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ORIGINAL ARTICLE

Entrepreneurial ways of designing and designerly ways of entrepreneuring: Exploring the relationship between design thinking and effectuation theory

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Abstract

Scholars have suggested that design thinking and effectuation theory may enrich each other. However, to date, we lack deeper theorizing and empirical evidence to further advance this valuable discourse for the benefit of innovation management. Our qualitative study draws on 41 in-depth interviews with Australian designer-founders, with the aim to provide a theoretical perspective on and empirical insights into the relationship between the behavioral practices of design thinking and the cognitive principles of effectuation. The contributions are twofold. First, our study explains how design thinking practices enable designer-founders to enact the cognitive principles of effectuation. Uncovering these "entrepreneurial ways of designing" provides an explanation for the effectiveness of design thinking for entrepreneurial innovation and new venture creation. Second, our study sheds light on the ways in which designer-founders interpret effectuation principles through the professional values and norms embodied in design thinking. These "designerly ways of entrepreneuring" resemble particular, normative interpretations of effectual action. By doing so, our study offers empirical substantiation and theoretical elaboration of the ways in which design thinking functions as an approach for entrepreneurial innovation and new venture creation. Through shedding light on the "entrepreneurial ways of designing" and "designerly ways of entrepreneuring" exhibited by designer-founders, our research reveals the reciprocal relationship between design thinking and effectuation theory.

KEYWORDS

design thinking, effectuation theory, entrepreneurship, innovation, new venture creation

1 | INTRODUCTION

Design thinking has gained prominence in the business world for its problem solving and innovation benefits. For example, design thinking has been heralded as suitable for understanding the problem space better and for advancing the solution space, particularly in contexts of high uncertainty (Kolko, 2015; Liedtka, 2018). Consequently, innovation scholars

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are interested in design thinking for its practical relevance as a useful innovation approach (Brown, 2008; Gruber et al., 2015; Martin, 2009; Yoo & Kim, 2015). Drawing on extant research, we view design thinking as a human-centered approach for innovation, which is grounded in the ways of thinking and working common to the design profession (e.g., Brown, 2008, 2009; Brown & Martin, 2015; Lockwood, 2010). Design thinking is enacted through design thinking practices and organized in a systematic process that fosters ongoing learning for innovative problem solving (Carlgren et al., 2016; Dell'Era et al., 2020; Elsbach & Stigliani, 2018; Micheli et al., 2019). However, despite its practical relevance, the diffusion of design thinking into the scientific discourse in the field of innovation management has, until now, primarily taken place independently from other theories (Dell'Era et al., 2020). This limited integration is problematic because design thinking lacks the theoretical foundations that can provide the basis for its continuing diffusion into the innovation literature (Dell'Era et al., 2020). Deeper theorizing in design thinking research is important, as many claims for the effectiveness of design thinking as a useful innovation approach are grounded in anecdotal evidence of organizations that were successful in leveraging design thinking for their benefit (e.g., Brown, 2008, 2009; Brown & Martin, 2015). Researchers are questioning the overreliance on anecdotal evidence and demand more theoretical substance (Dell'Era et al., 2020).

Recently, in a plea to advance research into entrepreneurship methods, Mansoori and Lackéus (2020, p. 812) suggested that scholars should "take advantage of the theoretical strengths that effectuation is grounded in […] and the strengths around actionable, tactical prescription that (…) design thinking provide(s)." This suggestion aligns with a growing body of literature proposing that design thinking and effectuation theory may mutually enrich each other across theory and practice domains (Garbuio et al., 2018; Glen et al., 2014; Dorst, 2011; Liedtka, 2015; Sarooghi et al., 2019). Advancing such an integrative perspective is warranted by shared underlying philosophical roots in pragmatism inherently connecting both research streams (Dalsgaard, 2014; Reuber et al., 2016). Further, design thinking and effectuation theory have each independently shown promise to advance innovation theory and practice, but their combined role remains unclear (e.g., Berends et al., 2014; Liedtka, 2015). Despite shared philosophical roots, proposed theoretical synergies, and potential for practical complementarities, the discourses around these research streams have essentially developed in isolation.

Effectuation theory has been primarily embraced by entrepreneurship and management scholars and its ongoing diffusion in the literature has benefitted from its well-developed theoretical underpinnings and clearly articulated cognitive decision-making rules (Chandler et al., 2011; Grégoire & Cherchem, 2020; Sarasvathy, 1998, 2001, 2008). This foundation served the entrepreneurship discipline to advance its theorizing and it informed many studies to better explain and/or predict entrepreneurial success (e.g., Read et al., 2009b; Perry et al., 2012). However, skeptics have criticized the practical implications of effectuation theory, stating that "many of the ideas arising from the effectuation lens are still open to empirical operationalization" (Romme & Reymen, 2018, p. 3) and bemoaning that effectuation theory does not explicitly feature actionable prescription for effective behavior (Mansoori & Lackéus, 2020; Perry et al., 2012). Further, scholars have suggested that "the ways in which effectuation is understood and enacted may deviate from the precepts emphasized in scholarly work" (Reuber et al., 2016, p. 539).

Practitioner Points

- Design thinking practices bring the cognitive principles of effectuation to life.
- Design thinking is an effective practical approach for entrepreneurial innovation.
- Design thinking adds a normative dimension to effectual decision-making.

Although, based on the current state-of-the-art research, we may assume that design thinking and effectuation both support innovation in a new venture context, we do not know if and how the relationship unfolds in practice. Uncovering relationships, differences, and synergies may shed light on actionable, effective behavioral practices for advancing effectuation theory and provide deeper theoretical insights into the mechanisms that make design thinking a useful innovation approach. With this research, we seek to better understand if and how this potentially synergistic relationship manifests and unfolds in practice. In doing so, we provide the foundation for advanced innovation theorizing and cross-pollination of disparate academic discourses.

To explore the relationship between design thinking and effectuation theory, we conducted in-depth interviews with Australian designer-founders engaged in entrepreneurial innovation. We selected informants with a design degree and/or considerable practical experience in design, as we expected these informants to be able to leverage design thinking as a problem-solving approach. We focused on new venture founders engaged in entrepreneurial innovation, which we define as the creation of new business opportunities and the exploitation of opportunities through a new venture, as this context provides a conducive setting to study effectuation.

Our study makes several important contributions. Firstly, we contribute to design thinking research by building a stronger theoretical understanding of the effectiveness of design thinking through establishing connections with effectuation

theory as explanatory foundation. Connecting the behavioral practices of design thinking with the cognitive principles of effectuation adds a new theoretical dimension to the current discourse around design thinking. In turn, this conceptual integration and empirical investigation of previously disparate theoretical frameworks mutually informs and advances our understanding of innovation management. We identify five synergistic connections across both domains and conceptualize these connections as "entrepreneurial ways of designing." In addition, we uncover normative implications of design thinking for effectual decision-making. The use of design thinking can trigger tensions that emerge when designer-founders simultaneously seek to live up to values and norms of the design profession (their professional origin) while acting entrepreneurially, which can create conflicting objectives and priorities. We conceptualize these normative implications as "designerly ways of entrepreneuring." In combination, our findings provide a fine-grained understanding of the synergistic and antagonistic aspects that constitute the design thinking-effectuation interface, while better explaining why and under which conditions design thinking works. Secondly, we contribute to effectuation theory by explaining how the use of design thinking practices can facilitate the adoption of effectual decision-making principles in practice. Explaining how the principles of effectuation come to life through design thinking practices adds a novel behavioral perspective to effectuation theory.

The article is structured as follows. The next section provides the theoretical background of this study. In the third section, considerations concerning methodology, data collection, and data analysis are introduced. Fourth, the empirical findings are presented. The last section contains a discussion of the findings, explains the study's main contributions, and suggests future research avenues.

2 | THEORETICAL BACKGROUND

We have divided the literature review into three sections: First, we review the design thinking literature. After that, we review the literature concerning effectuation theory. The third section provides an integrative view on design thinking and effectuation theory.

2.1 | Design thinking: The practices of expert designers

Design thinking has gained popularity with innovation practitioners and academics alike, many of which promote design thinking as a highly relevant innovation approach (Brown, 2009; Martin, 2009; Liedtka, 2015). Scholars often contextualize the effectiveness of design thinking in the light of prior research that has investigated the role of design as a strategic driver of innovation and gaining competitive advantage (e.g., Dell'Era & Verganti, 2007; Luchs et al., 2016; Verganti, 2009). Indeed, empirical studies have shown that firms' design resources positively impact organizational performance (e.g., Candi & Saemundsson, 2011; Gemser & Leenders, 2001; Hertenstein et al., 2005; Homburg et al., 2015; Swan et al., 2005). The demonstrated performance-enhancing benefits of design have sparked avid scholarly interest in the role of design as an approach for innovation, commonly known as design thinking (Bettiol & Micelli, 2014; Brown, 2008, 2009; Brown & Martin, 2015; Liedtka, 2015; Noble, 2011; Seidel & Fixson, 2013).

Despite the difficulty in arriving at a commonly accepted definition, most design thinking scholars seem to agree that the practices of professional designers are relevant and useful in the context of innovation (Brown, 2008, 2009; Liedtka, 2015; Martin, 2009). More and more organizations embrace design thinking for its relevance, and anecdotal evidence suggests its effectiveness, particularly for innovation (Brown, 2008, 2009; Liedtka, 2015, 2018; Martin, 2009; Seidel & Fixson, 2013). At its core, design thinking is a human-centered, iterative approach for problem-solving and innovation, inspired by the way designers tend to think and act (Brown, 2009). Following previous suggestions by Carlgren et al. (2016), which are also supported by complementary literature (e.g., Dell'Era et al., 2020; Liedtka, 2015), we focus our review on the behavioral practices that characterize design thinking. Behavioral design thinking practices identified in the literature are diverse, with the commonly accepted practices being human-centeredness, embracing diversity, visualization, experimentation, and (re)framing of problem and solution spaces (Carlgren et al., 2016; Dell'Era et al., 2020; Liedtka, 2015; Micheli et al., 2019). Scholars have suggested that a designer's human-centeredness and a strong focus on qualitative, ethnographic research methods paired with the development of deep empathy with people assist in finding and satisfying (latent) human needs (Brown, 2008; Michlewski, 2008). Next, designers are used to collaborating with diverse actors inside and outside of the organization, which aids with the integration of divergent perspectives into a holistic point-of-view (Dunne & Martin, 2006; Luchs et al., 2016). Further, a designer's professional practice of visualization can help to overcome the ambiguity of abstract, verbal explanations through concretization into visual representations (Boni et al., 2009; Drews, 2009; Ward et al., 2009). The practice of experimentation denotes the creation of artifacts, for example, prototypes that allow for interaction and feedback generation. Experimentation is performed in an iterative fashion that combines divergent and convergent phases and encourages rapid learning through failing early and often (Boland & Collopy, 2004; Lockwood, 2009). Lastly, the practice of (re)framing assists designers in finding

the right problem to solve and envisioning alternative futures and "what-if" scenarios (Dorst, 2011; Kolko, 2010; Martin, 2009). Table 1 offers an overview of the aforementioned design thinking practices and a list of key references.

2.2 | Effectuation: The decision-making principles of expert entrepreneurs

Effectuation theory has its roots in Sarasvathy's work on entrepreneurial decision-making (Sarasvathy, 2001, 2008). The underlying conceptual and empirical research sought to explain the creation of new ventures by expert entrepreneurs (Sarasvathy, 2001, 2008; Read et al., 2009b). In her seminal work, Sarasvathy (2001, 2008) proposes five decision-making principles that distinguish effectuation, the "logic" of entrepreneurs that allows them to make decisions under uncertainty; vis-à-vis causation, the "logic" that managers use who operate in more predictable, less uncertain contexts. First, the means orientation principle relates to an entrepreneur's available means, such as one's knowledge gained through education or industry experience, one's identity, and one's personal relationships and networks (Berends et al., 2014; Sarasvathy, 2001; Wiltbank et al., 2006). Decision-makers who adopt an effectual logic start from the questions "Who am I?," "What do I know?," and "Whom do I know?" and create something new from these existing means. Thereby, effectuation assumes that goals are set based on the means available to the entrepreneur. Second, the affordable loss principle addresses the tendency of expert entrepreneurs to move forward affordably. Effectual decision-making considers the downside risk of failure and seeks to limit risk by placing small, incremental bets. Third, the strategic partnership principle relates to establishing partnerships and gaining commitments from stakeholders. Building alliances and negotiating stakeholder commitment can add new means and shape venture goals. Fourth, the exploitation of contingencies principle centers around unexpected events and contingencies. The iterative process of effectual decision-making makes use of surprises that can be turned into a source of opportunity. And, last, the nonpredictive control principle concerns entrepreneurs' attitudes toward the future. Effectuation relates to emergent or nonpredictive strategy making, which assumes that the inherent uncertainty of business contexts requires entrepreneurial action to control and proactively shape the future. In Table 2, we provide an overview of the five effectuation principles and corresponding key references.

Effectuation theory has been applied to, for example, the context of corporate entrepreneurship (Brettel et al., 2012), investment decisions of business angels (Wiltbank et al., 2009), and decision-making concerning new venture strategy (Deligianni et al., 2017). Empirical studies have consistently shown the power of effectuation as a driver of superior start-up performance (for a review, see Read et al., 2009b). While much research on effectuation has focused on individuals and teams in an entrepreneurship context, Berends et al. (2014), for example, found that small firms may use effectual rather than causal decision-making logic to manage innovation. Another example suggesting that effectuation may be applicable for innovation management is the study by Blauth

TABLE 1 Design thinking practices

Design thinking practices	Explanation	Key references
Human-centeredness	*Human-centeredness leverages designer's ability to uncover and satisfy human needs, and places a strong focus on qualitative, ethnographic research methods paired with the development of deep empathy with people.*	Brown (2008), Dell'Era et al. (2018), Michlewski (2008), and Ward et al. (2009)
Embracing diversity	*Embracing diversity leverages collaboration with diverse actors inside and outside of the organization, which aids with the integration of divergent perspectives into a holistic point-of-view.*	Beverland et al. (2016), Brown (2008), Dunne and Martin (2006), and Luchs et al. (2016)
Visualization	*Visualization helps to overcome the ambiguity of abstract, verbal explanations through concretization into visual representations.*	Boni et al. (2009), Carr et al. (2010), Drews (2009), and Ward et al. (2009)
Experimentation	*Experimentation denotes the creation of artifacts, for example, prototypes, that allow for interaction and feedback generation. Experimentation is performed in an iterative fashion that combines divergent and convergent phases and encourages rapid learning through failing early and often.*	Boland and Collopy (2004), Brown (2008) Drews (2009), Fraser (2009), and Kumar and Holloway (2009)
(Re)framing	*Framing and reframing make use of abduction to assist individuals in finding the right problem to solve and envisioning alternative futures and "what-if" scenarios.*	Boland and Collopy (2004), Dorst (2011) Drews (2009), Fraser (2009), Lockwood (2009), Kolko (2010), and Martin (2009)

Source: Adapted from Carlgren et al. (2016); Dell'Era et al. (2020); Micheli et al. (2019).

TABLE 2 Effectuation principles

Effectuation principles	Explanation	Key references
Means orientation	*Entrepreneurs start from the questions "Who am I?", "What do I know?" and "Whom do I know?" and create something new from these existing means. Effectuation assumes that goals are set based on the means available to the entrepreneur.*	Furlotti et al. (2020), Pryor et al. (2016), and Sarasvathy (2001)
Strategic partnerships	*Entrepreneurs establish partnerships and gain commitments from stakeholders. Building alliances and negotiating stakeholder commitment can add new means and venture goals.*	Dew et al. (2009), Sarasvathy (2001), Sarasvathy and Kotha (2001), York et al. (2016)
Nonpredictive control	*Entrepreneurs leverage emergent or nonpredictive strategy making, which assumes that the inherent uncertainty of entrepreneurship requires entrepreneurial action to control and proactively shape the future.*	Dew et al. (2009), Read et al. (2009a), Sarasvathy (2001), Wiltbank et al., (2006)
Affordable loss	*Entrepreneurs move forward affordably. Effectual decision-making considers the downside risk of failure and seeks to limit risk by placing small, incremental bets.*	Chandler et al. (2011), Dew et al. (2009), and Martina (2020), Sarasvathy (2001), Sarasvathy and Kotha (2001)
Exploitation of contingencies	*Entrepreneurs leverage unexpected events and contingencies. The iterative process of effectual decision-making makes use of surprises that can be turned into a source of opportunity.*	Garud et al. (2010), Harmeling (2011), Honig (2004), Sarasvathy (2001), Sarasvathy and Kotha (2001)

Source: Adapted from Sarasvathy (2001, 2008); Tryba and Fletcher (2020).

et al. (2014), who found that adopting an effectual logic can foster the creativity of employees working in new product development departments. Other studies that suggest that an effectual logic can provide benefits in an innovation context include research on managing R&D projects with high levels of innovativeness (Brettel et al., 2012) and research on the creation of major innovations for business-to-business markets by small and young technology firms (Coviello & Joseph, 2012).

Interestingly, while effectuation is conceptually well-developed (Sarasvathy, 2001, 2008), empirically supported and validated (Chandler et al., 2011; Dew et al., 2009), and has been linked to new venture performance (Deligianni et al., 2017), skeptics have criticized that the theory lacks prescription of specific behaviors (Glen et al., 2014; Mansoori & Lackéus, 2020). It has been argued that "although Sarasvathy (2001) stated that there are behaviors that are typical of effectuation and causation, effectuation and causation fundamentally refer to cognitive processes" (Perry et al., 2012, p. 839). Specifically, Glen et al. (2014, p. 662) criticize that effectuation does not give any guidance "as to how to develop useful ideas in the first place." Mansoori and Lackéus (2020) echo this sentiment and point to the lack of normative clarity and behavioral tactics that could prescribe how effectuation can be applied to achieve innovation outcomes in practice. Innovation practitioners may thus feel challenged by the abstractness of effectuation, which may limit its diffusion into innovation practice.

2.3 | An integrative view on design thinking and effectuation theory

Social scientists largely agree that the successful diffusion of knowledge in theory and practice depends both on rigorous theorizing and practical relevance (Roberts & Adams, 2010; Romme, 2016; Starkey & Madan, 2001; Tranfield et al., 2003; Tranfield & Denyer, 2004). For example, if academic theorizing or inquiry lacks thoroughness, the role and dissemination of a knowledge domain might be at stake. Similarly, if academic insights fail to reach or matter to practitioners, the divide between the academic ivory tower and practitioners risks expanding.

According to Dell'Era et al. (2020, p. 325), "the scientific discourse on design thinking has in a way unfolded in a vacuum, often independently from other theories, and particularly from other innovation theories (Norman & Verganti, 2014; Verganti, 2008, 2009; Verganti & Dell'Era, 2014)." While being relevant to (innovation) managers (e.g., Brown, 2009; Martin, 2009), closing this knowledge gap thus poses an important challenge for integrating design thinking into the larger scientific discourse (Dell'Era et al., 2020). One way for advancing design thinking research is to leverage extant theories, even from other disciplines or domains that can help expand our theoretical understanding of a focal domain (cf. MacInnis, 2011). In the context of design thinking, this could include theories that spell out cognitive principles that

guide decision-making and problem-solving. Designers' approach to solve problems and produce appropriate solutions by "organizing complexity [and] finding clarity in chaos" (Kolko, 2010, p. 15) suggests that design thinking is effective for innovating in contexts of uncertainty. However, although design thinking has been previously linked to cognitive bias reduction (Liedtka, 2015), past design thinking research has not specified the cognitive rules and principles that could guide individuals when coping with or attempting to reduce perceived uncertainty.

To this end, effectuation theory presents a well-accepted "logic" that guides entrepreneurs' decision-making when solving problems (Read et al., 2009b; Sarasvathy, 2001, 2008) and it appears to be a suitable candidate for integration (Dorst, 2011; Garbuio et al., 2018; Glen et al., 2014; Liedtka, 2015; Mansoori & Lackéus, 2020; Sarooghi et al., 2019). The integration of design thinking and effectuation theory is warranted by shared philosophical roots. Both theories lean heavily on pragmatism as the epistemological foundation (in particular on Dewey, 1929a, 1929b, 1938a, 1938b, 1946; Simon, 1996). While design thinking scholars have proposed that pragmatism provides the "conceptual scaffold for design thinking" (Dalsgaard, 2014, p. 143) and that "central concepts in design thinking resonate with the pragmatist philosophy" (Dalsgaard, 2014, p. 143), effectuation also has "pragmatist roots" (Reuber et al., 2016, p. 536). This shared epistemological foundation of design thinking and effectuation provides us with the bridgeheads on both sides of the knowledge gap that we intend to cross with this study. Moreover, pragmatism recognizes the need to reconcile dualistic understandings in view of building more meaningful frameworks that better account for real-world complexities (e.g., Farjoun et al., 2015). In the context of this research, a pragmatist lens would encourage, for example, the integration of cognition (or cognitive principles) and action (or practices) rather than treating them as independent and studying them separately (e.g., Farjoun et al., 2015).

Given their shared philosophical roots and previous propositions that they have strong potential for enriching each other, design thinking and effectuation theory are pertinent candidates for the exploration of their theoretical and practical relationship. Building on prior literature, we conceptualize effectuation as a set of cognitive principles (Sarasvathy, 2001, 2008) and design thinking as a set of behavioral practices (Carlgren et al., 2016; Dell'Era et al., 2020). To achieve our aim of shedding light on the relationship between design thinking and effectuation theory, we ask the following research question:

> What is the relationship between the behavioral practices of design thinking and the cognitive principles of effectuation?

3 | METHODOLOGY

This section clarifies the methodological considerations guiding our research on the relationship between design thinking and effectuation theory. Since our study was one of the first to empirically explore the connections between design thinking and effectuation, a qualitative methodology was chosen (Eisenhardt, 1989; Yin, 1994). For data collection purposes, we decided to conduct interviews with informants, as we deemed this method to be most suitable for answering the beforementioned research question.

3.1 | Research setting and sampling

For the purpose of selecting informants who were likely to possess expert knowledge and experience with design thinking and who were likely applying effectual reasoning, we decided to study designer-founders, that is, experienced designers who had cofounded at least one new venture in the past 5 years before data collection, attempting to introduce one or more product innovations to the market. The context of entrepreneurial innovation in small, new ventures provided a suitable setting for the study of effectuation. Further, aligned with the means orientation principle of effectuation theory, we assumed that experienced designers would attempt to apply at least some of their professional ways of working to innovate in this context (Sarasvathy, 2001, 2008).

