The Same, but Better: *Understanding the Practice of Designing for Incremental Innovation in Web Design*

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Although the vast majority of new products are incremental innovations, radical innovation still attracts the most attention from design researchers and practitioners. We examine the frequently overlooked practice of designing explicitly for incremental innovation as the bread-and-butter work for most professional designers. Informed by a broad literature review of incremental and radical innovation, we report a qualitative case study of a leading European digital design agency tasked with designing a 'same, but better' product—a global subsidiary company website. Based on three rounds of coding of five videorecorded design meetings, we contribute a model showing how the observed digital designers purposely delimited radical innovation by managing six critical forces that constrained their design space. These forces are client, customer, competitor, catalogue, content, and context. Our 'six C' model can be used by design researchers to articulate and analyze incremental innovation in design processes and by professional digital designers to improve their understanding of how to best manage incrementally innovative web design projects. We discuss how our six C model complements previous contributions, and we suggest avenues for future work.

Keywords – Six C Model, Radical Innovation, Incremental Innovation, Case Study, Web Design.

Relevance to Design Practice – We present a web design case study of the familiar, but often overlooked, practice of designing explicitly for incremental innovation. We contribute a model of six critical forces that affect incrementally innovative design processes. Our six C model can be used by design researchers to examine design processes, and by professional designers to better analyze, manage, and navigate incrementally innovative web design projects.

Introduction

In 1994, when Steve Jobs was heading NeXT Computer and long gone from Apple (a situation that would change four years later), he explained to *Rolling Stone Magazine* why he believed *radical innovation* as revolutionary product change was the most challenging target in professional design practice.

> I have a great respect for incremental improvement, and I've done that sort of thing in my life, but I've always been attracted to the more revolutionary changes. I don't know why. Because they're harder. They're much more stressful emotionally. And you usually go through a period where everybody tells you that you've completely failed. (Goodell, 1994)

More than two decades later, Jobs' view on the allure of designing for radical innovation seems ubiquitous when looking at articles and anecdotes in the media and in popular culture. In our experience as digital design researchers and educators, design students and novice designers often construe radical innovation and breakthrough ideas in a romanticized fashion akin to *changing the world* or equally grandiose slogans, seemingly nurtured by the achievement of a few highly successful individual designers and innovators, including the late Steve Jobs. Such a wishful conception of radical innovation is a strong motivational force; however, it poses a severe problem. In reality, the bulk of design practice is *incremental* and separate from the appeal of technological revolutionism. Designers may at times get a

design brief instructing them to develop a radically new design to break away from the current, but their bread-and-butter work is incremental in scope and execution. As the seminal reference, Gobeli and Brown (1987) estimated that nearly 80 percent of all new products are incremental innovations. This suggests that adopting a diversified product innovation portfolio strategy, as one among several innovation management strategies (van der Panne, van Beers, & Kleinknecht, 2003), may often lead to a higher chance of success. Choosing a portfolio depends on the type of product being designed. Ulrich and Eppinger (2016) distinguished between nine types of innovation products: generic (market-pull, e.g. consumer bikes), technology-push (e.g. Teflon™ frying pans), platform (e.g. consumer electronics), process-intensive (e.g. snack foods), customized (e.g. motors), high-risk (e.g. pharmaceuticals), and quick-build (e.g. software) products, as well as product-service systems (e.g. restaurants)

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and complex systems (e.g, airplanes). As this typology shows, the type of innovation and the allocated time for the design process is directly affected by the design domain and the kind of product that a company develops in its product innovation portfolio. Although recent contributions (e.g. Norman & Verganti, 2014) have studied radical and incremental innovation in digital design and web design, we consider it striking that Gobeli and Brown's (1987) combined literature and interview survey of product innovations more than thirty years ago remains the arguably most relevant source for innovation diversifiaction in digital design and web design as well. This observation further embodies a *discrepancy* between the hype of radical innovation, as mirrored in much research literature, and the incremental nature of day-to-day professional design work.

Considering incremental innovation to be less relevant or even mundane would be a misunderstanding. Designers are often tasked with designing a physical or digital product purely to attain incremental innovation, as radical change may not be *desirable* (the current product may lead the market or have little competition), *feasible* (the technology for radical change may be immature for market release), or *profitable* (the current product may be top-grossing). One example of such planned incremental innovation is Apple's S-series of iPhones replete with slightly enhanced, native software. As a case in point, the relaunch of the iPhone 5S (September 20, 2013) was a marginally improved version of the iPhone 5 (September 21, 2012). While many tech critics drew a collective sigh when seeing the iPhone 5S' lack of radical potential, journalist Glenn Fleishman (2013) acutely pointed out that,

> Apple makes its living through punctuated equilibrium, not through disruption.[1] Revolutions are hard; small but significant improvements are far easier. The all-in-one iMac, the MacBook Air, the iPod, the iPhone, and iPad all changed the way in which the entire industry created similar products. Those were released at years-long intervals, not every year.

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This reflection is in line with the articulation of incremental innovation in design by Kyffin and Gardien (2009) who describe it as a phase "where new features are gradually added to improve the performance of the existing product" (p. 62). Often, there will be a need to improve design for manufacture and assembly as margins are squeezed by competitive products. Much industrial and digital design work builds on iteration in incremental innovation since products and services in this *nuts and bolts* (Marquis, 1969) category are "defensive fillers to address as many niches as possible as the product advances along its product cycle" (Gobeli & Brown, 1987, p. 28). In other words, incremental innovation means designing a new product that, when compared to an existing solution, seems to be *the same, but better*.

In this study, we examine what digital designers in a web design project actually do when they are being explicitly tasked with delivering incremental innovation and nothing more. We argue that this topic, given its prevalence in professional practice, needs more critical attention from the design research community regardless of domain. First, we clarify key terms and review the literature on incremental and radical innovation in design in general and in digital design in particular. We then analyze a digital design project where designers from a major European digital design agency were tasked with designing a global subsidiary company website that should closely resemble, yet stand out from, the parent company website, which the agency had already designed from scratch. We report a qualitative study of this incremental design process based on approx. six hours of videorecorded design meetings. Through three rounds of coding, we contribute a *six C model* that illustrates the digital designers' most relevant actions and approaches as they identify, interpret, and negotiate six critical *forces* in order to delimit radical innovation. We end by suggesting avenues for future work.

Background

Clarifying Design and Innovation

It is generally agreed that a "shared understanding" (Harrison, Back, & Tatar, 2006, p. 262) as well as a "shared language" and "[a]n ability to communicate and exchange creative ideas is an essential part of the creative process" (Mamykina, Candy, & Edmonds, 2002, p. 97). We therefore begin by clarifying our use of *design* and *innovation* since these terms are at times used interchangeably.

Design

Design is hard to capture in a consensual definition that takes into account that design is a creative process. Building on Dorst (1997), Askland, Ostwald, and Williams (2010) proposed two primary conceptualizations of design—a positivist paradigm introduced by Simon's (1973) work on design as a rational problem-solving process, and a paradigm inspired by Schön's (1983) view on design as a "reflective conversation with the situation" (Schön, 1992, p. 205). Despite this argued dichotomy, Ralph and Wand (2009) synthesized earlier definitions of design and coined a universal proposal according to which design (transitive verb) means creating a design (noun), which can be seen as,

A *specification* of an *object*, manifested by an *agent*, intended to accomplish *goals*, in a particular *environment*, using a set of *primitive components*, satisfying a set of *requirements*, subject to *constraints*. (p. 108, orig. emphasis)

This guiding definition suffices for our purpose, but with the addendum that design is a unique field of research, "a *tertium quid*—a third way—distinct from the arts and sciences" (Nelson & Stolterman, 2003/2012, p. 11, orig. emphasis), which is an idea often attributed to Archer (1979).

Innovation

The conceptual link between design and innovation is complicated (Mortati, 2015), and the role of design thinking in innovation may be even more complex (Kleinsmann, Valkenburg, & Sluijs, 2017). To ease this complexity, Na, Choi, and Harrison (2017) offered a design innovation spectrum, ranging from technological innovation via product/service innovation to process innovation and, finally, organizational innovation. Kolko (2007) adopted a more semantically oriented approach by distinguishing between two types of design. Design with a capital D (Kolko's denotation) may refer to a unique field of research with its own paradigms, theories, tools, and heuristics (Ralph & Wand, 2009), whereas design with a lower case d seems to have emerged in industry as a method of incubating business ideas to facilitate market-oriented business initiatives. The central problem is that the industry's free-floating use of the term *design* decimates the richness of Design proper. Consequently, the industry's interpretation of design should more appropriately be called innovation since innovation according to Kolko (2007) implicitly emphasizes newness and inventiveness, or in his words "valuable newness" (p. 225). This idea mirrors observations by Gobeli and Brown (1987), underlining the importance of newness to buyer and producer in product innovation.

Kolko's discerned misconception may be true if innovation is construed quite narrowly as "the *process* of turning ideas into reality and capturing value from them" (Tidd & Bessant, 1997/2009, p. 19, orig. emphasis). Still, as Tidd and Bessant note in their textbook *Managing Innovation* (op. cit), a nuanced view on innovation respects the value of usefulness so that innovation can be seen as "the process of turning opportunity into new ideas and putting these into *widely used practice*" (p. 16, emphasis added). This focus on impact, usage, and success in a given real-world context is mirrored in a metastudy by Baregheh, Rowley, and Sambrook (2009) who based on 60 definitions sampled from various disciplines (but not design) proposed this multidisciplinary definition of innovation:

Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace. (p. 1334)

Following Kolko (2007), who noted how "[t]he often arbitrary interchange of the words Design and Innovation is doing a disservice to the growth of both concerns" (p. 229), we interpret design and innovation as follows. As a unique field of research with its own modes and tools of inquiry, we see the practice of design as "the ability to imagine that-which-does-not-yet-exist, to make it appear in concrete form as a new, purposeful, addition to the real world" (Nelson & Stolterman, 2003/2012, p. 12). This resembles Buchanan (2001): "[d]esign is the human power of conceiving, planning, and making products that serve human beings in the accomplishment of their individual and collective purposes" (p. 9).[2] We dissociate ourselves from the marketing-oriented view on innovation where the relationship between product newness and customer benefit is very asymmetrical in favor of the former. Rather, we adopt the definition by Baregheh et al. (2009) where novelty (*new/improved*), usefulness (*successfully*), and purposefulness (*in order to*) are fused with contextual financial value (*in their marketplace*). This complex interrelatedness is further underpinned by studies on how users often value an innovation by ascribing novelty to it (Rindova & Petkova, 2007).

Defining Radical and Incremental Innovation

The idea of *radical* innovation can be traced back to Schumpeter's (1934) influential theory of how the force of radical technological change can undercut the competitive advantage enjoyed by larger companies (Dahlin & Behrens, 2005). In the wake of his ideas, many closely related adjectives have been ascribed to this sheer force, e.g., revolutionary (vs. evolutionary) (Zaltman, Duncan, & Holbek, 1973), discontinuous, breakthrough, or disruptive (Christensen, 1997; Markides, 2006), each with a slightly new perspective. Motte, Yannou, and Bjärnemo (2011) summed up key characteristics of radical innovation, but as Dahlin and Behrens (2005) noted, a problem in early (pre-market) studies is that an assessment of radicality (or the lack thereof) can only take place once a new product has entered and affected the market. To avoid this selection bias and retrospective evaluation, Dahlin and Behrens (2005, p. 725) presented three definitional criteria of technological radicality:

Criterion 1: The invention must be novel: it needs to be dissimilar from prior inventions.

Criterion 2: The invention must be unique: it needs to be dissimilar from current inventions.

Criterion 3: The invention must be adopted: it needs to influence the content of future inventions.

Satisfying the first two criteria ensures radicalness of a new product, while the third criterion targets technological change as market impact. Basing radicality purely on dissimilarity, though, is problematic insofar as dissimilarity is binary, meaning *not similar; unlike; different* (see http://www.thefreedictionary.com/dissimilar). What is important for something to be radical is the *degree* to which it differs from something else, and here its antipole is *incremental*. Instead of opting for an either-or dichotomy, other researchers have stressed various levels of these qualities as "[t]he distinction between radical and incremental innovations is easier to intuit than to define or measure" (Dewar & Dutton, 1986, p.

1423). One way to differentiate, however, is to review "the degree of novel technological process content embodied in the innovation and hence, the degree of new knowledge embedded in the innovation" (ibid.). This approach would resemble Gobeli and Brown's (1987) definition by which incremental innovations are those "which utilize little new technology and provide few new benefits to the user" (p. 25).

Another differentiation strategy focuses on gradual transition based on *levels of innovativeness*. Garcia and Calantone (2002) offered a continuum of descending degrees of innovativeness, ranging from radical, really new, discontinuous, and incremental to imitative inventions. Here, *radical* means "embody[ing] a new *technology* that results in a new *market* infrastructure" (p. 120, orig. emphasis), which creates "a demand previously unrecognized by the consumer" (p. 121). Therefore, "a radical innovation can be identified by the initiation of a new technology *and* new marketing S-curve (p. 122, orig. emphasis). What Kleinschmidt and Cooper (1991) referred to as "moderately innovative, middle-of-the-road products" (p. 240), Garcia and Calantone (2002) called "really new" innovations that "will result in a market discontinuity or a technical discontinuity, but will not incorporate both" (p. 122). An innovation can thus only be radical if a double discontinuity occurs. If no discontinuity occurs, the innovation is incremental, and so the product will merely "provide new features, benefits, or improvements to the *existing* technology in the *existing* market" (p. 123, orig. emphasis). Interestingly, Garcia and Calatone further underlined that "for many firms, incremental innovations are the lifeblood of the organization."

Radical and Incremental Innovation in Design

In popular discourse, distinguishing between radical and incremental innovation is often based on estimated benefits. One example is the UK Design Council (Fullagar, 2015) according to whom designing for incremental innovation entails the benefits of helping a client stay competitive by continuous product renewal, assurance of product familiarity in the target group and domain, and affordability. The shortcoming is a moderate return on investment since "[n]ot much is ventured, and not much is gained" (Gobeli & Brown, 1987, p. 28). Designing for radical innovation may yield bigger wins, the opportunity to build and own a new market, and a better point of market entry for new players; all of which may compensate for the intrinsic drawbacks such as slow market adoption and an audacious newness that may lead users to evade the product altogether. Managing generative constraints and cumulative design rules may increase the potential for attaining radical innovation (Arrighi, Le Masson, & Weil, 2015). In contrast, incremental innovation in design (regardless of domain) tends to garner much less attention in both industry and academia.

In design research, Norman and Verganti (2014) argued that "radical product innovation is driven by either advances in technology or a deliberate change in the meaning of the product rather than being driven by the human-centered design philosophy widely used in product design" (p. 81). In addition to the authors' extensive research experience, their premise is that

their "examination of both existing products and the literature on innovation" yielded no "contrary evidence." They interpret human-centered design (HCD) with its many design process iterations and continuous checking with users via prototypes as hill-climbing, i.e., a procedure of finding local maxima. As a design strategy, this is key for small improvements (incremental innovation), but it is unable to lead to radical innovation. The latter emerges only by technology and meaning change in the form of an intentional leap to another, higher hill; a metaphor for a product's maximum quality in the design space topology. On this basis, Norman and Verganti presented the following definitions:

> *Incremental innovation*: improvements within a given frame of solutions (i.e., *doing better what we already do*); and *Radical innovation*: a change of frame (i.e., *doing what we did not do before*), (p. 82, orig. emphasis)

The authors thus consider radical innovation a joint breakthrough technologically as well as in users' assignment of meaning (essentially the reason they buy a given product). This understading echoes the leap from incremental to radical innovation via *meaning* change discussed by Rampino (2011). The dual occurrence of technology and meaning change is rare. Incremental change in technology and meaning, however, is very common and can be defined as follows:

> *Market-pull innovation* starts from an analysis of user needs and then develops products to satisfy them. We put both HCD and traditional market-pull methods here: Both start from users to identify directions for innovation. (p. 90, orig. emphasis)

Norman and Verganti's (2014) view on radical vs. incremental innovation seems to be based on an *appeal to ignorance* argument (argumentum ad ignorantiam), i.e., the claim that since they have not discerned a single example of radical innovation built directly on HCD, HCD is unable to evoke radical innovation. In our reading, Norman and Verganti seem to suggest that HCD may very well *want* to, but is *unable* to evoke radical innovation, so that HCD depends on incremental innovation.

Rather than challenge this claim and the authors' emphasis on the users' role in these two types of innovation, we focus our attention on the habitual, but significantly less studied situation where designers are explicitly tasked with designing for incremental innovation only. Here, designers must reach a design that shows only a *limited degree of added novelty and usefulness*. Since incremental innovation is highly prevalent in professional design practice, our aim was to study how *designing for incremental innovation* unfolds in an actual design process. We analyzed a web design project where the digital designers were instructed to *not* attain radical innovation, but *only* incremental innovation. In what follows, we subscribe to Norman and Verganti's (2014) idiomatic definition of incremental innovation as "doing better what we already do" (p. 82) (i.e., *the same, but better*), but with the critical addition that designing for radical vs. incremental innovation necessarily forms a complex continuum, and that designing explicitly for incremental innovation very often is—and therefore must be studied as—an important strategic design objective in itself.

Case: *The Design of a Global Subsidiary Company Website*

Presentation

We conducted a study of a digital design project in which a group of designers from one of Europe's leading strategic digital design agencies were tasked with designing a global corporate website for a subsidiary company of a major international company specialized in animal healthcare solutions. We chose this case for our analysis for three reasons. First, since we had already established a fruitful partnership with the agency, we were able to easily resolve the familiar issue of Non-Disclosure Agreements (NDAs) that may curtail a research team's access to an in-vivo design process marked by much confidential information. Second, as most previous work on incremental innovation stems from product design, we were curious to explore how an incremental innovation process would play out in a different domain, namely digital design, which is where we position our own research. Third, we found this case particularly relevant because the design agency had recently completely redesigned the parent company's main corporate website, so the new design brief stated that the new subsidiary website be obviously new, but still bear a clear resemblance to the interface of the parent company's website. The subsidiary website should therefore be fresh and distinct, yet retain core elements (e.g., aesthetics, user experience, content, etc.)

from the country-specific websites that the subsidiary company had relied on until now. This web design task thus mirrors how users of design products tend to prefer an optimal combination of novelty and typicality (Hekkert, Snelders, & van Wieringen, 2003), since many of the prospective users of the new subsidiary company website were expected to be familiar with the parent company website, including its user interface, style, elements, and navigation.

Data Collection

To be allowed to collect the data, we signed the aforementioned NDA, so company names remain undisclosed, and participant names are aliases. We refer to the parent company as *PC* and to the subsidiary company as *SC*. Using standard participant observation (Spradley, 2016), we recorded 368 minutes of video using a GoPro HERO4 camera. This was supplemented by field notes and photos. Since design meetings have been established as a fruitful ground for harvesting new insight into design activities (McDonnell & Lloyd, 2009; Olson, Olson, Carter, & Storrøsten, 2009), we accepted an invitation to observe five such design meetings. Meeting 1: UX and user journeys (M1) was an ideation session with Finley, a UX designer, and Francis, a design researcher (see Figure 1).

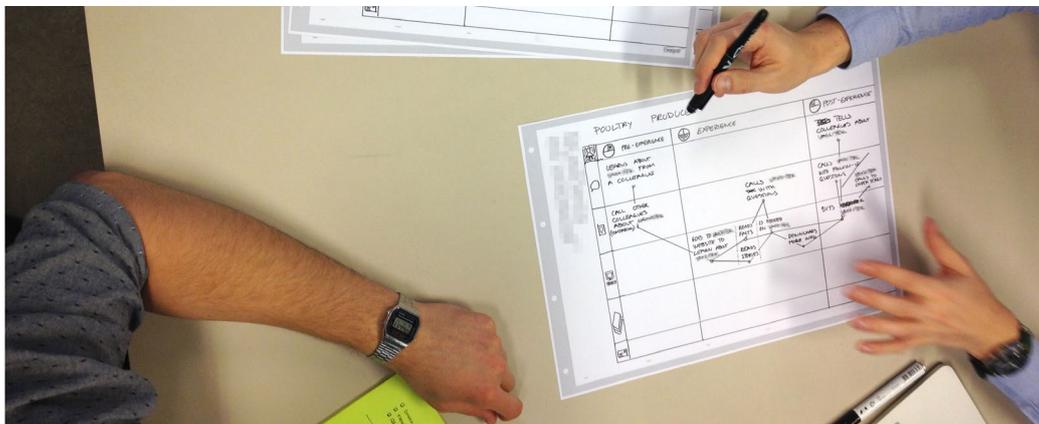Meeting 2: UX follow-up (M2) saw Francis and Finley discuss their individual design work so far (see Figure 2).

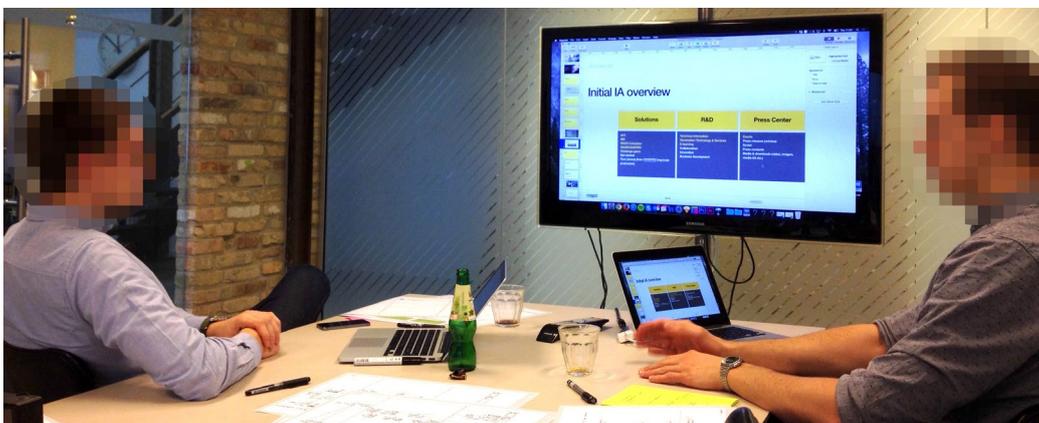**Figure 1. Francis and Finley during meeting 1: UX and user journeys** (M1).

Figure 2. Francis and Finley during meeting 2 (M2)**: UX follow-up.**

Meeting 3: Touch base (M3) (see *Figure 3*) was a status meeting where Louise, a local main office senior project manager, and Ryan, a design research intern, also took part. On a video conference call, they were joined by Matthew, an executive director, and Amy, a digital experience designer, both from one of the design agency's other offices.

In Meeting 4: Positioning (M4), Ryan showed his analyses of the subsidiary company's competitors to Matthew, who again joined on a video conference call. In meeting 5: Presentation wrap-up (M5), Finley, Ryan, and Louise met with Matthew and Amy (again on a video conference call) to discuss the design concept and the way to present it to the client a few days later. Due to impassable NDA constraints, we could not follow the design process beyond M5. For an overview, see *Table 1* below.

Method

We had originally approached the design agency with the intent to conduct a fully open, exploratory in-vivo study guided by an interest in collaborative creativity in digital design; however, we soon noticed how in this particular design brief, the designers would commit themselves to refrain from ideas that could seem too risky, bold, or new. When designing the SC's new website, the design team would repeatedly refer to and base their design on their previous work on the PC website.

To explore the observation that the designers would eschew choices that could seem too radical, we devised a new research design to move from *observational adequacy* to *descriptive adequacy* (Chomsky, 1964). We then did a *first round of coding* to assign "units of meaning to the descriptive [and] inferential information compiled" (Miles & Huberman, 1994, p. 56). In this first *interpretive* process (Denzin, 2002), "codes are attached to 'chunks' of varying size—words, phrases, sentences, or whole paragraphs, connected or unconnected to a specific setting" (Miles & Huberman, 1994, op.cit.). A design space can be seen as composed of creativity constraints that govern "what the outcome of the design process might (and might not) be" (Biskjaer, Dalsgaard, & Halskov, 2014, p. 456). To better understand the design space in question, our first round of coding of the video data focused on instances in which the designers would

Table 1. Terminology: Parent and subsidiary company, participants' alias, job title, and location.

| Alias	Company	Office location
PC	Parent company–previous client	Undisclosed due to NDA
SC	Subsidiary company–current client	Undisclosed due to NDA
Alias	Job title	Office location
Finley	UX designer	Local main design office, undisclosed due to NDA
Francis	Design researcher	Local main design office, undisclosed due to NDA
Louise	Senior project manager	Local main design office, undisclosed due to NDA
Ryan	Design research intern	Local main design office, undisclosed due to NDA
Matthew	Executive director	Major branch design office, undisclosed due to NDA
Amy	Digital experience designer	Major branch design office, undisclosed due to NDA
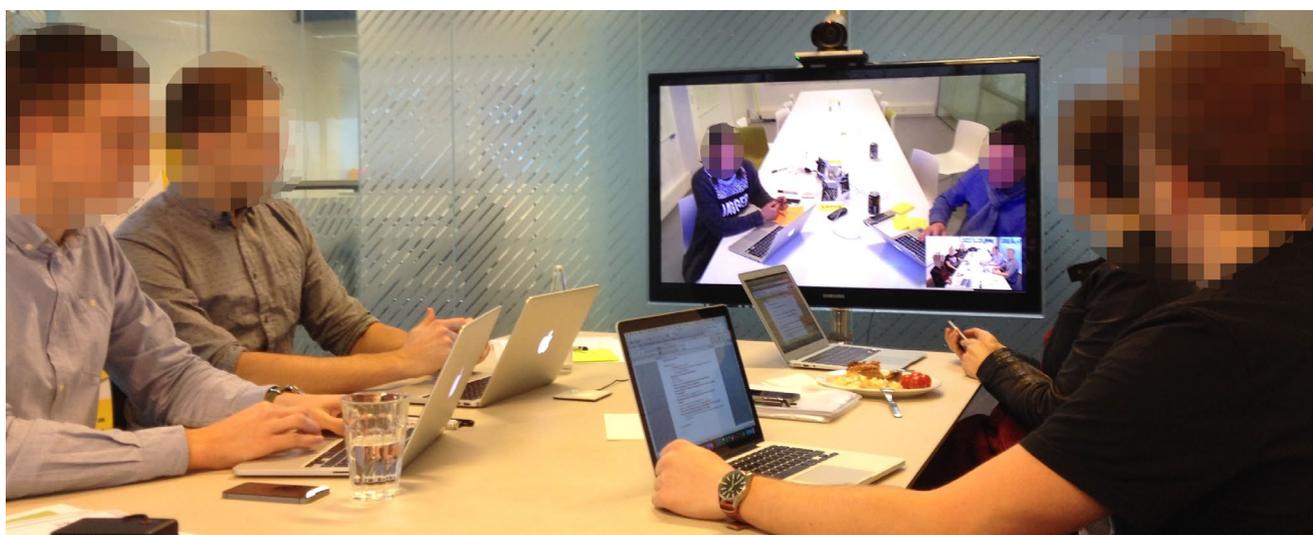
Figure 3. Francis, Finley, Ryan, and Louise with Matthew and Amy on a video conference call during meeting 3: Touch base (M3).

articulate and adjust their design space to ensure compliance with incremental innovation following *the same, but better* maxim as the guiding design constraint. The coding was carried out in a table with file names, time stamps, interpretive observation notes, and transcription of key verbalizations. The GoPro camera splits recorded files into .mp4 chunks of maximum 11 minutes and 50 seconds. Therefore, we will cite, e.g., a quote in Meeting 2, .mp4 video file 3 at 6 minutes and 27 seconds as follows: "...quote..." (M2/3/06, 27).

Our *second coding round* focused on discerning main themes via *constant comparison analysis* (Glaser & Strauss, 1967) to reduce our data to codes inductively to develop the general themes. The method is from grounded theory, but can be used "with talk, observations, drawings/photographs/ video, and documents" (Leech & Onwuegbuzie, 2008, p. 594). We then utilized Saldaña's (2015) *first-impression* mode of *eclectic coding* for selection and synthesis of the data into main themes.

Our *third coding round* was built on Saldaña's (2015) mode of *elaborative coding* to refine our themes. We compared our themes to three established analytical models in the intersection of design and innovation research. The first was Lawson's (2006, p. 106) Rubik's CubeTM-like model where design problems can be unpacked and analyzed by seeing their place on three axes: internal-external, radical-practical-formal-symbolic, and designer-client-user-legislator. The model possesses strong explanatory power in design, but it does not target innovation. To address this, we studied Tidd and Bessant's (1997/2009) classic *4 Ps of innovation space* model (p. 26) based on Francis and Bessant (2005). Tidd and Bessant's (1997/2009) compass-like model features four axes: paradigm, product, position, and process. In sum, these two models enable a bridging of design and innovation needed for our purpose. Finally, to ensure optimum domain-relevance, we examined a stakeholder analysis model by the NHS Institute for Innovation and Improvement in England (NN, 2008). The NHS Institute was a special health authority of the National Health Service in England 2006-2013. Although our case concerns animal health, not public health issues, we argue that this model is relevant in this particular context. The NHS nine C analysis model includes nine stakeholders each starting with the letter C:

Commissioners: those that pay the organisation to do things;

Customers: those that acquire and use the organisation's products;

Collaborators: those with whom the organisation works to develop and deliver products;

Contributors: those from whom the organisation acquires content for products;

Channels: those who provide the organisation with a route to a market or customer;

Commentators: those whose opinions of the organisation are heard by customers and others;

Consumers: those who are served by our customers: ie [sic] patients, families, users;

Champions: those who believe in and will actively promote the project;

Competitors: those working in the same area who offer similar or alternative services (op. cit.).

Using *iteration* (Srivastava & Hopwood, 2009), *analytical abduction* (Ryan & Bernard, 2000), and *peer feedback* (Gielen, Peeters, Dochy, Onghena, & Struyven, 2010) in this third coding round, we merged key parts of these three models with the themes that had emerged in the second coding. Our three rounds of coding suggest a *model* that may help improve our analytical understanding of how professional designers working on concrete web design project approach the task of designing explicitly for incremental innovation. We emphasize that our model is not meant to be exhaustive in terms of explanatory adequacy (Chomsky, 1964). Rather, we argue that it serves to offer *descriptive adequacy* and is able to aid more comprehensive studies into designing for incremental innovation.

Analysis

The model consists of *six key findings* that we refer to as components: *client, customer, competitor, catalogue, content,* and *context*. Each of these is presented as a *proposition*, not a hypothesis, as the latter would require measures proper (Whetten, 1989). As it happens, each of the six components may be accurately represented by a noun starting with the letter C, so to facilitate comprehensibility, we simply denote our model *the six C model* of designing for incremental innovation in web design. We see our model's six components as *forces*, which the designers identify, interpret, and negotiate in the design process in order to attain their incrementally innovative objective. Our use of the term *forces* is in accordance with the work on organizational forces (functional, customer, product, and geographic) by Galbraith, Downey, and Kates (2002, p. 274). We define each of the six Cs based on relevant literature, and we analyze the strategies that the designers employ in order to manage them.

Client

The stakeholder that the design team in M1-M5 most consistently referred to as the most critical was, unsurprisingly, the *client*, the parent company, PC, acting on behalf of the subsidiary company, SC. We define client as *the entity who commissions the digital product or service being designed*. This is in accordance with Lawson (2006) and the NHS nine C model (NN, 2008), but is not featured in Tidd and Bessant's (1997/2009) innovation space model since their model targets in-company innovation processes, not (external) clients or designers. In M5, Louise sums up the client's goal: "PC wants its brands—the subsidiary companies—to promote PC more" (M5/3/06, 30), and "PC's hot dream is that all brands are more or less SC. And they have accomplished that with SC, but not with the others" (M5/4/11, 22). This key insight suggests that the design team should keep the SC website design as close to PC's as possible. As Louise puts it, "in reality, the design brief [for SC] is exactly the same" (M5/4/10, 50). Still, Matthew concludes that their work on the new SC website "is not even a redesign, it is starting from scratch" (M3/1/10, 40).

This presents a dilemma. The design team must design a new SC website from the ground up, yet make sure it resembles PC's website. Finley and Francis know this when they use Post-Its™ to map out the client's minimum requirements (M1/4/08,30-11, 50). Indeed, Francis asks: "How little [change] can we get away with?" (M1/1/01, 32). Later, Finley states that one of their ideas "may be too ambitious with regard to what they [SC] actually said they wanted" (M1/8/00, 52). This shows how the team aims to meet the client's requirements, but, more interestingly, how they deliberately *restrain* themselves to only come up with an incrementally innovative website design.

Customer

Informed by the definition offered by the NHS (NN, 2008), we define *customer* as *the entity who acquires and uses the digital product or service being designed*. This mirrors Lawson's (2006) user, and is indirectly featured in *position* in Tidd and Bessant's (1997/2009) innovation space in the form of changes in the context within which a new product is introduced. The two first meetings, M1 and M2, are dedicated to mapping user journeys and stakeholder analysis. This shows the importance of focusing on the customer. Francis and Finley articulate the need for an equilibrium already on the landing page to "target both individual users and more globally [...] journalists" (M1/3/00, 53). This priority is reflected in the wireframe's three main categories—Business, R&D, and Press. Francis and Finley again briefly venture into "more challenging" (M1/8/02, 34) ideas for user groups, e.g., "Your first year with [SC's product]" (ibid.), but they soon dismiss these ideas and instead focus on gaining even more insight into existing customers (M1/8/04, 44) to ensure the site is "in eye level" (M2/5/02, 32) and "something the user can relate to" (M2/5/02, 35).

Francis notes that "on the PC website, we have a classic hero image at the top of the site" (M1/7/10, 24), and Finley later adds: "We need the hero images to be easy to relate to" (M2/5/04, 30), so "when we have farmers in overalls, we should also have scientists and doctors in lab coats" (M2/5/05, 28). In M3, where all team members meet, Louise stresses how veterinarians are a "super important target group" (M3/6/08, 03). Finley remarks that universities are also relevant, and so the team sets the personal and global cases as a "spectrum with subgroups" (M3/7/03, 31) conceived as a matrix (M3/7/04, 56). The team is again tempted to push the limits by opting for significantly more challenging design concepts to reach new users; however, they quickly favor a familiar, safe, and incremental solution built on their prior web design work and existing customer insights.

Competitor

In design and innovation, it is critical to be able to perform better than the competitors (Aghion, Bloom, Blundell, Griffith, & Howitt, 2002; Porter, 1998). We define *competitor* as *the entity who in the same domain offers identical or closely related digital products or services*. Competitors are not featured in Lawson's (2006) model, but are prominent in the NHS nine C model (NN,

2008) and represented under *position* in Tidd and Bessant's (1997/2009) innovation space. In innovation research, it is often stressed how disruptive or radical innovation is necessary to stand out from the competition (Markides, 2006, p. 22). In this web design study, all six design team members are keenly aware of this. In fact, M4 on SC's positioning is dedicated exclusively to this topic.

From the outset, Finley and Francis express how "we must not accommodate competitors" (M1/2/00, 52), and that they "should include something about a 'noticeable difference' when using SC's products" (M2/4/05, 24) in order to "'fight back claims made by competitors" (M2/3/02, 08). Louise remarks that this difference could be the case stories (M3/3/04, 43). Based on his mapping of SC's competitors, Ryan asserts that SC should focus on being more "lean forward" in the website communication and show how SC is "a Mac" and the competition "a [Windows] Personal Computer" (M5/1/02, 30). SC should be "right, engaging, and different—those are the three criteria," as Matthew puts it (M5/1/09, 03). This suggests a more radical approach to the positioning of SC. Even so, it is interesting to note how Louise instantly punctures such strategic aspirations by stressing how positioning SC against the competitors "must be in keeping with the web design, user journeys, wireframe, and so on" (M5/1/10, 22); all of which are incremental in scope. Matthew concludes that they will "keep the message bloody simple" (M5/1/11, 10). This quote shows how even positioning SC against global competitors is purposely kept incremental in order to match the rest of the proposed design concept.

Catalogue

While the first three C's—client, customer, and competitor—are predictable findings in light of the literature, we did not expect to see just how much attention the team gave to the fourth C, *catalogue*. We define catalogue as *the previous or current product version(s) or very closely related products or services by the designer(s) that alone or in sum make(s) up the constraining frame of reference for the new digital product or service being designed*. This aspect is not described in the NHS stakeholder analysis map for health innovation (NN, 2008), nor does it appear in Lawson's (2006) analytical, cube model of salient features of design problems. One could argue that catalogue is slightly related to Schön's (1983) idea of a *repertoire*, and that it is included, very indirectly, in Tidd and Bessant's (1997/2009) innovation space model under *product*. On the other hand, their model does not explicitly address to what extent—let alone how—new, innovative product introductions either rely on or differ from specific existing products or services offered by the same company. We consider this absence particularly interesting given the prevalence of this textbook innovation space model, and it further points to the scarcity of in-depth, in-vivo studies on incremental innovation as a special type of very familiar professional design practice. Although we did expect some reference to previous web design work by the design team—an innovation process never begins completely from scratch—we had not anticipated just how often

and how systematically the design team would refer to detailed features of former web design projects in order to *revisit*, *reselect*, and *reintroduce* them into the current project on the design of the SC website. What separates catalogue from competitor in this regard is that in the former, designers are not competing against anyone (except, perhaps, themselves), but reviewing and adding to their portfolio based on their own previous work.

Since the design agency had previously designed a completely new website for PC, including a new CVI (corporate visual identity), we did expect some reference to this project. Establishing SC's role in relation to PC was "a balancing act" (M1/2/03, 45), as Finley puts it. This metaphor reoccurs when Finley, esoterically, says that he and Francis should do some "slip-boarding [sic] so that it [the SC website] doesn't look 100 percent like PC" (M1/3/08, 35). This presents the team not only with a 'same, but *better*' dilemma in terms of improvement, but also with a 'same, but *different*' dilemma: To what extent should the new design proposal for the SC website adhere to or deviate from the PC website? The pull toward adherence is strong. This is illustrated by Finley and Francis browsing the PC website for references and inspiration (M1/9/06, 15), and by several comments, e.g., "Great, it [the SC wireframe] starts to look like the structure we had on PC" (M1/3/05, 14). Louise concludes that the SC brief is exactly the same as the one they did for PC (M5/4/10, 50). This adherence is mirrored in the concept, e.g., that "it is a strategic exercise like at PC.com" (M3/1/04, 51), and that the team, using their experience from the PC project, should be *"flexing their design muscles a bit"* (M3/4/02, 13) and thereby create "a 'comfort zone' using commonplaces" (M3/3/00, 46). But this close adherence causes confusion, e.g., when Finley and Francis struggle to figure out which products belong to SC and PC, respectively, (M2/2/00, 00-02, 30). To establish the basic dissimilarity between the SC and PC websites, they test ideas "so that the SC website would look different from the PC website" (M1/7/10, 30). Reaching an incrementally innovative design concept to resolve this *same, but different* dilemma by revisiting one's own prior, closely related products and points of reference is a critical and demanding task. This is even more pronounced in the next C, Content.

Content

We define content simply as the elements (affordances, components, user interface, etc.) that in sum constitute the digital product or service being designed. This is what makes a product or service what it is, so insight into this will depend on the design domain. Since the NHS map (NN, 2008) is meant for stakeholder, not product, analysis, content is not included. It is only indirectly featured in Lawson's (2006) model since what a design solution should contain—the content—is necessarily the center of any design problem. Also, content is captured by Tidd and Bessant's (1997/2009) innovation space model under *product* insofar as the content defines what a given product offers its users.

Since the design team has been commissioned to design a new corporate website for SC, web design usability in the vein of Nielsen (1999) is unsurprisingly a priority from the outset in

M1 and M2. In M1, Francis and Finley begin by conducting a heuristic analysis focusing on user experience and user journeys. To obtain a common starting point, Francis asks: "Why do we need a corporate website for the SC, and what types of content should we include?" (M1/2/01, 03). It is clear that they struggle with the "balancing act" (M1/2/03, 45) of the *same, but different* dilemma between the current PC and new SC website. Francis openly admits that "we are somewhat fumbling in the dark here" (M1/2/05, 46). Later, they refer to the draft wireframe on the whiteboard as "the 'heavy place of birth'" (M1/5/03, 50). Their approach means including "the basic stuff" (M1/2/06, 38) guided by PC's "hero style with a focus on a person in a context" (M1/2/10, 20), and they proceed to map the client's requirements, including "that […] counter that shows the number of animals treated" (M1/4/07, 37). Francis and Finley explore more original ideas, but instantly scrap them. Hand-drawn typography (M1/6/06, 10) is "too much" (M1/6/07, 10), and a static image above a tiles gallery (M1/7/10, 24) is considered "too sophisticated" and "too ambitious" (M1/8/00, 52).

This presents them with a complex design problem. Both designers agree that "content is king" (M2/6/02, 03), but as Finley states, "my concern will be that we really have to kick content in the ass [sic] [i.e., make it significantly different] for it to be good." This is hard when they must include content from several country-specific sites (M2/1/00, 00-11, 50), but have very few guidelines from the client (M3/3/10, 32). To resolve the situation, Matthew, as executive director, decides that three types of content should carry the corporate site—diverse articles, static technical pages, and engaging cases (M3/3/02, 31). This evaluation resonates with Finley's assessment of the website as "content-driven" (M2/6/03, 25). Matthew's decision briefly resolves the team's design dilemma, but it returns when they must choose the visual style of the SC website.

Amy's presentation of her draft visual design leaves Finley frustrated because the SC colors are identical to the ones on PC's website (M5/3/05, 11). Then something unexpected happens— the video conference call to Amy and Matthew is disconnected, which leaves Louise and Finley alone to talk among themselves. Here, Finley utters his doubt—he considers the choice of the SC colors "a reuse from PC" (M4/4/09, 55) and thus "confusing" (M4/4/11, 08) with regard to distinguishing between SC and PC. Louise acknowledges Finley's wish for a clear move away from PC's color scheme, but stresses that "it is a requirement that these are the colors we should use. Completely" (M5/4/10, 50). When the video conference connection is re-established, Louise elaborates her point, praising Amy for having "struck a super cool balance, so that it [the SC website mock-up] is not PC.com, but there are still so many parallels to PC.com, and I think it works really, really well" (M5/5/03, 50). What this analysis shows is not that content is a critical part of any design process focusing on achieving innovation; this is self-evident. Rather, the analysis reveals just how tightly coupled *content* and *catalogue* are in incremental innovation; in fact, so much so that content should be seen through the very lens of catalogue conceived as one's own closely related prior designs.

Context

The final component in our six C model is context. We define context as the sum of exogenous factors relevant to the design brief that make up the constraining frame of reference for the new digital product or service being designed. This means all pertinent factors beyond the above five. This aspect is partly included in Lawson's (2006) model as legislators are among the stakeholders who determine the nature of a design problem. Also, it is contained in Tidd and Bessant's (1997/2009) innovation space model under *position*, but again only indirectly, as their model does not address designers on a commissioned design brief, but a company that through its internal R&D department introduces a new product or service to the market with no external design team as a separate stakeholder and complicating factor. Context appears in the NHS map (NN, 2008), but is stretched across several central areas—collaborators, contributors, channels, commentators, and champions—which for our purpose is both overly complex and without a clear link to the actual design brief.

Our analysis of the present study suggests that the relevance of context is manifest in two ways. The first one concerns *uncertainty*. This is arguably clearest in the production of website content. Francis notes that it is "an important discussion, how much content SC wants to contribute to the website" (M2/3/03, 50) since the website is "content-driven" (M2/6/03, 25). Finley believes that the person who did the PC website content will also be doing content for the SC website "so it really isn't a problem" (M1/7/03, 40). Still, in M3, Louise and Matthew as the two seniors with the best (limited) knowledge of PC's strategic plans, are not aware of this being decided at this stage (M3/3/07, 50-09, 45). This lacuna in combination with a lack of content and their client's apparently very concrete way of thinking complicate the website design (M3/3/10, 32). Therefore, Matthew and Louise decide on a very basic wireframe user interface design that closely resembles the one on PC (M3/1/04, 51).

The other example of context relevance is the team's *interpretation* of PC's overall strategy. What complicates matters particularly is the fact that, as Louise says, "there are two super strong marketing people sitting locally [at SC], and they just take the concept and run because they don't get any guidance from the central office—yet" (M5/5/07, 40). The team knows the SC website "has to have some PC in it" (M5/5/03, 50), "even just an PC logo" (M5/3/07, 32), but how much and exactly what is not stated in the design brief. The choice of a strict PC color scheme for the SC website renders Finley frustrated and leads him to suggest "one big CVI [corporate visual identity]" for PC and all their subsidiary companies (M5/4/11, 41); a suggestion Louise applauds. Although PC has not stated it, Louise believes that this PC-centered design uniformity where the SC website is a "branding platform" (M5/2/00, 45) "is the direction PC is taking […] and we deliver on that 100 percent" (M5/5/05, 28). She asserts that as a team, "we must present this as a conceptual design" (M5/5/08, 41). Given that the team will have their first design presentation meeting with the client just two days later, Louise, as senior project manager, deliberately chooses a design strategy that is neither radical nor jeopardous, but safe and evidently incremental. This shows that the team's lack of knowledge into PC's overall strategy, including choice of collaborators and expectations for the commissioned design, leads the team to interpret the design brief very conservatively and opt for the safe solution—incremental innovation.

Discussion

Figure 4 below conveys an overview of the six Cs that our three rounds of coding and analysis have revealed. In combination, they comprise *the six C model* of designing for incremental innovation in web design. The model shows the six Cs as critical *forces* that designers through reflective actions and approaches must *identify*, *interpret*, and *negotiate* to purposely delimit radical innovation.
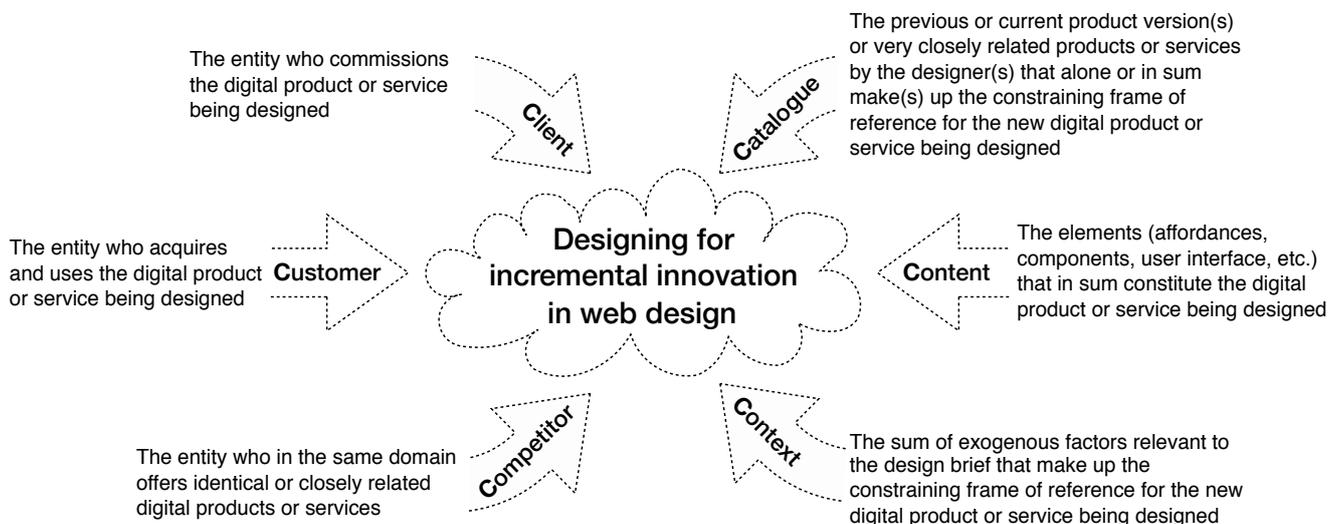

Figure 4. The six C model of principal forces in designing for incremental innovation in web design.

Applying the Six C Model

We consider our six C model a *theoretical contribution* to improve understanding of the prevalent, but surprisingly rarely examined practice of designing explicitly for incremental innovation, here exemplified by a case study from web design. Concretely, we see the six C model as an *analytical tool* not only for studying incremental innovation in digital design and web design through in-vivo observation of a design process as presented here, but also for implementation in concrete practices in this particular design domain and potentially beyond.

Implications for Design Research: Studying Design Dilemmas and Dependencies

In order to examine salient *processual* aspects of incremental design, the strategy we propose for using the six C model means studying the particular actions and approaches that designers employ for the purpose of *identifying*, *interpreting*, and *negotiating* the model's six components. In the case study reported here, this strategy of analysis has enabled us to articulate not only the *design dependencies* between the different forces that influence the design space, but also the *design dilemmas* that are intrinsic to or arise from the design process. The key questions when designing explicitly for incremental innovation is therefore not "how much can we get away with?" or "how bold are we allowed to be?" Such admirable aspirations of pioneering design work are hallmarks of radical innovation. Rather, as Francis succinctly asks in the beginning of the design process: "*How little [change] can we get away with?*" (M1/1/01, 32).

As an analytical tool for design researchers to help pry open some of the complexity of design processes of incremental innovation, here exemplified by web design, our six C model provides an alternative to current models. Compared to Tidd and Bessant's (1997/2009) four P model that maps out the innovation space of a given company or organization, our model's six components articulate the *concrete forces* that directly affect designers' work practices. This difference in analytical aim and scope is to be expected as our model has emerged from a highly focused study of professional design practice exemplified by a single design project. It lies beyond the extent of this paper to carry out a combined analysis using both these analytical models. Still, we see potential in applying both models to understand the larger innovation space in which a design project is placed, as well as the specific activities that designers engage in to better comprehend and maneuver in this space. The two models offer complementary perspectives on the principal structures and forces affecting the opportunities and constraints for incremental innovation in a design project.

Compared to the NHS nine C stakeholder model (NN, 2008), our model differs in two main regards. First, in our case study, we have identified *fewer stakeholders* exerting strong influence on the design process. Future studies of related incremental innovation design projects might indicate additional stakeholders whom designers address in an incremental innovation design process. Although designing a new subsidiary company website

may seem rather trivial (not least considering the design agency's strong reputation and portfolio of clients), the case presented here is complex in terms of stakeholders. Not only is the field of animal healthcare solutions characterized by many medical and ethical concerns and requirements, the group of stakeholders is also diverse, ranging from poultry breeders, researchers, and industry professionals to animal welfare organizations and end consumers—and to the top-level decision-makers at the parent company. Our six C model thus *extends beyond stakeholder mapping* by discerning some of the additional critical, interdependent forces that designers must consider in the process. Second, and maybe most importantly, our model accentuates a *distinctly processual perspective* on incremental innovation processes within a given design domain. The six components and the designers' perception of them are rarely, if ever, stable and immutable throughout any design project. Rather, the designers continuously work to *identify*, *interpret*, and *negotiate* each of these six components and their interrelations throughout the design process in order to achieve their incrementally innovative design objective. As designers respond to one force, this will directly influence the relations to the other forces. This means that a big part of this type of *same, but better* design work consists of reflectively managing the numerous intricate design dependencies between the model's six components, and finding fruitful ways to understand and address the design dilemmas that these interdependencies give rise to.

Implications for Design Practice: Navigating Design Processes of Incremental Innovation

In addition to this analytical research perspective, we argue that the six C model may be used as a *compass-like tool* in the vein of Beckman and Barry's (2007) design process model. Our six C model equips professional designers with a new implement to better navigate complex, digital design processes where breakthrough, disruption, and originality are not desired, i.e., design situations where these usually much-coveted design qualities from radical innovation should ideally be avoided. More specifically, the model can support designers' awareness of how the discerned six critical forces affect incremental innovation when generating and evaluating design ideas. As an example, a designer may browse his/her *catalogue* in order to identify the sources of inspiration that most clearly stand out compared to the *competitors'* offerings while also taking into account some of the constraints imposed by the *client*. Similarly, a meticulous survey of a given *customer* community may help identify ways to make minimal changes in the *content* of an exisiting website (or another digital service or product), so that *customers* still perceive the website as new and refreshed, yet still clearly associated with the company and what is desired as a positive user experience.

Although it is beyond the scope of the paper to present a specific method for application of the six C model, we argue that designers can use the model to impose on themselves *creative self-restraint* so that the final design meets the incremental innovation requirement of being a *same, but better* product. By seeing the model's six forces as crucial points to pay attention to in the creative design process, designers can clearly position

themselves and their shared vision for the final design along the six Cs conceived as axes. As an example, designers can innovate on the *content* of a given website by itemizing some of its main elements, e.g., fonts, color scheme, icons, logos, informational footer, button and menu styles, images, videos, etc., and for each of these discuss "how little change they can get away with," to paraphrase Francis (M1/1/01, 32), as seen in direct relation to the model's other five forces. Another example of application could be renewing exisiting 2D objects as 3D based on a designer's *catalogue* where striking an optimal balance between novelty and familiarity (Hekkert et al., 2003) in the visual appearance is paramount. As with any model of a complex phenomenon such as designing for incremental innovation, each of the six Cs will eventually be further refined when introducing the model into professional design practice and when applying it to a greater variety of design cases. This leads us to speculate that even more components may emerge. As an immediate next step, exploring and improving (or adding to) the model's component *catalogue* in the light of Schön's (1983) work on *repertoire* seems promising for more practice-based studies.

Radical and Incremental Innovation as a Continuum

Our study suggests that radical and incremental innovation are not mutually exclusive. Instead, they should be considered two poles on an *innovation continuum* as proposed by Garcia and Calantone (2002) in their comprehensive meta-review of typologies and terminologies in innovation research.[3] By taking a different, more narrowly focused process-analytical approach, our study shows how the designers for each of the six components operate along and reflect upon such a continuum when addressing the emergent or inherent design dilemmas, e.g., when they contemplate whether to use hand-drawn typography (M1/6/06, 10) for the *content* component—and immediately scrap that idea because they deem it too sophisticated (M1/8/00, 52). Similarly, the designers strive to ensure that the SC website be designed in eye level with the *customer*. They discuss how much they should challenge and/or cater for this heterogenous user group in their curation of visual and text material for the SC landing page (M1/3/00, 53). As for the *competition* component, the designers (especially Ryan) meticulously identify and analyze the main competitors' websites to ensure a clear difference while being mindful of the goal of supporting quite conventional user journeys. One of the design dilemmas encountered with respect to the *client* component concerns the requirement of designing a brand-new website for the SC while ensuring that the SC website resembles the PC website. This design dilemma illustrates the aforementioned *interdependencies* between all six components. This becomes evident when the designers discuss the visual style and color scheme of the SC website in M5. Here, Finley and Laura's views clearly diverge. Finley finds that reusing PC website colors on the SC website is *confusing* (M4/4/11, 08), while Louise insists that it *works really, really well* (M5/5/03, 50).

This particular example points to the importance of one of the study's perhaps most interesting findings, the importance of being acutely aware of one's own (or the design agency's)

catalogue, when designing explicitly for incremental innovation. This means systematically considering one's own *previous* work and to what extent and how one's engagement with an *ongoing* design task as a *same, but different* digital product or service may differ from the former. One way to construe this retrospective practice is by looking at the role of sources of inspiration. In design, utilizing sources of inspiration instrumentally is closely related to the emergence of a design concept (Halskov & Dalsgaard, 2007) as sources of inspiration may benefit the creativity of the outcome (Bonnardel & Marmèche, 2004; Gonçalves, Cardoso, & Badke-Schaub, 2014). How well- or ill-defined a design task is will directly affect the strategy of searching for inspiration (Biskjaer et al., 2019). This makes it relevant to consider the strategies adopted by the designers when they browse their idea archives (Inie, Endo, Dow, & Dalsgaard, 2018). What makes the catalogue component especially interesting for incremental innovation is *how* the designers meticulously *revisit*, *reselect*, and *reintroduce* key components from previous projects. Although research has shown that "conceptually closer rather than farther sources [of inspiration] appear more beneficial [for creativity]" (Chan, Dow, & Schunn, 2015, p. 31), it is striking how *close to home* the designers in the present study stay when looking for inspiration. This is clear when Finley and Francis look for references and inspiration on the PC website (M1/9/06, 15). Their conservative selections lead to the positive team affirmation, "Great, it [the SC wireframe] starts to look like the structure we had on PC" (M1/3/05, 14). We stress that we do not wish to undervalue the relevance of sustaining a catalogue, e.g., as an idea archive, for radical innovation projects in design. We do note, however, that we have not found any studies to suggest that a designer's catalogue should be as critically important for a radical innovation-oriented design project as what we have observed in the present study. This leads us to conclude that the catalogue component of our six C model is especially salient and should be investigated in even more depth. Indeed, we speculate that the practice of revisiting, reselecting, and reintroducing key components from previous design projects in order to constrain originality and novelty in an ongoing design project may beneficially be conceived as a form of (conservative) combinational creativity (see e.g., Costello & Keane, 2000).

Limitations

We are fully aware that presenting an alliterative initialism such as six Cs may seem forced or even contrived. Even so, we argue that the nomenclature and the model's six components is both accurate and in accordance with other models related to innovation as a creative process, e.g., Rhodes' (1961) seminal four Ps of creativity model (process, person, product, and press), Tidd and Bessant's (1997/2009) four P innovation space model (paradigm, process, product, and position), the four C model of creativity (little-c, mini-c, Pro-c, and Big-C) (Kaufman & Beghetto, 2009), and the five A framework of creativity (actor, action, artifact, audience, and affordances) (Glăveanu, 2013), to name but a few. Admittedly, *catalogue* may also be called *back catalogue*,

backlist, or *archive*, but, we argue that reader-friendliness is better served by opting for a C-word, hence *catalogue*. Similarly, we did consider other forces such as budgets, deadlines, legal requirements, partners, new technology, and even team cognition as additional forces that would have a bearing on a web design process meant to deliver incremetal innovation. However, the six Cs are representative of the core themes that emerged through the three rounds of qualitative coding. Therefore, we chose to formulate our model's six components in a simple, yet capacious manner to ease communication and operationalizability, and to achieve descriptive adequacy.

As the related work section has revealed, most studies on incremental and radical innovation originate from research within industrial and product design. For the present study, we have chosen a rather neglected design domain in this regard— web design—in order to help fill a knowledge gap, which we as researchers and educators in digital design have often observed. Consequently, we do not claim that our six C model should be immediately generalizable to other design domains. Rather, our work is a highly focused study of a single case in a single design domain, which also happens to be relevant as a burgeoning business sector. We do not wish to conjecture to what extent our model may be directly applicable to industrial and product design or, if so, where its shortcomings would presumably be. Embarking on such assertions would require application of our model to more cases, ideally supplemented by quantitative analysis. Instead, we consider this a promising next step for future work. Similarly, it would be interesting to also examine how well the six C model would fit when applied to a design process (in web design or another design domain) aiming at radical innovation. The challenge here is, however, that such radicality as financial and/or meaning-change impact (Norman & Verganti, 2014) can only be assessed post-hoc, i.e., once the design process is concluded and the product or service has been introduced in the market place. Given the statistically minuscule chance of success for any radical innovation project (Balachandra & Friar, 1997), this would essentially mean that a research team should follow a significant number of design projects in order to, eventually, 'hit the jackpot' with a given study. Such unpredictability in the research design itself is not the case with incremental innovation since the chance of (modest) success is far greater because the new product or service being designed often directly builds upon or is closely inspired by an existing design offering. This was exactly the case with the present design project.

Conclusion and Future Work

Our case study of a leading European digital design agency's design of a subsidiary company website has aimed to improve current understanding of the practice of designing explicitly for incremental innovation. The analysis based on three rounds of coding has resulted in a model of this paper's main contribution— *the six C model of designing for incremental innovation in web design.* The model has six interrelated components, *client, customer, competitor, catalogue, content,* and *contex*t, and offers a distinct analytical lens on design processes by focusing on the key *critical forces* that designers must be aware of and address in order to *delimit their design space* and *range of innovation.* Our analysis has revealed that these six components are not static entities, but strong, dynamic forces in the design process, and that designers continuously *identify*, *interpret*, and *negotiate* these components. In particular, we have observed how designers work to understand and manage design *dependencies* between the six components as well as the complex design *dilemmas* that this kind of design process entails.

The model has emerged from a specific case study from web design, but is grounded in related literature from various design disciplines, especially industrial and product design. As our literature review has shown, design and innovation research has yet to study in even more depth the well-known, but unheeded, practice of designing explicitly for incremental innovation. Our six C model is relevant by addressing a particular type of design task that is highly prevalent in professional design practice, i.e., the creative process of coming up with a *same, butter better* design of an existing product, and is posed in an equally common professional context—a design agency hired by a familiar client to undertake a pre-defined design task (that in reality, however, is not always so clearly defined).

We see at least two avenues for future work on studying designing for incremental innovation as a design objective in itself. The first is to undertake additional studies using the six C model to help *identify potential patterns* in the design process in terms of the dynamic composition of the components, the strategies designers use to address them, and the relative success or failure of specific design decisions and strategies. Such studies should venture beyond the domain of digital design and web design and also explore industrial design and product design. We envision that identifying such salient patterns may lead to concrete recommendations and insights into best practices as a resource for new design projects of special relevance to professional designers. The second is to *operationalize the six C model* even more so that it can play a pro-active and productive role in a given design project. We speculate that the six C model could be further developed to serve as an instructive tool for discussion in the matching of expectations between design team and client. Based on our experience as design educators, we surmise that yet another promising development of the six C model would be to offer design students and less experienced professional designers (regardless of domain) a thematic *map* to give them some conceptual scaffolding in complex incremental innovation design projects, which are widespread in practice, but overshadowed by the much less frequent, yet much more celebrated, radical innovation design projects.

Acknowledgments

Endnotes

1. Based on a comment on his blog by biology professor Alistair J. Cullum, Fleishman has later suggested that the term *gradualism* might be more accurate than *punctuated equilibrium.*

2. See Heskett (2002): "design, stripped to its essence, can be defined as the human capacity to shape and make our environment in ways without precedent in nature, to serve our needs and give meaning to our lives" (p. 7).

3. This notion has been further developed with regard to incremental and radical ideas based on paradigm-relatedness metrics for investigating creativity and diversity in ideation (Silk, Daly, Jablokow, & McKilligan, 2019).

References

1. Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2002, October). *Competition and innovation: An inverted-U relationship* (Working Paper, No. 9269). Cambridge, MA: National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w9269

2. Archer, B. (1979). Design as a discipline: Whatever became of design methodology? *Design Studies, 1*(1), 17-20.

3. Arrighi, P., Le Masson, P., & Weil, B. (2015). Managing radical innovation as an innovative design process: Generative constraints and cumulative sets of rules. *Creativity and Innovation Management, 24*(3), 373-390.

4. Askland, H. H., Ostwald, M., & Williams, A. (2010). Changing conceptualisations of creativity in design. In *Proceedings of the 1st Conference on Creativity and Innovation in Design* (pp. 4-11). New York, NY: ACM.

5. Balachandra, R., & Friar, J. H. (1997). Factors for success in R&D projects and new product innovation: A contextual framework. *IEEE Transactions on Engineering Management, 44*(3), 276-287.

6. Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision, 47*(8), 1323-1339.

7. Beckman, S. L., & Barry, M. (2007). Innovation as a learning process: Embedding design thinking. *California Management Review, 50*(1), 25-56.

8. Biskjaer, M. M., Dalsgaard, P., & Halskov, K. (2014). A constraint-based understanding of design spaces. In *Proceedings of the Conference on Designing Interactive Systems* (pp. 453-462). New York, NY: ACM.

9. Biskjaer, M. M., Christensen, B. T., Friis-Olivarius, M., Abildgaard, S. J. J., Lundqvist, C., & Halskov, K. (2019). How task constraints affect inspiration search strategies. *International Journal of Technology and Design Education.* https://doi-org.dianus.libr.tue.nl/10.1007/s10798-019-09496-7

10. Bonnardel, N., & Marmèche, E. (2004). Evocation processes by novice and expert designers: Towards stimulating analogical thinking. *Creativity and Innovation Management, 13*(3), 176-186.

11. Buchanan, R. (2001). Design research and the new learning. *Design Issues, 17*(4), 3-23.

12. Chan, J., Dow, S. P., & Schunn, C. D. (2015). Do the best design ideas (really) come from conceptually distant sources of inspiration? *Design Studies, 36,* 31-58.

13. Chomsky, N. (1964). *Current issues in linguistic theory.* The Hague, the Netherlands: Mouton.

14. Christensen, C. M. (1997). *The innovator's dilemma: When new technologies cause great firms to fail.* Cambridge, MA: Harvard Business School Press.

15. Costello, F. J., & Keane, M. T. (2000). Efficient creativity: Constraint-guided conceptual combination. *Cognitive Science, 24*(2), 299-349.

16. Dahlin, K. B., & Behrens, D. M. (2005). When is an invention really radical? *Research Policy, 34*(5), 717-737.

17. Denzin, N. K. (2002). The interpretive process. In A. M. Huberman & M. B. Miles (Eds.), *The qualitative researcher's companion* (pp. 349-66). Thousand Oaks, CA: Sage.

18. Dewar, R. D., & Dutton, J. E. (1986). The adoption of radical and incremental innovations: An empirical analysis. *Management Science, 32(*11), 1422-1433.

19. Dorst, K. (1997). *Describing design–A comparison of paradigms* (Doctoral dissertation). Delft University of Technology, Delft, the Netherlands.

20. Fleishman, G. (2013, September 14). *Explaining Apple's incremental approach. Online blog: Glenn Fleishman writes words about things* [Web log post]. Retrieved from http://glog.glennf.com/blog/2013/9/14/explaining-apples-incremental-approach

21. Francis, D., & Bessant, J. (2005). Targeting innovation and implications for capability development. *Technovation, 25*(3), 171-183.

22. Fullager, P. (2015). Incremental vs. radical: What's the future of product innovation? *Design council UK online feature.* Retrieved October 22, 2015, from http://www.designcouncil.org.uk/news-opinion/incremental-vs-radical-what-s-future-product-innovation

23. Galbraith, J. R., Downey, D., & Kates, A. (2002). *Designing dynamic organizations: A hands-on guide for leaders at all levels.* New York, NY: Amacom.

24. Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: A literature review. *Journal of Product Innovation Management, 19,* 110-132.

25. Gielen, S., Peeters, E., Dochy, F., Onghena, P., & Struyven, K. (2010). Improving the effectiveness of peer feedback for learning. *Learning and Instruction, 20*(4), 304-315.

26. Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory.* London, UK: Weidenfeld & Nicholson.

27. Glăveanu, V. P. (2013). Rewriting the language of creativity: The five A's framework. *Review of General Psychology, 17*(1), 69-81.

28. Gobeli, D. H., & