, in-house designer, and independent designer contributed with different responsibilities, as shown in Table 3. Top management is mainly responsible for developing design directions. In-house and independent designers share similar responsibilities in developing the design concept until the final production model.

TABLE 3.

The responsibilities in the design development process.

Design Phase	The management	In-house designer	Independent designer
Early stage	Responsible for : • to screen the possible project • the product characteristic. • Instruct marketing to conduct research	Responsible for : • to provide the design concept and design developments align with the management requirement. • To meet the dateline	Responsible for : • To propose the management what to produce • to develop a design brief
Development stage	Responsible for : • to make sure design concept on the right track. • Time management and time frame	Responsible for : • To develop design until final testing • to solve the design with the function at the prototyping process. • To meet the dateline	Responsible for : • Develop design concept, design development, final design, and prototyping collaborates with the management. • To meet the dateline
Final stage	Responsible for : • the production wise. • To plan for the product launch.	Responsible for : • Usability testing with user • keep track of all production developments	Responsible for : • Involve in the early stage of the production. • Planning the product launching.

The study identified that management's responsibility is to make sure that all design activities are on track. From an accountability perspective, management aims to systematically ensure adherence to a hierarchical growth plan and comprehensive resource allocation.

This may lead to significant communication and work challenges between management and designers. For example, the use of certain methods of instruction via emails and verbally to an in-house designer. The project briefing falls under the responsibilities of the top management during strategic management meetings. In some situations, when the head of

design is involved in strategic product development meetings, he or she only presents the design concepts. Management will then decide which concept to further develop within a given time frame and instruct the design department to materialise the concept following the guidelines given by them. The interaction between the Head of Design (HoD) and management appears to be one way where HoD presents design concepts and management decides which to pursue. The data indicates a limited back-and-forth communication process, where management provides guidelines and the design team materializes the concept based on the given instructions.

Both in-house designers and independent designers have similar responsibilities to meet management expectations by developing at least an acceptable concept according to predetermined guidelines and requirements. The most challenging responsibility they share is convincing top management, which normally has no design background or experience, to select a design concept based on typical design qualities rather than pure pragmatic cost and market requirements. Moreover, misunderstandings may accumulate as management fails to explain clients´ needs and preferences to the designers. Frequently, the design concept will go back to its initial idea once reaching the conclusion of the final design development. For example, In-house Designer 7 says:

> […] this is known as a 2D sketch, we will show this concept to our boss or management. We have to come out with very nice 2D sketches because they cannot imagine of what the design will looks like if we show them a very rough and loose sketch. We have to do a proper 2D presentation to present to them, before we proceed to 3D drawing […]

According to the interview, In-house Designer 7 explained they needed to propose an alternative method to convince the management to make sure the top management understands the design concept (Figure 2). The designer must effectively communicate the design in 2-D representations and devise strategies to help management understand and visualise the non-represented elements of the design concept.

In another independent designer case, the management had already determined what type of furniture they wanted to produce. They presented the design brief to the independent designer based on the data from the marketing department. The management was mainly interested in managing budgets and production processes, which only led to minor design improvements. The independent designer’s responsibilities were to propose a possible design solution to solve an existing problem and to address the client´s requirements. As a result, the independent designer collaborates with management to determine the design direction, whether it is incremental or radical.

FIGURE 2.

The 2D digital illustration for presentation to the management.

The involvement in the design development process

Management in Malaysian industry adheres to the traditional management system that requires them to get fully involved in the product development process, as shown in Table 4. At different levels, involvement can vary, with higher management possibly setting broad guidelines, while middle or lower management may engage more directly in the product development process. The extent of full involvement also differs based on the company's approach and culture. From their perspective, the in-house designer is only legitimised to style and visualise the design concepts, as well as to brand the product to fit into the existing system or technology.

Most in-house designers, according to Table 4, only visualise and focus on redesigning parts of the existing products. However, in one company, an in-house designer was only involved in CAD to provide technical support in production design. Moreover, in-house designers only engage in research after directly receiving instructions about what to design from the head of a department or management.

In other companies, department heads contact designers directly to discuss a new project. Often, management itself conducts brainstorming sessions and design research. Despite the management having already established some concepts, the in-house designer retains their freedom to select their preferred design methodology for concept development. Then again, the management appeared to place more trust in independent designers than in-house designers. Some of the company's focus is on independent designers to enhance the current designs in the market for reproduction. The independent designer keeps track of all design developments for the company until final production.

TABLE 4.

The involvement in the design development process.

Design Phase	The management	In-house designer	Independent designer
Early stage	Involved in : • directly/indirectly in the design development process of the product. • the strategic decision making of the product, and when need a specialist on complicated research, hire the professional researcher or consultant designer for the new design.	Involved in : • the product development process. • Brainstorming with the management on the design project and received instruction on the project	Involved in : • strategic planning to participate in the early stage of project screening. • Brainstorming with the management on the design project
Development stage	Involved in : • keep track of all design developments • Brainstorming and concept selection screening • Advice on the concept development	Involved in : • design development process to create the product suite with the technologies, acceptable and look beautiful in the markets. • Brainstorming ideas • Design presentation to the management	Involved in : • keep track of all design developments • Brainstorming and concept selection screening • Design presentation to the management
Final stage	Involved in : • keep track of all final design developments	Involved in : • Producing CAD and final prototypes • the production planning	Involved in : • Producing CAD and final prototypes • the production planning • keep track of all final design developments

The problem-solution during the design development phase.

By and large, in-house designers and independent designers share similar tasks as problem solvers, idea generators, and design developers. They need to be sure that the proposed designs meet the technology requirements and show sufficient diversification to be accepted in the market.

For instance, an in-house designer In-house Designer 8 had to design a rice cooker with new technologies and solve issues about size compared to competitive conventional models on the market (Figure 3). The design he produced seemed bigger compared to the competitor's product. In order to address these issues, the designer manipulated the design principles, utilising psychology and perspective, to produce a design that appeared more compact, which he then presented to the management.

Table 5 explains how designers effectively engage with the design development process, encompassing activities such as conceptualising design concepts through sketching, as well as addressing production-related challenges in order to meet the expectations of both customers and managers. In contemporary business contexts, management is commonly perceived as assuming the role of a problem solver in many domains such as marketing, sales, and customer communication. Historically, designers employed within an organisation have consistently engaged in collaborative efforts, wherein they address design challenges and generate conclusive design resolutions in conjunction with managerial personnel and other departments.

The design process incorporates problem-solving techniques that rely on effective communication and teamwork. These abilities are essential for in-house designers to successfully address and overcome challenges. However, independent designers frequently deviate from this trend as they tend to address work, planning, and design challenges on their own, owing to the limited scale of their companies.

Figure 3.

A sample of the rice cooker with the additional technology and extra compartment makes the product look bigger compared to the existing and competing brand products.

Cooker with the additional technology with an extra compartment

Comparison with existing Design

Table 5.

The problem-solving in the design development process.

Design Phase	The management	In-house designer	Independent designer
Early stage	Problem solution in : • Brief planning • Time frame • Budget constraints	Problem solution in : • Early concept development issues • Rejected concept • failed to generate ideas • Fulfilled management requirements	Problem solution in : • Brief planning issues • to deliver a good design or services to the client. • Rejected concept • budget constraints
Development stage	Problem solution in : • Financial problems • time management / time frame	Problem solution in : • Design failures • Private and confidentiality issues • Technical design issues	Problem solution in : • Design failures • Private and confidentiality issues • Technical design issues
Final stage	Problem solution in : • Overdue project • Project failure • Production issues	Problem solution in : • Error on CAD/final drawing • The design cannot be manufactured	Problem solution in : • Error on CAD/final drawing • Overdue project • Production issues

Discussion

In this section, the Research Questions were addressed to gain a better understanding of how designers' personal experiences influence their design and development practices.

RQ1: What are the roles played by the designers in the design development processes, as well as their personal experiences with the managers in their design activities?

The categories that emerged from the interviews about designers´ activities in product development processes can be categorized in 7 phases: (1) project screening; (2) project brief or aims; (3) market research and user research; (4) design concept and development; (5) technology systems and mechanisms; (6) final design; (7) prototype development; (8) production; and (9) product launch (see table 6).

The development methodologies may vary among different companies; nonetheless, there is a general consensus that the basic approach remains consistent. The product development process involves brainstorming, creating, designing, and prototyping. The designer's creation reflects this iterative process, which ultimately leads to design solutions. In Malaysian industry, the involvement of the marketing department to conduct research for designers has always been an established practice. From management's perspective, the marketing department sets the strategy to carry out research with the end-user in order to develop market-design driven products, relevant for the nation.

The approach only identifies user-centred problems, and sometimes it does not perfectly address the requirements of actual user needs. In some cases, if the organisation thinks that the marketing department is not capable of doing critical research, it will hire a professional researcher as a consultant to conduct the research. For example, the production company where participant 'A' worked hired a professional researcher to conduct research on Malaysian DNA because, according to management, designers were not the most suitable ones for carrying out research. Nonetheless, management did not intervene in the expertise, capabilities, and responsibilities of the designers because they acknowledged that these play a crucial role in enabling designers to effectively address design challenges. Most participants elucidated how such knowledge and abilities contribute to aiding a corporation in resolving its design-related challenges. The market and design research category in Table 6 describes how market and user analysis is significant for designers to enhance their creativity and develop their design concepts. The majority of designers emphasied the critical importance of research in any creative development, noting that it is essential for gathering background information and forecasting future design trends and developments.

Table 6.

The comparison of the in-house designer, management, and consultant designer roles.

Roles \ development process		Project screening /Early target	Project brief or aims	Market and user research	Design concept and development	Technology, system, and mechanism	Final design	Prototyping development	production	Product launch
Decision level	Management	Board of director/ CEO	Board of director/ CEO	Marketing Executive	Management to control	Management to decide	Management to decide	Management to decide	Management to control	Planned by management
	In-house designer				report to management	report to management	report to management	report to management	If needed	If needed
	Independent designer	Deal directly with Management	Deal directly with Management	Deal directly with marketing	Design concept work together with management	Design development cooperate with management	Final design collaborates with management	Prototyping collaborates with management	Work together with overall production	Proposed plan for launching
Responsibility	Management	Screening what to produce Managing time and schedule	decided what to produce	provide marketing research result	determine design concept	Determine technology, system, and mechanism	Decided final design	Decided final design for production.	Control production	Involved in exhibition
	In-house designer				Proposed design methods and concept	Proposed technology, system, and mechanism	Propose final design and user testing	Solve design and function	If needed	If needed
	Independent designer	Proposed what to produced	Involved in creating brief	Conducted research	Chosen design methods and concept.	Developed and proposed	Proposed final design	Solved design and function	Involved in production	Participated in Exhibition
Involvement	Management	Directly involved	Directly involved	Directly involved	Direct/indirectly	Directly involved	Directly involved	Only on the final prototypes	Directly involved	Directly involved
	In-house designer				Proposed/create design concept/follow concept briefly.	Design development	Proposed final design	Creating final prototypes		
	Independent designer	Involve in new product	Involve in new product	Involve in new product	To propose/create design concept/follow concept briefly.	Design development	Propose final design	Creating final prototypes	Involve early stage of the production till packaging	Involve indirectly (if needed)
Problem solution	Management	Identify early needs and problem	Finalized project brief	Identify user, market needs, and problem	Engineer identifies technology problem	Engineer solve technology problem	Decision final solutions	monitor production problems		
	In-house designer				Product surfaces concept	Product has to follow technology and system proposed by engineer	Proposed final design solution	Testing design and function		
	Independent designer	Proposed needs and problem	Proposed and finalized project brief	Proposed user, market needs, and problem	New design new concept (superficial level)	Design solving-proposed technology, system, and mechanism	Proposed and finalized design solution	Testing design and function		

RQ 2: What are the primary challenges designers face when dealing with managers in the design development process?

All participants regularly experienced negative challenges when dealing with management concerning design and development. The feeling of not being in control of design and development processes led to concerns about not meeting target deadlines and anxieties about facing difficult challenges, creating a situation where a designer could not participate effectively in the design and development phases.

Designers encounter challenges when critically evaluating their ideas and actions due to the influence of management, which has the authority to oversee decision-making throughout the entire design development process, as shown in Table 5. The designers in Malaysia are still looking for ways to meet Malaysian design standards and to see how well the Malaysian industry is capable of producing quality and resilient design in the market. As illustrated in Figure 4, it is difficult for managers and industrial designers (in-house designers) to deal with trust issues during the conceptualisation and decision-making stages of the strategic design process.

Figure 4.

The managerial trust issues perspective in the context of Malaysian industrial designers.

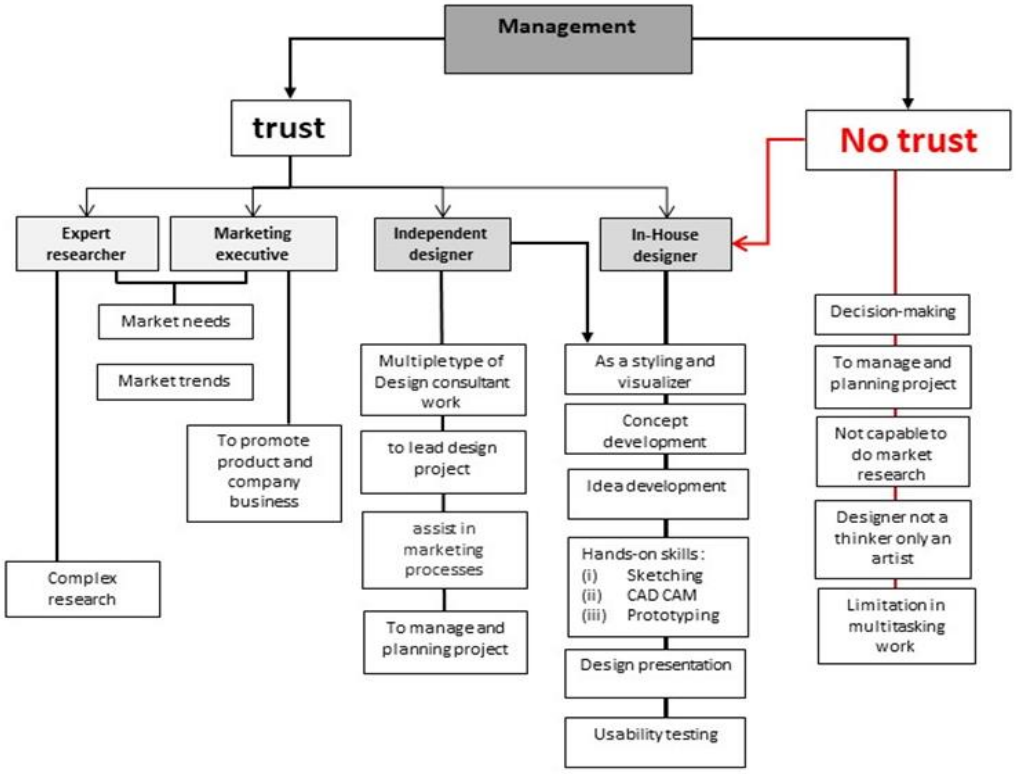


Figure 4 shows how senior management, in-house designers, and independent designers interact with issues of trust in the design organization. Figure 4 serves as an example of managerial speculation regarding the many responsibilities, contributing elements, and activities of the designers within an organisation. Trust issues are dependent on the level of responsibility in decision-making, involvement in the design process, and how the problemspace is framed.

According to the study, management assigned different levels of responsibility to the in-house designer, the independent designer, the marketer, and the professional researcher. Organisations may engage their services for a multitude of purposes, such as leveraging their specific knowledge, gaining novel insights, ensuring impartiality, adapting to changing circumstances, and tapping into their extensive networks and resources. Through collaboration with other external stakeholders and design professionals, these organisations can have access to a diverse array of design viewpoints.

Findings show that organisations and businesses engaged in industrial design activities largely adhere to the traditional management system, which indicates a hierarchy with linear structures, giving management the power to direct all design and development stages.

Because it uses a one-way communication technique, it indirectly widens the chasm between designers and management. Trust issues are aligned with the fact that designers and managers work according to a linear process. The researcher agrees with Boess (2008), who claims that designers use their abilities to anticipate the right meaning for the product but unfortunately need to be monitored as the management needs to make sure that design and development are on the right track. The in-house designer is facing challenges from management, as they are not perceived as strategic thinkers or leaders to lead the design development. This results in missed opportunities when in-house designers are not considered the right people to manage and lead the design project.

Indirectly, management failed to see in-house designers' abilities to influence strategic design decision-making based on existing technological resources and organisational competences. For instance, management should encourage in-house designers to lead design development, solve problems, and entrust them to interpret market research results. However, due to a lack of trust from management, in-house designers were unable to strategically influence design decision-making, confining themselves to design styling. This means that companies in Malaysia are hesitant to rely on their in-house designers to create innovative designs for them, as they themselves do not understand the holistic value of the concept. Comparatively, independent designers were entrusted with more responsibilities to broaden the design scope and solve problems more strategically. Management confided in the extensive experiences, reputations, and broad exposure of these independent design consultants.

RQ 3: How to improve collaboration between management and designers to achieve innovation through strategic design?

The Malaysian design industry continues to employ a market-need-driven approach when it comes to the creation and advancement of new products and services. It means that marketing-orientated managers adopt an evolutionary attitude by directing designers and researchers to markets with a foreseeable high demand (Johnson, Whittington, Regnér, Angwin, & Scholes, 2020). This market pull approach has proven to be inadequate to meet 'real' user needs and aim for 'radical' innovation.

However, a certain level of maturity among Malaysian managers is needed to drive innovation through a technology-push approach. It necessitates that they: (1) understand designers' deeper and more versatile capabilities; (2) involve designers more in design throughout all stages of the innovation and design process; and (3) give designers responsibilities and trust in joint decision-making. (4) Dedicate interest, time, and resources for strategic design, which should be clearly distinguished from daily operational tasks. This indicates that it is essential for a corporation to embrace the principles of a 'learning

organisation' and to create an environment that allows making mistakes. Mintzberg's concept of a 'learning organisation' underscores the significance of organisational flexibility, adaptability, and continuous improvement. According to Jashapara (1993), organisations can enhance their adaptability, creativity, and overall success by prioritising learning and development initiatives.

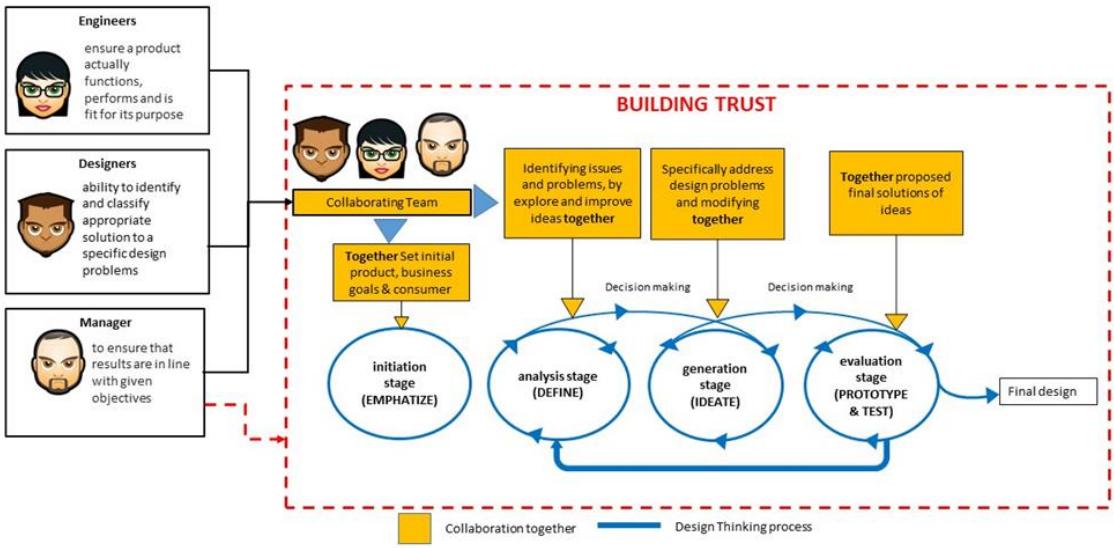
Furthermore, organisations need to instil a more nuanced appreciation of design thinking among their managers. According to Leavy (2010), this will create a more independent, creative, and innovative atmosphere within the organisation. The shift from an exclusively stylistic or product focus to a more diversified mode of design thinking requires significant changes in an organisation´s management system, culture, and mindsets. Management should acknowledge the designer as the main person when generating new ideas and innovations.

As the design profession innately recognises the transition from "design serving as a mere component in product development" to "design assuming a strategic role in innovation" (Muratovski, 2016), managers should also work collaboratively with designers to develop networks for anticipating new products and services. Undoubtedly, the integration of design thinking into design management will yield fresh perspectives on the design process by facilitating the allocation of resources through participatory decision-making.

Brown (2009 recommends that organisations embrace design thinking and integrate design at a strategic level, with designers taking the lead. Particularly for the Malaysian design industry, designers and engineers need to be involved in early-stage strategizing and decision-making (Figure 5). Moreover, organisations need to nurture an open, collaborative, and explorative culture and mindset that combine logic, empathy, and creativity to gain valuable insights and create innovative solutions. To facilitate this, a culture of inclusivity, trust, and participation among designers, managers, and (prospective) users and stakeholders should be established, based on a common ground for knowledge transfer and decision-making through legitimate experiences.

Figure 5.

The collaboration between designers, managers, and engineers in the design thinking process.



Conclusion

The main outcome of this study highlights that management does not encourage and recognise creative exploration and decision-making among Malaysian designers, particularly in-house designers. This situation, which is prevalent in Malaysian industry, can be partly attributed to a top-down Southeast Asian business culture, which is characterised by "Paternalistic Leadership" values (Jaes et al., 2023), as well as multiple transitions from being a colonised to a developing nation and now moving to a developed nation in-the-making (Kalantidou & Fry, 2014). This cultural and social shift has led to pragmatic mindsets and behaviours among interacting actors, where the work environment takes justification and accountability seriously. However, such a pragmatic work environment may harm stimulating creative talents, capabilities, and interactions among Malaysian designers, design leads, and decision-makers.

Therefore, this study argues that design excellence and innovation require management to adopt a design-orientated mindset, where creative explorations and decision-making should be more democratic and shaped through practical engagement and experiential learning (Kolb, 2014), allowing cultural dispositions to emerge and subjectivity to take more centre stage. Furthermore, established social practices and underlying latent tendencies inherent in these practices should be considered in developing design solutions (MacKay et al., 2021).

As design and decision-making practices are then to be contextually embedded and interconnected with their social environments. 'Design' and 'Design Thinking' methods and

techniques are to be applied and extended to other departments within an organisation as well as a wider community than just managers, designers, and clients to achieve strategic impact beyond incremental innovation.

The scope of, this study only focused specifically on Malaysia, limiting the generalisability of the findings. Findings may not apply to designers working in different geographical regions or industries with distinct design practices, cultural influences, or regulatory environments. Moreover, only a limited number of industrial designers participated in the study over a specific time period. Therefore, insights may not fully capture the diversity of experiences and practices within the design community.

Future research in this area should focus more on how to create an atmosphere of creativity among managers, designers, and other stakeholders by developing a deeper understanding of how designers should practice and how managers should support these practices.

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