Designers are increasingly regarded important founding team members. In 2016, for example, 21% of "unicorn" start-ups with a market valuation exceeding one billion US dollars had at least one designer cofounder on the team, while designers cofounded 36% of the top 25 most funded start-ups (Maeda et al., 2016). We were explicitly interested in founders of firms that were recently created with the purpose of bringing product innovations to the market. This choice is justified, as the context of small, innovative new ventures is particularly conducive to the use of effectuation (Berends et al., 2014), as also emerged from our qualitative analysis. Innovation in and the creation of new ventures typically takes place under conditions of uncertainty and ambiguity (Sarasvathy et al., 2003), and an individual's domain knowledge and professional practices are essential means that entrepreneurs can use to their benefit (Sarasvathy, 2001, 2008). Hence, the choice of designer-founders was both theoretically and empirically motivated. The choice of experienced designer-founders provided us with informants who would have habitualized the use of design thinking in their ways of working. To limit memory issues and retrospective bias of our informants (Eisenhardt & Graebner, 2007), we focused on designer-founders who had founded their latest venture less than 5 years ago (at the time of the interview).

To identify potential informants, we used LinkedIn, an online network for professionals and firms in which they publish content, exchange points of view and network with each other. When searching the LinkedIn database, we focused on informants who (1) were based in Australia, as this allowed the research team better access to in-person interviews; (2) had indicated on LinkedIn that their current role description was "founder," "cofounder," "entrepreneur," "designer-founder," "designer entrepreneur," or alternative descriptions; (3) had indicated that they had a professional design background and/or significant design expertise, for example, by having enacted professional design roles before having created their new venture; and (4) had founded their latest venture less than 5 years ago. Accordingly, all informants have completed a formal university degree in design and/or have 5 or more years of design experience as this would enhance the probability that the informants would have habitualized design thinking in their ways of working. The informants were also directly involved in the innovation process of their new ventures, which signaled the potential for them to recall past behaviors. As we intended to detect patterns that were not informed by a particular industry context or design discipline, we tried to capture a broad range of industries and design backgrounds. We thereby applied purposive, maximum variation sampling taking into account informants' industry memberships and design specializations (Creswell, 2007). The final sample included informants who worked in a diverse range of industries, including furniture, fashion, agriculture, healthcare, entertainment, professional services, and financial services. Further, informants had specialized in a variety of design disciplines, such as fashion design, service design, product design, user experience design, and industrial design. Lastly, informants' ventures performed a diverse range of innovation projects, such as the development and market introduction of new goods, new services, and/or new business models. In Table 3, we list the domain in which the respective ventures innovate (e.g., furniture or professional services), informants' design experience (measured from the time when they first engaged in design activity), their founding experience (one vs. multiple ventures), their highest academic design degree (if available), and the length of each interview recording (in minutes).

3.2 | Data collection

We used a semistructured interview guide that informed our primary data collection. Semistructured interviews allowed us to gain deep insights into how informants created new ventures and pursued entrepreneurial innovation (Creswell, 2007; Miles & Huberman, 1994).

The interview guide contained general questions about the informants' backgrounds, their ventures, and their experiences as a designer involved in new venture creation. In particular, we asked the informants about their views on how design may have informed new venture creation. We purposefully did not feature any questions in the interview guide that directly addressed the topics of design thinking and effectuation to "avoid the imposition of alien meanings upon the [organizational actors'] actions and understanding" (Gioia et al., 1994, p. 367). The semistructured interview approach offered us the freedom to let informants introduce new themes and topics that emerged during the interviews, and it allowed us to probe for such themes and topics (see Appendix for sample questions). By granting anonymity in any reporting and confidential treatment of sensitive data, we sought to prevent social desirability bias that could color informants' answers (Kumar et al., 1993), while allowing informants to open up and provide insightful narratives and rich information. Our interview recordings totaled 45 hours, with an average of 67 minutes per interview. We transcribed the interview recordings verbatim, which amounted to a total of over 900 single-spaced pages. To triangulate informants' factual reports, we performed secondary research on informants' professional background and their ventures. We analyzed social media posts, company websites, publicly available interviews, and other available information to verify the factual claims that were made in the interviews. We continued data collection until all core themes had been sufficiently saturated (Guest et al., 2006). Researchers usually define data saturation as the point when "no new information or themes are observed in the data" (Guest et al., 2006, p. 59). The final sample contained 41 informants (see Table 3). On average, informants had more than 15 years of design experience. A total of 21 informants were first-time founders, while 20 informants had founded multiple new ventures in the past.

3.3 | Data analysis

To organize the analysis, we followed the data analysis procedure described in Gioia et al. (2013), going from a first-order analysis, in which we adhered "faithfully to informant terms" (p. 20) to a more abstract second-order analysis in which we were "firmly in the theoretical realm" (p. 20). The first round of explorative interview analysis was done with pen and paper; the second step of data analysis was done with the software QSR Nvivo, which allowed for a software-assisted cross-interview analysis. To facilitate the coding process, the first author read the raw data several times (Bogdan & Biklen, 1997). The data were coded by the first author, and the resulting codes were compared and discussed with the research team using various examples across various rounds to ensure a rigorous analysis and reliability of the generated codes. Due to the shared and ongoing sensemaking process of the research team, every iteration required the team to meet,

TABLE 3 Informants

Nr.	Pseudonym	Innovation focus	Design experience (in years)	Past new ventures	Highest academic design degree	Interview length (in min)
1	Dave	Employee onboarding	26	Multiple	Bachelor of Visual Arts in Graphic Design	57
2	Cameron	Agriculture analytics	23	One	Bachelor of Industrial Design	81
3	Olivia	Clothing as a Service	8	One	Bachelor of Industrial and Product Design	88
4	William	Video messages	16	Multiple	Bachelor of Science in Industrial Design	70
5	Isla	Homewares	4	One	Certificate in Interior Design	70
6	Grace	Laundry as a Service	10	One	Bachelor of Industrial and Product Design	42
7	Brian	Lunchboxes	20	One	Bachelor of Product Design and Mechanical Design	49
8	Thomas	Health app	12	Multiple	Master of Visual Communication	71
9	James	Customer support	13	Multiple	No design degree	98
10	Lucas	Virtual reality	10	One	Bachelor of Graphic Design	48
11	Emma	Work planning	3	One	Certificate in User Experience Design	65
12	Chloe	Aquaponics as a Service	4	One	Bachelor of Communication Design	67
13	Henry	Furniture	7	One	Bachelor of Industrial Design	61
14	Ellen	Content Marketing platform	19	Multiple	Bachelor of Visual Communications	80
15	Ethan	Voice recognition	21	Multiple	Higher National Diploma in Animation Design	86
16	Mason	Digital consulting services	17	Multiple	Bachelor of Visual Communication, Design and Photography	73
17	Leo	Fashion	13	Multiple	Bachelor of Design	52
18	Liam	Discount codes	20	Multiple	Bachelor of Visual Communication	47
19	Hunter	Personal library	20	Multiple	Diploma in Graphic Design	71
20	Lachlan	Parcel management	15	One	Bachelor of Multimedia Design	93
21	Samuel	Contracts as a Service	22	One	Associate Degree in Electronic Design	82
22	Hudson	Superannuation fund	23	One	Bachelor of Design	62
23	Levi	Virtual reality games	11	One	Bachelor of Digital Media Design	68
24	Harry	Digital agency	27	Multiple	Masters by Research in Industrial Design	82
25	Jack	Project management	16	Multiple	No design degree	47
26	Noah	Project management	18	Multiple	No design degree	51
27	Alex	Radio recordings	20	One	No design degree	98
28	Zoe	Lunchbox delivery service	10	One	Master of Architecture	64
29	Oliver	App development	18	Multiple	Bachelor of Architecture	78
30	Peter	Timetracking	15	One	Bachelor of Product Design	69
31	Ralf	Fitness gear	31	Multiple	Bachelor of Design	76
32	Gary	Home loans	30	Multiple	Bachelor of Design	62

TABLE 3 Continued

Nr.	Pseudonym	Innovation focus	Design experience (in years)	Past new ventures	Highest academic design degree	Interview length (in min)
33	Mary	Education	5	One	No design degree	61
34	Lucy	Agriculture technology	7	One	Bachelor of Architecture	59
35	John	Agriculture robotics	24	Multiple	Bachelor of Planning and Design, Architecture	58
36	Robert	Video production	10	One	Certificate in Graphic Design	52
37	Grant	Funeral support	29	Multiple	Diploma in Fashion Design	62
38	Eric	Timetracking	5	Multiple	No design degree	94
39	Adela	Workout gear	9	One	Bachelor of Fashion Design	57
40	Marcus	Social empowerment	10	One	Bachelor of Architecture	62
41	Jim	Soccer equipment	28	Multiple	Bachelor of Graphic Design	69

discuss, and reinterpret the emerging theoretical framework in a collaborative manner. In cases of disagreement, specific codes were revisited, and discrepancies were adjusted accordingly. Involving multiple researchers provided us with a form of investigator triangulation (Denzin, 1978) that helped to handle the richness of the contextual data and imparted more confidence in the findings (Eisenhardt, 1989).

Figure 1 visualizes our data analysis process, which followed well-accepted practices for qualitative data analysis and visualization (e.g., Gioia et al., 2013; Giudici et al., 2018; Sjödin et al., 2019, 2020). To arrive at our first-order concepts, we first coded the data in vivo and then assigned these codes to first-order concepts, staying true to the terminology informants used in their narratives. Tables 4 and 5 provide an overview of the first-order concepts identified during data analysis. The second-order analysis uncovered the underlying structure in this array of first-order concepts. During this second-order analysis, we consulted relevant literature to make sense of our initial findings, transitioning from inductive to abductive analysis (Alvesson & Kärreman, 2007; Gioia et al., 2013). After going back and forth between our initial findings and literature on design thinking and effectuation (see Tables 1 and 2 for an overview of literature consulted), we arrived at the interpretation that design thinking practices enabled designer-founders to enact the cognitive principles of effectuation, which we arranged along five distinct second-order themes. We conceptualized these five themes into the aggregate dimension "entrepreneurial ways of designing." In our data analysis, we furthermore identified four second-order themes revolving around the ways in which designer-founders interpreted effectuation through the professional values and norms embodied in design thinking, which we conceptualized into the aggregate dimension of "designerly ways of entrepreneuring." When engaged in this activity, we consulted literature on the paradoxical relationship between creativity and commerce (e.g., DeFillippi et al., 2007; Eikhof & Haunschild, 2007; Gotsi et al., 2010; Hesmondhalgh, 2013; Davis & Scase, 2000). In our final step of analysis, we captured informants' experiences in a process model (Figure 2), which visualizes the dynamic relationships and connections between the emerging concepts from our study. Resulting from our analysis, these relationships provide an explanation for the effectiveness of design thinking for the purposes of innovation in and creation of new ventures.

4 | FINDINGS

In this Findings section, we will first unpack our findings on "entrepreneurial ways of designing," that is, ways in which designer-founders enacted the cognitive principles of effectuation through the application of design thinking practices. Then, we will discuss our findings on "designerly ways of entrepreneuring," and explain how designer-founders interpreted effectuation through the professional values and norms embodied in design thinking.

4.1 | Entrepreneurial ways of designing

"Entrepreneurial ways of designing," as enacted by the designer-founders in our sample, include the following five themes: (1) practicing human-centeredness helps to unlock knowledge and leverage identity, (2) embracing diversity helps to integrate the views of various strategic partners, (3) visualization helps to envision and control the innovation trajectory, (4) experimentation helps to limit potential losses along the innovation trajectory, and (5) (re)framing helps to adopt new perspectives and make better use of contingencies. Below, we will discuss these five themes in more detail, providing illustrative quotes to substantiate them. Supplemental evidence is provided in Table 4. Informants' quotes are labeled with a nonidentifiable pseudonym (e.g., Brian or Amanda) to maintain anonymity.

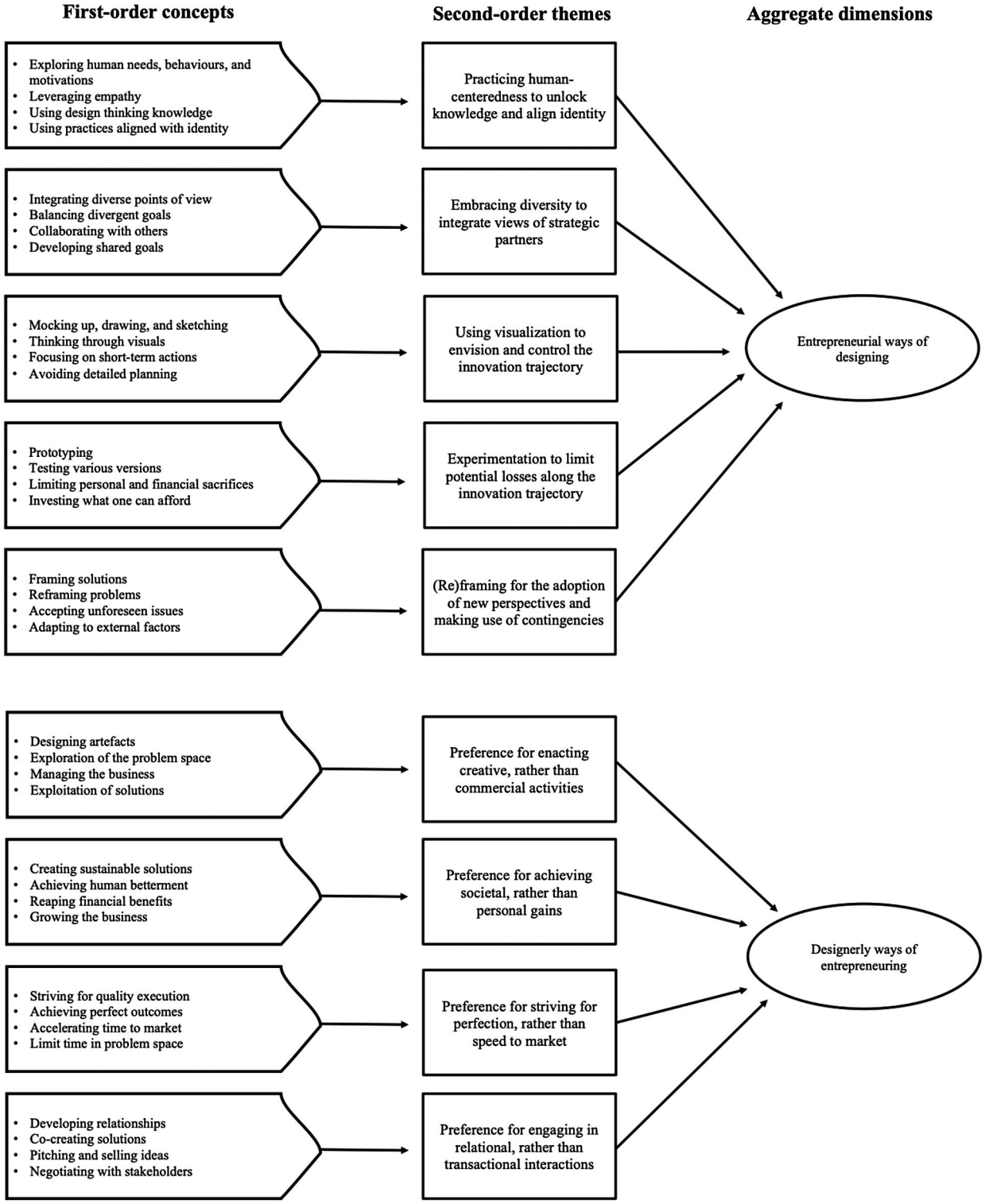

FIGURE 1 Data structure

4.1.1 | Practicing human-centeredness helps to unlock knowledge and align identity

The first theme revolved around the connection between human-centeredness, which is a foundational design thinking practice, and the means orientation principle of effectuation theory. In this instance, the means orientation principle relates to the heuristic that entrepreneurs should leverage their existing knowledge and their identity to drive entrepreneurial innovation and new venture creation. The theme emerged from the observation that designer-founders leveraged their design thinking knowledge and their identity as professionals

TABLE 4 Entrepreneurial ways of designing: Additional evidence

Aggregate dimension: entrepreneurial ways of designing		
Second-order themes	**First-order concepts**	**Selected quotes**
Practicing human-centeredness to unlock knowledge and identity	Exploring human needs, behaviors, and motivations	Now, all design should be led with empathy. So, what is a beekeeper? Who are they? What do they do? Would they use this? This is just using one of them as an example. What does a beekeeper do? There's a new generation of beekeepers. Have a look at agritech in general. People think farmers are out there with 19th-century tractors. They're not. There's a lot of drones. There's a lot of support. The industry's very sophisticated. (Harry)
	Leveraging empathy	If you're a designer, you have the empathy and the understanding of the human condition that helps you to make those decisions that aren't just based on making money. You probably make better decisions, because I think it's more balanced decisions than the entrepreneurs that are just, their passion is making money. Their passion is the outcome, and they'll do anything to get to that outcome. But, if your passion is the journey, your decisions are way different, aren't they? (Ellen)
	Using design thinking knowledge	I think entrepreneurship or starting a business is actually a perfect profession for designers because it's just solving problems. It's just effectively doing the same thing that you've always done, but instead of coming up with a visual fix, you're sort of pushing all components of it. (Hudson)
	Using practices aligned with identity	The designer who is building a design company, has the passion or their core foundation for why they get out of bed in the morning is to design, and building a business allows them to design in a way they want to design, and find new clients. (Zoe)
Embracing diversity to integrate views of strategic partners	Integrating diverse points of view	You need to do the research […] I think it's really important to have enough background to understand that and respect it. Whereas a lot of times, particularly the client will be like "well why does it cost this much?", "why does it take so long?". And so, you have to be that translator between the two. (Thomas)
	Balancing divergent goals	When you're dealing with clients, you're trying to solve a problem for them. At the same time, obviously, you're trying to… the viability of the business comes into that. The satisfaction of our client as well as the satisfaction of our staff, all these things. This is the fine balance that you have to get right. This is why I think it's really, really hard being an entrepreneur in design because you're so aware of all of those intricate balances, right? When you're successful, you get all of them right. (Ellen)
	Collaborating with others	You can look at [the venture] as a series of collaborations. We collaborate with our agents, to and fro. All of our imagery, all our marketing materials are a direct collaboration with a photographer, so we spend a lot of time collaborating with her on that work. In essence, manufacturing is a collaboration between two different individuals. Our manufacturer of all our metal products is a true collaboration. We speak on the phone basically every day. (Henry)
	Developing shared goals	I think that creating an overall goal where different departments or people within an organization are actually trying to achieve the same thing together helps unite disparate activities into something that's more collaborative as well so that you have to necessarily work with each other to get things done. (Emma)
Using visualization to envision and control the innovation trajectory	Mocking up, drawing, and sketching	I think there's a lot of design techniques that I've incorporated into the way that we do things, and specifically planning, and sketching, and externalization we use a lot. We try not to just end up in conversations where we're just opinion versus opinion, and we go back to data as much as we can. (Emma)
	Thinking through visuals	I'll still draw and sketch because that's just how my mind works. If I think something out, I don't work linearly; I'll just map and just go. Probably quite similar to a lot of designers. You think spatially. (William)

TABLE 4 Continued

Aggregate dimension: entrepreneurial ways of designing		
Second-order themes	**First-order concepts**	**Selected quotes**
	Focusing on short-term actions	I think the most important thing is iteration. And an interesting thing: you talk about MVP and [being] quick at getting stuff out. That's what that process should be. It's super hard to overcome and get shooting stuff out, and not go to perfection. That's just because you're creative. But the process teaches you to actually get stuff out quicker. (William)
	Avoiding detailed planning	Neither of us has ever been, which is probably to our detriment, looking at a 5-year business plan. We both are quite looking short-term. Which means we're working really hard, really quickly. (Henry)
Experimentation to limit potential losses along the innovation trajectory	Prototyping	Within the first two weeks, we quickly CAD modeled something, and had a prototype made. It was a nonfunctional, just a boxy prototype just to get a sense of scale and shape and then when we received that prototype, that was the first time we changed direction. (Brian)
	Testing various versions	I'm seriously flexible in terms of what I think is right and wrong, just do it based on the data and the information I have at hand at any one time. I'm quite happy to put in place structured experiments and research and inquiry to try and make sure that we validate assumptions as we go. (Hudson)
	Limiting personal and financial sacrifices	I basically invested little to no money in the business. We produced the lamp. We spent a few hundred dollars each to get it to market, got it to market, and then we won an award. […] And then, started selling products, which then afforded us to pay rent on a studio, and then once we had enough money, we could then develop a second product. And that's how we built the business from scratch. (Henry)
	Investing what one can afford	[Investors said]: "We love what you guys are doing." And the reason they asked about pricing is because, from a business perspective, they were looking at it, going like: "Will these guys be around long enough with the money they're… Are we going to be able to utilize their service for a long period of time?" I was like; I didn't think of it like that. Because we're looking at it, initially we're looking at it from us, can we afford to pay for this? Can we afford to do this? (James)
(Re)framing for the adoption of new perspectives and making use of contingencies	Framing solutions	In design, you have to think totally differently about things. Creativity exposes you to different approaches to different things, which makes you a better entrepreneur, I think, generally. I think that a lot of companies that have designers, that have people who are creative, can tackle things differently. It makes them better from a business perspective. (James)
	Reframing problems	[Reframing helped us to think] Not about features, not about solutions. When you take that off the table, you can start thinking about other things. […] Is there a sustainable revenue model here? Would there be a lot of demand for this in the market? (Emma)
	Accepting unforeseen issues	I want to be doing something unique and different. I really liken it to, if you're walking along a path, you might not have been there before, but if it's a worn path, then you're not an explorer, you're not an adventurer. Whereas I like to find those paths that people haven't walked on before, to actually explore somewhere new, and the chance of discovering something that hasn't been discovered before. You can't do that in the physical world, so I do that in business, and particularly through technology, you're looking for new ways to apply technology to create new things that haven't been seen before. (Dave)
	Adapting to external factors	Look, design is about constant change, you know?! We're continually, I think, from one thing I'm moving on to something else. Every project has a different set of criteria and needs a different outcome. So, that's again the ability to deal with ambiguity or change. And design is a constant change, isn't it really? (Cameron)

TABLE 5 Designerly ways of entrepreneuring: Additional evidence

Aggregate dimension: ***designerly ways of entrepreneuring***		
Second-order themes	**First-order concepts**	**Selected quotes**
Preference for enacting creative, rather than commercial activities	Designing artifacts	That's always my number one issue in life as a designer: I don't get to draw enough. If I could double the amount of hours in a day I could spend the second half just drawing. Because there's so many other things that we had to do, CAD modeling, dealing with suppliers, photographing things, doing all these other jobs, emailing people and I just never get enough time to sketch. Some of the… not always, but sometimes, some of the most insightful things happen when you're sketching and drawing. (Brian)
	Exploration of the problem space	We were just interested, as designers and creatives, to explore the internet, to explore this digital marketing, to explore what that [opportunity] could [be]. I think that's what the creative mind does. It's more into solving problems and exploring things. (Ellen)
	Managing the business	I need to be doing something with my hands, like a pure management position is really difficult for me, especially if I'm just doing all this bureaucratic shuffling and organizing. I have to be really involved creatively because otherwise, I'd just deteriorate. (Hunter)
	Exploitation of solutions	I have to build a product that serves the function of the customer that I have to make a margin on. I've got to sell it. I've got to be able to make money out of it. Otherwise, I don't have a sustainable business. (John)
Preference for achieving societal, rather than personal gains	Creating sustainable solutions	I tend toward social and environmental sustainability or going beyond sustainability to make something better. That's part of how I design, and that's part of that mindset, so that's also different thinking than people who are there to make money. (Zoe)
	Achieving human betterment	That was another thing which I was contemplating because to me it's coming from a strong passion and vision and initially that [for-profit venture] should have probably been a non for profit because I want to help the society, I want to help the community. (Mary)
	Reaping financial benefits	That's the first time I'm having my own venture and I need to think about the financial aspect, how can I make a business profitable. (Mary)
	Growing the business	I love design and it's a different feeling running your business or working in a business when you're doing design to when you're doing business development. But unfortunately, if you do want to make the decision to scale your business, it's very, very likely that 95% of your time will be business development. So, that's a sacrifice that you'll have to make. (John)
Preference for striving for perfection, rather than speed to market	Striving for quality execution	As a designer obviously I have my perception of what high quality is, and sometimes I'm not happy with the output. But like I said before, I just got to take it on the chin, and then when the opportunity comes again, make sure it doesn't happen. (Lucas)
	Achieving perfect outcomes	I see this in other designers as well. You sometimes don't have all the bits of information and you get to a point in the design and you can't see the path forward. You've got 80% of the picture in your head, but there's this little bit which just annoys you and it's not looking perfect. You just keep on working on it and you are just going around in circles with it. (Oliver)
	Accelerating time to market	It doesn't have to look good, in fact they actually say that a product that looks bad and does well is definitely going to do much better than a product that looks really awesome but just doesn't get the traction. [As a designer] I don't have that ability to be able to launch tech products really fast to market, so I start from the other end. (Dave)

TABLE 5 Continued

Aggregate dimension: ***designerly ways of entrepreneuring***		
Second-order themes	**First-order concepts**	**Selected quotes**
	Limit time in problem space	This is very entrepreneurial, as well. […] We would never ever ship products, and we would never ever release things if we tried to absorb every single person's view. In our stage of the company right now, the goal is to release fast, and get things out the door, even if it angers people. That's the way it is, right? (James)
Preference for engaging in relational, rather than transactional interactions	Developing relationships	As a designer you can always be the voice of the user, even if you don't tell your customer. […] If you develop a good relationship with a client you can softly introduce that stuff. To the point where, all of the sudden, they're asking you, "What should we do for this?" Or: "What will we do [with our] next product?" (Cameron)
	Cocreating solutions	Working closely with the people you're designing for is so valuable. I can't even imagine how you can sit in a room and develop without the people that are going to consume your product or service because they're such a fundamental part of designing the solution (Mary)
	Pitching and selling ideas	A very important skill in entrepreneurship is the ability to sell, which I think generally designers don't have. (Alex)
	Negotiating with stakeholders	Even in the not-design-y, creative aspects, like, you know, just, how do we negotiate things? And how do we deal with risk from the competition? Things like that. They're not exactly design problems, but they're still interesting problems to solve. (Lachlan)

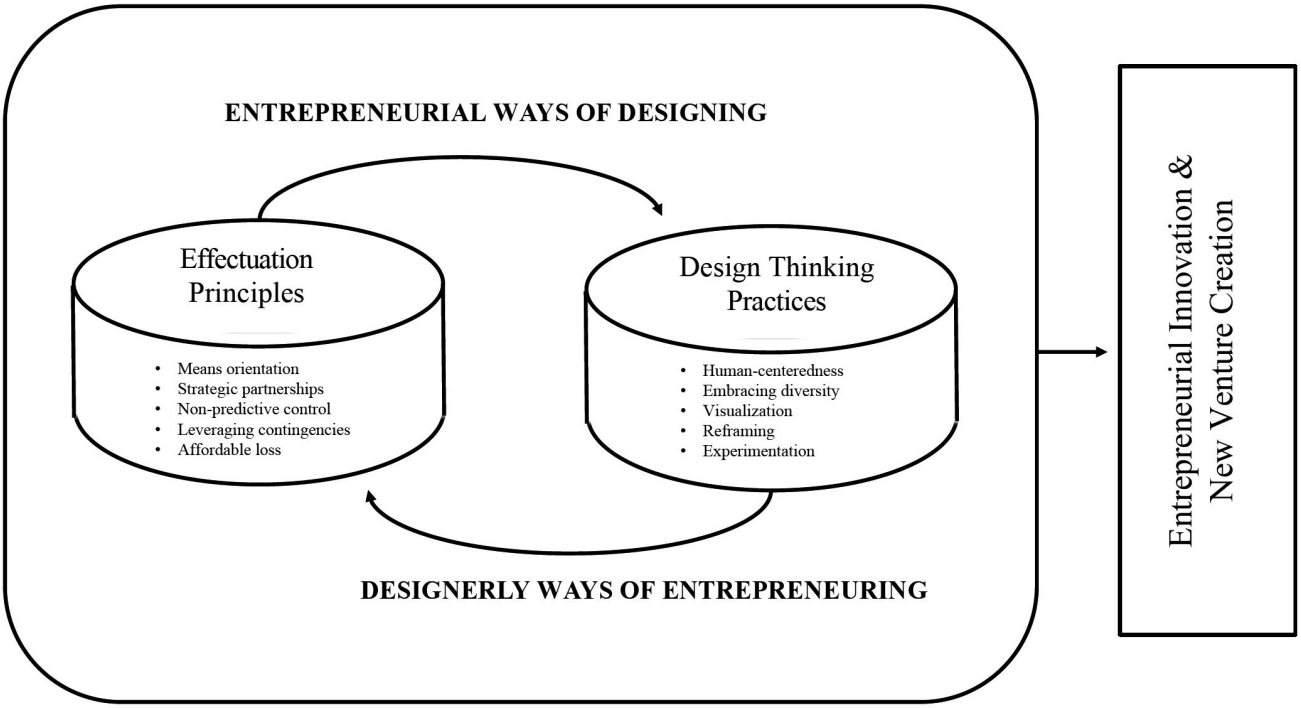

FIGURE 2 Relationships between design thinking practices and effectuation principles

who aim for human betterment to steer entrepreneurial opportunities into a more meaningful, human-centered direction. Relevant knowledge included the skillful application of design thinking practices and tools for innovation purposes. In particular, designer-founders' knowledge of using processes, practices, and tools that could deepen the understanding of human needs, behaviors, and motivations played a vital role in how designer-founders innovated and engaged in new venture creation. A concrete example for the generative force of design thinking as a human-centered innovation approach

was given by an informant who highlighted that they turned designers' sensitivity for, understanding of, and insights into human behavior into an entrepreneurial opportunity that laid the foundation for the creation of a new venture:

> This comes back to the reason why. How we started, when we jumped on that wave of understanding the human behavior of just copying and pasting a URL into another email and sending it to a friend. […] I saw that opportunity whereas most people would just go, "Yeah, this is fun." And they wouldn't think about it. When I saw it and I understood it, as a designer, even though it's completely different from graphic design or whatever I studied, but I understood that human behavior. That was a really interesting insight for me because I go, "Oh wow, this is what people are doing. How can we harness that and use it?" (Ellen)

Informants highlighted that their empathy for and understanding of people's attitudes, habits, feelings, needs, and motivations accrued over time through the use and mastery of qualitative, human-centered research. Such empathic knowledge is unlocked through designerly ways of working. For example, the use of ethnographic research helped designer-founders to gain insights into human experiences and develop a deeper understanding of and empathy for users and other stakeholders:

> Basically, as a designer, [ethnographic research] fundamentally forms a brief in terms of who the user is or who the audience is. That's so fundamental to the brief that to effectively do any design, you need to have that empathy and understanding. (Oliver)

Another informant discerned how the founding team members leveraged their design knowledge to create their new venture. The informant also pointed out that the team members leveraged their identities and their shared passion for design, which allowed them to create a successful product and business:

> In a way, we've designed a product and a business around the things that we're good at and the things that we enjoy doing as well. We definitely are very passionate and interested in design. […] We truly believe that building design into the business is an important part of being able to sell a product at a certain price, at a certain quality, that people are going to love, that people are going to recommend to their friends. (Brian)

Further, one informant explained how the creation of a new venture can be driven by design thinking as the "standard model of human-centered design" and that the path forward can be structured along the design thinking process, when saying:

> It is the standard model for human-centered design, isn't it? Go and talk to people, think of it. Observe, then create a strategy based on those observations, ideate, create something, prototype, try it, you know? (Cameron)

When viewing this finding through the perspective of effectuation theory, we find that the practice of human-centeredness enabled informants to enact the means orientation principle, which posits that entrepreneurs make use of their pre-existing means to drive entrepreneurial innovation and new venture creation. The practice of human-centeredness helped designer-founders to tap into their empathic knowledge. Design thinking utilizes and generates empathy as an important resource, which can be nurtured and made available through human-centeredness. Further, the practice of human-centeredness helped designer-founders to tap into their design thinking knowledge and their identity as designers, which informants regarded as innovation-relevant resources that inspired the innovation in and creation of new ventures.

4.1.2 | Embracing diversity helps to integrate the views of various strategic partners

The second theme revolved around embracing diversity, including diverse stakeholder perspectives, and cocreating joint opportunities. The design thinking practice of embracing diversity supports the strategic partnership principle of effectuation theory, as this principle suggests that stakeholders need to be convinced to self-select into the venture, provide new means, and inform shared goal setting. For example, one informant elaborated the following:

> If you're creating a business, it's all about making sure there's a need for it. […] I also like to have other people's point of view. So, if I've got somebody and I respect their work, I'm very open to them putting forward their ideas. And testing that out too. So, I'm not sitting here going: "Hey, I have the grand plan and the ultimate vision in my head, and it has to be like that." I'm very open to people giving me alternative viewpoints. It's definitely a bit of both. I certainly have a perspective and if they're not getting that direction, then I'll try and understand why. (John)

Taking into account various external viewpoints and catering to various stakeholder needs appeared to be familiar terrain for designers, as one informant suggested:

> Design is an integrative role. You take a bunch of inputs and then you figure out what to do about it. […] So, I do think that's quite similar to creating a company, because you've got all the same inputs: the users saying this, and the marketers saying that, and the investors saying that and whatever else. You've got to integrate that and figure out what to do. It's quite similar. (Noah)

One important stakeholder perspective designer-founders took into account was the points of view of users and customers, as one informant explained:

> I'm talking to hundreds of customers trying to work out, is this a viable thing? And is it desirable? Do people need it, is it solving a real problem and then can we, out of those people can we make a business out of it? (Jack)

While users and customers are important stakeholders, other stakeholders, such as investors, were treated with similar care and sensitivity for their humanity, motivations, and needs. For example, informants facilitated stakeholder self-selection by creating persuasive stories around mutually relevant goals that could convince stakeholders to provide their means to the new venture. For example, one informant commented that:

> You are trying to tell a persuasive story to get people to put their hand in their pocket for after tax dollars to invest in something. So, you need to be able to create a vision, and you also need to be able to create a sense of confidence that you are going to be able to deliver. Because you are spending their money, and there is actually going to be an outcome that is relevant enough for them to participate in that journey. (Gary)

Taken together, the design thinking practice of embracing diversity supports the strategic partnership principle in effectuation theory, which suggests that partnerships with stakeholders expand resources and inform shared goals. Embracing diversity opens up paths for gaining new stakeholder commitments that may otherwise remain inaccessible. Enacting this practice allowed designer-founders to tap into the potential of leveraging divergent perspectives, creating mutually beneficial goals, and procuring a diverse range of means through considering a broad, diverse range of strategic partners.

4.1.3 | Visualization helps to envision and control the innovation trajectory

The third theme revealed the importance of visualization for jointly imagining and controlling the innovation trajectory. The design thinking practice of visualization supports the nonpredictive control principle of effectuation theory by visualizing the possible future paths on which the entrepreneur might be venturing with stakeholders and generating stakeholder commitments along the way by way of visual storytelling. Visually taking stock of "what is," "what if," "what might be," and "how might we" was perceived as a powerful way of communication. Also, visualizing helped to align teams and develop a shared view regarding entrepreneurial endeavors quickly. As one informant highlighted:

> My view is that people are visual. We respond to visual stimuli whether we are introverted, or accountants, or whatever. […] Words are important, but I could say the word pear and you will imagine something different, […], but if we draw a picture of a pear, at least we are both looking at the same pear, so we are closer to a reference point, I believe. And when you are trying to work together in teams, the quicker you can get people aligned, having a shared view of what something is, then at least you are focusing on that. (Gary)

Commenting on the topic of visualization, one informant indicated that the practice facilitated dialog within the new venture team:

> When something gets published, whether that is a photograph, a sketch, a prototype, it then initiates a dialogue between us, and we either stay on track, or the path gets tuned a little bit from there. (Brian)

Also, the practice of visualization of potential solutions appeared to be inherently linked to stakeholder self-selection, as another informant pointed out:

> From my experience as a designer, the important thing at the beginning, that sort of seed-stage of an idea, is that you are able to visualize it and get people on board. […] Visualize it, so other people can contribute to it and move it a step closer to actually being real. (Dorian)

Another informant summarized that their team leveraged visuals for the purpose of storytelling. Visualization helped to reduce the ambiguity of multiple abstract futures into a concrete vision of the imagined future:

> We actually have pictures that tell that story […] describe it in a way that people will remember. People will remember stories. They don't remember facts, especially if there are 500 of them on a page. […] Designers articulate the whole journey from beginning to end in a very simple way. As a designer, your objective is to convert something complex into something simple, digestible. (Mason)

Another example centered around one informant's use of visual aids to gain commitment from teachers and school principals, who were key stakeholders of the informant's venture:

> Visual aids obviously help in telling stories—it's such a powerful thing, and I find that whenever I'm pitching ideas the story just buys me the principals' or the teachers' [commitment]. (Mary)

Overall, we found that the design thinking practice of visualization supports the nonpredictive control principle by helping individuals and teams to collectively envision and anticipate the future. The practice of visualization has a dual function, as it both supports designer-founders' individual sensemaking and as it allows for collective sensemaking with the new venture team and other stakeholders. The practice helps to envision a future path that can subsequently be ventured on, and it helps to anticipate and inspire concrete actions to control the innovation trajectory. Visualizations and related artifacts thus function as important effectual resources. New venture founders can gain greater control over the innovation trajectory by the practice of visualizing and by utilizing visual artifacts to facilitate sensemaking.

4.1.4 | Experimentation helps to limit potential losses along the innovation trajectory

The design thinking practices of experimentation emerged as an effective way of limiting potential financial and personal losses. This finding aligns with the affordable loss principle of effectuation theory, which suggests that effectual decision-making limits downside risk by restricting the financial and personal resources that are utilized. Iterative development of prototypes and testing provides continuous validation and readjustment along the innovation process, which allows for the revision of the innovation trajectory every time a prototype is created and tested. Thereby, design thinking limits unproductive resource expenditure. For example, one informant explained the iterative process their team applied when creating the new venture and suggested that the founders' design background helped them do so:

> In design, you'll create a prototype and you'll put it out there and do some small-scale research, and then build something that lots of people can use, so you'll have the quantitative numbers. And I think we're doing the same here [with the new venture]. (Jack)

Another informant voiced the view that the creation of new ventures is essentially the result of continuous experimentation:

> A start-up isn't risky for me, because it's not about each individual start-up that I do. They're all experiments, I never start a start-up thinking this is going to be a company. I'm just going to create a cool product. If it does well, then we'll look at starting a company from it […] I'm figuring there's going to be 10 to 20 start-ups that I'm going to do in my career, and perhaps one of them works, maybe it doesn't, well we'll see. (Dave)

When speaking about the importance of experimentation, another informant commented on its importance for managing uncertainty around the technical feasibility of the venture's first product. They also commented on the importance of iterative experimentation and prototyping for continuous learning, which was a recurrent topic:

> We try to prototype and test and review along the way and by the time we get to the point of making our production tooling and making our first batch of 50, or 100,000 parts, we are far more confident as we know, we have removed as much risk as we possibly can. […] We have a prototype, and it fails for whatever reason, but then because we are both involved in discussing what went wrong and discussing what the next step is, and what do we want from the next one, by the time we get to the next one […] it has got both of our thinking in the next one. (Brian)

Further, it appeared that experimentation also helped to manage uncertainty around the desirability of innovative, new products. Assessing user reactions seemed crucial, as founders need to reduce the downside risk of potential failure of new products that the venture supports with resources:

> You can gain a lot of confidence in your idea by watching how people interact with it [the prototype] and their reaction to that. (Dave)

When examining this finding through the perspective of effectuation theory, experimentation can be regarded as a design thinking practice that supports the affordable loss

principle through the facilitation of ongoing learning, iterative validation, and incremental improvement. With each interim outcome, such as a prototype, an affordable loss assessment can be performed, collective learning can take place, and prior decisions can be revisited. In turn, this way of working can increase the knowledge base and limit potential financial and/or personal losses.

4.1.5 | (Re)framing helps to adopt new perspectives and exploit contingencies

Lastly, we found that the design thinking practice of (re) framing allowed individuals and teams to gain alternative perspectives on new venture creation, which helps to exploit contingencies productively. The practice of (re)framing helped entrepreneurs to enact the exploitation of contingencies principle of effectuation theory, as the practice allows individuals and teams to view surprises and roadblocks from a different vantage point. Seeing "what could be," which is at the heart of the practice of (re)framing, is deeply embedded in design thinking, as one informant expressed:

> You wouldn't start to design a thing and try to build a thing from nothing if you weren't excited about what could be. And I think that frame of the world is fundamental to being a designer. (Samuel)

Being able to frame problems and consider alternative ways of looking at problems appeared to be closely related to an individual's cognitive flexibility and skillset, as one informant explained through using the infamous quote of Abraham Maslow:

> "If all you have is a hammer, then everything is a nail." Being able to reach into a toolkit of diverse skills and use that to solve problems, for me, is the only way that you can really solve problems. If you only know one way of doing things, then you'll always see the problem in that way. (Emma)

Another informant voiced that the practice of (re)framing helped them to adopt an alternative perspective on innovation, by using an open, nonjudgmental approach for (in)validating assumptions:

> I'm seriously flexible in terms of what I think is right and wrong. I just do it based on the data and the information I have at hand at any one time. I'm quite happy to put in place […] research and inquiry to try and make sure that we validate assumptions as we go. (Hudson)

This quote is also reflective of commentary around the necessity for "being flexible" and "letting go of one's ego" when innovating. Designer-founders frequently highlighted that it is not about being "right or wrong" but about continuous learning and (re)framing based on new insights. Lastly, when looking at macro-level contingencies, informants voiced that design thinking can help to view these contingencies as opportunities, as one informant illustrated by explaining her experience with (re) framing the Covid-19 pandemic in an opportunity for growth:

> COVID-19 potentially propelled me to a path where I can scale up, reach more [clients], having a bigger impact quickly than I thought. There are always great opportunities with any hurdle, constraints or obstacles. […] I think it has a lot to do with a designer mindset because it's just another problem to solve, right, and like any other problem you just need to explore a bit, be creative with your ideas and find the right solution, the right path. So, I think it's definitely very much to do with having a human-centered design or design thinking mindset that helps you look into obstacles as opportunities and not as something that hit you and you're a victim of. (Mary)

In the light of effectuation theory, the ability to make productive use of contingencies is supported by the design thinking practice of (re)framing. Based on our findings, designer-founders commonly approached surprises and problematic situations with flexibility, and they tried to reframe potential problems into potential opportunities. Hence, the practice of (re)framing supports the exploitation of contingencies principle, which necessitates being adaptive and proactive when facing problems or surprises. Given the inherent environmental and epistemic uncertainty of innovation in new ventures, the practice of (re)framing appeared as a critical practice enabling designer-founders' resilience in the face of uncertainty.

4.2 | Designerly ways of entrepreneuring

"Designerly ways of entrepreneuring" refer to the ways in which individuals prioritize activities, engage in partnerships, and set goals in the new venture context, based on the professional values and norms embodied in the practices of design thinking. Designerly ways of entrepreneuring nudged the informants in our sample toward (1) enacting creative, rather than commercial activities, (2) achieving societal, rather than personal gains, (3) striving for perfection, rather than speed to market, and (4) engaging in relational, rather than transactional interactions. Below, we will discuss the four themes in more detail, providing illustrative quotes to substantiate them. Supplemental evidence is provided in Table 5.

4.2.1 | Designer-founders tend to value creative rather than purely commercial activities

Firstly, informants explained that the design profession placed value on the enactment of creative activities, which had to be balanced with commercial activities. One informant reflected on the relationship between creativity and commerce by contrasting front-end and back-end innovation activities, which, in their view, had to be weighed up against each other:

> We like to try and create space and time to explore things divergently and create things. But then at the same time, there's this constant desire to finish the next thing, get to this next thing. You're in this tension where you're trying to give yourself enough time to explore things, but then getting it finished, so we can move on. (Brian)

Designer-founders were generally motivated to engage in creative activities that were focused on the ideation of new offerings. Engaging in commercial activities, on the other hand, which were focused on the introduction of new offerings to the market in a financially successful way, was considered less motivating. One informant explained that designers' career-choice of entrepreneurship resembled a way to "do things that are meaningful," and they contrasted their professional motivation for entrepreneuring with the motivations of property developers, as one example of a more commercially motivated profession:

> Designers who are entrepreneurs, they want to do things that are meaningful […] I can't imagine too many designers who are going to be entrepreneurs like property developers, where they buy a property and fix it up a little bit and then they sell it, unless they buy a property and they really put their soul into it and then they sell it. (Alex)

Some informants interpreted the tension between creative and commercial activities as a trade-off, which caused a lack of energy and passion for engaging in commercial activities, such as selling and sales support, as one informant explained:

> I get really excited about creation, and management isn't very interesting to me […] I've got heaps of energy to put into solving the problem, and then I've solved it, and I really don't have a lot of energy to put into selling it to people and support it and all that. (Lachlan)

Other informants highlighted that designer-founders had to learn to "put aside" creative activities, as one informant argued:

> What you need to, unfortunately, get used to, if you want to scale a business, is to put aside the creativity in the making, which is a huge decision for a designer. (Robert)

Informants recognized that their professional background was nudging them into an inherent preference for enacting creative activities and that it was crucial to find a more balanced approach concerning the enactment of creative and commercial activities. This was evident in one informant's comment on the disadvantages of being a founder with a design background:

> The disadvantage [of being a designer-founder] is, as I mentioned earlier, you can get tied up in that design aspect of things and wanting to really be highly involved in that, whereas you need to relinquish some of that control. Whereas if you came from a business background, commerce, something like that, you'd be probably more interested in whether the business is growing and the numbers. But yeah, I think that's definitely a disadvantage. (Liam)

To summarize, the simultaneous demands of engaging in creative and commercial activities can surface tensions, particularly when the front-end and back-end innovation phases demand individuals to focus their attention on fundamentally different activities, for example, designing, prototyping, and user research for front-end purposes; and managing, planning, selling, and market research for back-end purposes. Designer-founders' professional background and associated values and norms may lead them to prefer engaging in creative activities, but they need to find a balance between engaging in professionally meaningful activities and engaging in commercial activities to ensure new venture performance.

4.2.2 | Designer-founders tend to seek to achieve societal rather than personal gains

Secondly, informants reported that they directed their attention toward transforming the lives of others for the better rather than focusing on their own personal gain. One informant explained that they looked beyond "making money" and prioritized the interests of society, in this example, relating to the avoidance of production that might end up in landfill:

> I don't want to be making landfill, I don't want to be doing things that are just for the sake of making money, so I don't want to be an entrepreneur whose primary focus is money. (Alex)

Generally, designer-founders valued empathy with others, developing insights into fundamental human needs and developing solutions that could benefit a variety of people. Achieving benefits for themselves and striving for financial gain was perceived as less meaningful. As an informant further elaborated:

> If I was an entrepreneur first, I would probably have jumped at many more business opportunities because they were just good business opportunities, even though I wasn't really going to do anything particularly meaningful. That's not for me, so I think, for me it's going to be something that has certain characteristics, solving a need, making something that is elegant. (Alex)

Another informant explained that they experienced a shift in their priorities away from self-centered goals to other-centered goals:

> [My definition of success as a designer-founder] is definitely having a positive impact on the world. Actually, leaving a legacy and that's my form of success. It's not, well not anymore, about designing the perfect piece. (Ellen)

However, while designer-founders may be intrinsically motivated to achieve betterment for other stakeholders, they also need to achieve their personal goals linked to the future success of the venture and their career-planning. The simultaneous need to strive for other-centered and self-centered goals created a potential tension for informants. Informants understood that they had to strike a fine balance between contributing to the achievement of others' goals and following their own priorities, which, for example, was achieved by the temporal separation of activities, as one informant outlined:

> I do everything I need to do for other people to set them up to do what they need, including investors. Because they are also doing a job and they just need their numbers when they need them so they can report to their stakeholders. I do that during the day until it's done, and then the rest of the day is mine to do design work, or collaborative work with the team. (Lucy)

As emerging in these findings, the simultaneous desire to achieve goals for oneself and others can surface tensions, particularly when self-centered and other-centered goals are contradictory. The values and norms embodied by design thinking may nudge individuals toward striving for other-centered, societal goals rather than personal gains. While we find that designer-founders were trying to find a balance between these multiple goals, the competing demands can elicit tensions designer-founders have to cope with.

4.2.3 | Designer-founders tend to strive for perfection rather than speed to market

Thirdly, informants reported that the design profession placed great emphasis on the quality of design execution, and deemphasized speed to market. Designers often work with a normative tendency to create meaningful solutions and consider every detail of the design before releasing it to market. However, in their role as designer-founders, informants were also responsible for bringing acceptable solutions to the market fast and often. As one informant explained:

> Designers have a habit to go and build the perfect solution. But a perfect solution is not the answer, the answer is the most basic solution first. Does it work? If it does, then everything you do, after that, will be better. (William)

Another informant commented that:

> It's not that you don't want something to be perfect, but you need to get the product out and you need to be selling it. Your feet are on both sides of the fence because you need it to be [of] quality, you need the details to be good. But you need to get it out there and sell it, or else you don't have a job. (Isla)

While time can be seen as a crucial and well-invested resource to achieve optimal design outcomes, designer-founders often faced time constraints. We found that the simultaneous desire to take sufficient time to produce a perfect solution and the need to bring solutions to market quickly was surfacing tensions, particularly when resources were limited. The different degrees of velocity were expressed in the following quote:

> Anyone with more of a business focus, they would even just get a rubbish designer to do something, put it out there, learn, move forward, and then be in a better spot than where they were when they started. That speed of working is something that I think designers, in general, they are not awesome at. (Oliver)

However, informants recognized the need to balance perfection and speed to market. As one informant put it:

> Hustling [is important]. I mean, just not waiting until something's perfect. Getting out there and talking to people, and making connections and building your network, rather than sitting in your studio creating a beautiful piece of design. I think for something to be viable; you have to get out there and make it with people. (Jack)

To summarize, our findings suggest that designer-founders' professional background may nudge them toward striving for perfection rather than speed to market. However, the commercial realities of entrepreneurship demand a balance between producing "perfect" solutions while also launching these solutions to market quickly. These potentially competing demands can place strain on designer-founders, particularly when engaging in the opposing motions of decelerating the innovation process to produce perfect outcomes and accelerating the innovation process to improve time-to-market.

4.2.4 | Designer-founders tend to engage in relational rather than transactional stakeholder interactions

Another recurring theme emerged when informants reflected on the ways in which they managed stakeholder interactions to facilitate innovation in a new venture context. The designer-founders in our sample expressed that they favored multidirectional, relational stakeholder interactions that could provide intangible benefits, for example, reflections on pre-existing assumptions, identification of latent needs, or the cocreation of novel solutions, as opposed to more transactional interactions typical of commercial activities that were characterized by negotiations and provided access to tangible resources. The preference for developing a mutually beneficial relationship, instead of a purely transactional interaction, was elaborated on by one informant, when saying:

> We're really trying to collaborate as much as we can so that we have the least exchange of money possible. Not because we are stingy, or because we have no money. We don't have a lot of money, but because [we prefer] that [type of] collaboration and transferring of skills. "If I do this for you and you do this for me, we'll be able to have a mutually beneficial relationship and we can both reap the benefits." (Chloe)

The relational, recursive interpretation of the strategic partnership principle appeared as a critical aspect characterizing this designerly way of entrepreneuring. One informant explained their perspective on collaborative interactions by foregrounding the need to empathize with and understand others to gain new means:

> I don't think you can collaborate with people effectively unless you actually understand the problems that they're trying to face. For me, even being an entrepreneur, starting this business has taught me to understand more personally the problems you face as a business leader, which for a lot of people, they'll never understand. (Emma)

However, as designer-founders, informants also had to engage in transactional interactions that would involve selling and negotiating access to tangible resources, such as financial means or other kinds of operating resources. One informant voiced that when they were engaged in business development, there were transactional interactions, such as selling and pitching, and collaborative interactions, such as consulting and teaching. They argued that these were fundamentally different interaction approaches and that a collaborative approach was, in their view, more effective:

> If you can actually play the role that you're actually there to consult and to teach, I found that is far more effective than pitching, if that makes sense. There is a different mindset associated with those two things. (Robert)

For our informants, the engagement with stakeholders who could provide access to tangible means appeared to be of secondary importance. For example, as opposed to viewing other designers as competitors, one informant summarized that they would regularly reach out to other designers they could learn from and collaborate rather than compete with them:

> My luck has been, since I started my career maybe six years ago, is that I've had the guts to email as many designers as I could and to meet up with them to learn from them, forty, fifty-year old's, thirty-year old's, as well as established designers. But a lot of people aren't, so they aren't learning from … A lot of people shy away from the idea of collaboration. But I truly believe that collaboration is the most important thing. (Henry)

The presented evidence suggests that the interviewed designer-founders tend to engage in relational stakeholder interactions that can help to generate intangible resources (such as unique insights, knowledge, or emotional support), as designer-founders' professional values and norms lead them onto this path of relational interaction. However, in order to procure tangible resources, such as financial investment or operating

resources, designer-founders need to also tap into the tangible means stakeholders can provide. The simultaneous pursuit of relational and transactional interaction styles may thereby cause tensions that designer-founders need to effectively manage.

5 | DISCUSSION

Based on the analysis of 41 in-depth interviews with Australian designer-founders, our study sheds light on the relationship between design thinking and effectuation in the context of entrepreneurship.

We find that designer-founders use design thinking practices to enact the cognitive principles of effectuation. Our analysis results in five operationalizations of effectuation principles through design thinking practices, which we label "entrepreneurial ways of designing": (1) practicing human-centeredness helps to unlock knowledge and align identity, (2) embracing diversity helps to integrate the views of various strategic partners, (3) visualization helps to envision and control the innovation trajectory, (4) experimentation helps to limit potential losses along the innovation trajectory, and (5) (re)framing helps to adopt new perspectives and make better use of contingencies. In addition, we find that designer-founders interpret effectuation through the values and norms of the design profession. These interpretations result in a balancing act between making choices and judgements that are true to professional values and norms and adhere to the demands of running a for-profit business. The norms and values of the design profession nudge designer-founders toward: (1) enacting creative, rather than commercial activities; (2) achieving societal, rather than personal gains; (3) striving for perfection, rather than speed to market; and (4) engaging in relational, rather than transactional interactions. We conceptualize these interpretations as "designerly ways of entrepreneuring."

Thus, our findings suggest a reciprocal relationship between design thinking and effectuation theory, which we have visualized in Figure 2.

5.1 | Theoretical contributions

This article's contributions are twofold: Firstly, we add a novel theoretical perspective to the design thinking discourse by explaining the effectiveness of design thinking practices through the theoretical perspective of effectuation theory. In doing so, we connect design thinking with an academic discourse that is theoretically well-developed and add theoretical substance to earlier suggestions that design thinking is an effective approach for entrepreneurship. Secondly, we add a novel behavioral perspective to effectuation theory by explaining how the principles of effectuation are enacted through design thinking practices. These contributions are aligned with MacInnis (2011), who has highlighted the benefits of connecting disparate knowledge domains. The integration of theoretical and practical perspectives expands our understanding of the relationships between design thinking and effectuation theory.

With our research, we help build a stronger theoretical foundation for the effectiveness of design thinking by integrating abstract effectual theorizing with concrete designerly ways of working. Further, by uncovering the theoretical and practical connection between effectuation theory and design thinking, we advance innovation theory, and we open up the vacuum in which the design thinking discourse has unfolded (Dell'Era et al., 2020). To date, the tentative conceptual approaches to connect both domains paint a rather abstract picture (e.g., Mansoori & Lackéus, 2020; Sarooghi et al., 2019). Our findings concretize the relationships between design thinking and effectuation, while accounting for the complexity of innovating in a new venture context. By highlighting the reciprocal relationship between effectuation and design thinking, which we conceptualize as "entrepreneurial ways of designing" and "designerly ways of entrepreneuring," we provide insights into the potentialities and implications of applying design thinking for the benefit of entrepreneurial innovation and new venture creation. As our findings suggest, designer-founders' use of design thinking practices provides ways of managing ambiguity and coping with high uncertainty. More broadly, our study contributes to extant literature by suggesting that design thinking can facilitate new venture creation as it enables effectual cognition.

At the start of the innovation process, design thinking can help to envision meaningful opportunities that may be useful for a diverse range of stakeholders, as these opportunities are rooted in human-centered considerations. The complementary use of design thinking as a practice-based innovation approach alleviates previous criticisms that effectuation theory does not give any guidance "as to how to develop useful ideas in the first place" (Glen et al., 2014, p. 662). Further, our study solidifies the importance of iterative experimentation as an effective practice for testing hypotheses, lending empirical support to previous conceptual considerations (Liedtka, 2015), and providing concrete insights into how experimentation may unfold in the context of entrepreneurship. Further, we show the "how" of this connection and advance our empirical understanding of the synergistic value of collaboration, experimentation, and iteration across both cognition and behavior. We highlight how embracing diversity allows entrepreneurs to understand diverse stakeholder motivations and propose futures that are desirable for various stakeholders engaged in the innovation process. In turn, visualization can then help control the innovation process by providing a shared meaning of the future. For example, visualization lets stakeholders engage in a discourse on the meaning of a

particular envisioned future. It enables stakeholders to assess if they are willing to provide the necessary means to arrive at this future.

Furthermore, our findings provide evidence for the existence of distinct professional interpretations of effectuation. It is evident that designer-founders interpret effectuation principles through values and norms of the design profession, which are embodied in design thinking practices. Thereby, it is plausible that the normative interpretation of effectuation may not only impact the ways in which effectuation principles are enacted but these interpretations may have wider strategic implications, informing new ventures' innovativeness, corporate goals, and competitive strategies. For example, we find that designer-founders tend to strive for broader, societal objectives rather than purely self-centered objectives, also referred to in the literature as the "shared value" approach (Porter & Kramer, 2011; Osorio-Vega, 2019). Our findings also suggest that due to the value designer-founders place on relational interactions and collaboration, they tend to follow a strategy of coopetition rather than competition (Bengtsson & Kock, 2000, 2014). Moreover, designer-founders seem to prefer an innovation strategy which allows them to simultaneously optimize and strive for perfect execution and high quality and satisfice to launch products to market quickly (Simon, 1955). For instance, designer-founders may be striving for ambidextrous innovation strategies that allow them to simultaneously explore the creation of new products, services, and markets and fuel an organization's innovation pipeline, yet, at the same time, to exploit existing products, services, and markets to generate the necessary means, the organization requires for survival (Andriopoulos & Lewis, 2009, 2010).

In more general terms, we observe that designer-founders seek to balance conflicting priorities and choices to avoid a one-sided focus of one particular category over another. Aligned with pragmatism's antidualistic ontology (Dalsgaard, 2014; Farjoun et al., 2015), categories such as creativity and commerce are regarded as both opposing and complementary, as well as interlinked with one another. Our findings suggest that designer-founders adopt an antidualistic ontology and accept tensions as an inherent part of a complex world. Our informants are vocal about their preferences, yet their success in entrepreneurial innovation and new venture creation suggests that they find ways to balance paradoxical demands (Gibson & Birkinshaw, 2004).

5.2 | Managerial implications

Our findings suggest that design thinking may be conducive to entrepreneurial innovation, and we argue that design thinking practices can be a catalyst for entrepreneurship. Explicating the intersection of design thinking and effectuation may help entrepreneurial designers to better assess how they can leverage their professional ways of working for entrepreneurial innovation. Our findings also help entrepreneurs to use design thinking as a practical way of enacting the cognitive principles that guide entrepreneurial decision-making and facilitate innovation in and creation of new ventures. Specifically, our findings assist in translating the abstract principles of effectuation into concrete ways of working, improving their practical applicability. More generally, our article provides practical guidelines into how the various design thinking practices can be applied to achieve entrepreneurial innovation and new venture creation. As effectuation theory does not provide specific behavioral prescriptions and readily applicable practices, practitioners who are faced with the challenges of navigating new venture innovation will benefit from our research. In essence, our study makes effectuation more understandable, teachable, and actionable.

Table 6 provides an illustrative overview of concrete behavioral guidelines and normative implications of using design thinking practices to enact effectuation principles. First, entrepreneurs may practice human-centeredness to uncover tacit resources, such as entrepreneurs' empathic knowledge and social identities and thereby expand the range of available means. However, they should be careful not to neglect the need for explicit knowledge and other resource requirements. Second, entrepreneurs may embrace diversity to integrate and balance the conflicting views of strategic partners, including users, investors, and other important stakeholders. However, they should be careful not to overprioritize the goals and needs of others over their own goals and needs. Third, entrepreneurs may utilize the power of visualization to create artifacts—such as maps, drawings, models—that can help others to envision desirable futures, thereby enabling control of the innovation trajectory. However, they should be careful not to overcommit time and effort for creating visual representations of one or few of many possible futures. Fourth, entrepreneurs may experiment early and often to provide interim outcomes, which allow for the continuous alignment of goals and thereby limit potential losses along the innovation trajectory. However, they should be careful not to strive for creative perfection in each single experiment and rather seek for the creation of a "minimum desirable product." Lastly, entrepreneurs may practice (re)framing to adopt new perspectives on challenging situations, design novel solutions to important problems, and thereby effectively turn contingencies into opportunities. However, they should be careful not to desperately seek for new problems that allow for reframing and rather focus on reframing the most important problems and framing the most impactful solutions.

As we have seen in this article's findings, designer-founders use design thinking as a pragmatic approach for entrepreneurial innovation and new venture creation. Designer-founders ideate new business opportunities that

TABLE 6 Actionable guidelines and cautionary tales

Effectuation principles	Design thinking practices	Actionable guidelines	Cautionary tales
Means orientation	Human-centeredness	Practice human-centeredness to uncover tacit resources, such as entrepreneurs' empathic knowledge and social identities and thereby expand the range of available means	Be careful not to neglect the need for explicit knowledge and other resource requirements
Strategic partnerships	Embracing diversity	Embrace diversity to integrate and balance the conflicting views of strategic partners, including users, investors, and other important stakeholders	Be careful not to overprioritize the goals and needs of others over your own goals and needs
Nonpredictive control	Visualization	Utilize the power of visualization to create artifacts (such as maps, drawings, and models) that can help others to envision desirable futures, thereby enabling control of the innovation trajectory	Be careful not to overcommit time and effort for creating visual representations of one or few of many possible futures
Affordable loss	Experimentation	Experiment early and often to provide interim outcomes, which allow for the continuous alignment of goals, and thereby limit potential losses along the innovation trajectory	Be careful not to strive for creative perfection in each single experiment and rather seek for the creation of a "minimum desirable product"
Exploitation of contingencies	(Re)framing	Practice (re)framing to adopt new perspectives on challenging situations, design novel solutions to important problems, and thereby effectively turn contingencies into opportunities	Be careful not to desperately seek for new problems that allow for reframing and rather focus on reframing important problems and framing impactful solutions

are informed by deep empathy with stakeholders, reframe problems, and frame their potential solutions, prototype business models that can be effectively communicated to stakeholders and visualize the future to establish shared meanings that allow stakeholders to self-select into the venture and commit their means. Our findings, however, also suggest that, ultimately, how effectuation principles are brought to life depends on the values and norms that are embodied in the ways of working practitioners adopt. We suggest that design thinking imprints a normative scaffolding for effectual decision-making, which carries significance for the many choices that have to be made when innovating and creating new ventures.

5.3 | Limitations and future research

Our qualitative study provides insights into the relationship between design thinking practices and effectuation principles. We invite scholars to take our study as a stepping-stone for exploring the following future research opportunities.

Our findings suggest that design thinking may be effective for innovation purposes in contexts of high uncertainty and that it may be particularly effective when individuals and teams strive for entrepreneurial innovation and engage in new venture creation. Further research is needed to assess the effectiveness of design thinking in low-uncertainty contexts, for example, when a new venture gains maturity and uncertainty recedes.

In close alignment with Carlgren et al. (2016) and Dell'Era et al. (2020), our findings cover five of the most prominent categories of design thinking practices. While we empirically identify concrete matches between specific effectuation principles and design thinking practices, these constellations are illustrative based on the data, but not necessarily exhaustive, as further linkages seem theoretically plausible. Due to the possibility for further linkages, we welcome future studies that could replicate our study, potentially expand our findings, and provide broader insights into the use of design thinking practices.

While our study rests on the experiences and perceptions of new venture founders with a professional design background, effectuation theory suggests that adopting a dominant innovation approach in a team setting may similarly rest upon cofounders and team members' experience. We assume that cofounders with a strong background in alternative approaches for innovation, such as lean start-up or agile development, may equally leverage, propose, or even advocate for adopting "their" approaches to guide innovation. Exploring the potential synergies and conflicts that may emerge when multiple approaches are co-adopted provides an interesting future research avenue.

It still remains unclear which type of organizational culture, with its explicit and implicit norms and values, may be conducive to the successful application of design thinking for entrepreneurial innovation (see also Elsbach & Stigliani, 2018). Similarly, we require deeper insights into the role of the individuals' and teams' value systems to better account for the effectiveness of the guidelines and cautionary tales we provide in this study.

Our research setting was new venture creation by designer-founders. This setting can be described as an "illuminative case" (Patton, 2002, p. 232), and we welcome future research that extends the scope of the present study to include new venture creation by nondesigners as well. Nondesigners may not necessarily have habitualized design thinking practices as an integral part of their professional practice nor will they be driven by the same deeply ingrained professional norms and beliefs as designers. As a result, the ways in which they bring effectuation principles to life by means of design thinking practices and the types of challenges encountered when doing so will most likely differ. Disentangling the differences between designers' and nondesigners' use of design thinking in a new venture setting requires further exploration.

Our findings suggest that the designer-founders included in our study seemed to balance and cope with creative-commercial tensions. This may, perhaps, be a result of designer's ability to consolidate multidimensional meanings relatively easily (Michlewski, 2008). We assume that the enactment of design thinking practices may shape the cognitive logic that individuals adopt. For example, the ability to reframe negative surprises into positive opportunities may change an individual's attitude toward the meaning of contingencies on a cognitive level. Moreover, the ability to empathize with humans may allow individuals to view seemingly competing stakeholder objectives as an opportunity to enable value-creating synergies. Additional empirical evidence and longitudinal research is required to shed light on how exactly this relationship may manifest over time. We thereby call for future research about these potential relationships.

Finally, our study provides an example for the successful connection of design thinking with extant theory. Such integration was warranted due to the shared philosophical roots in pragmatism. Future research that seeks to connect design thinking with other theories should critically consider the philosophical underpinnings of the respective theory and avoid epistemic mismatches that would potentially render both empirical and theoretical integration difficult.

6 | CONCLUSION

Our study sheds light on the relationship between design thinking and effectuation theory. Specifically, our study explains how designer-founders enact the cognitive principles of effectuation through design thinking practices, which we conceptualize as "entrepreneurial ways of designing." The study also discerns how professional values and norms embodied in design thinking inform how designer-founders interpret effectuation principles, which we label "designerly ways of entrepreneuring." The study contributes a novel perspective to the innovation management literature by combining design thinking's behavioral prescriptions with the cognitive decision-making rules of effectuation theory. We believe that this research provides fruitful grounds for future research exploring the nexus of design thinking and extant theory, and we welcome future attempts to connect design thinking with other scientific disciplines.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the Supporting Information section.
Supplementary Material

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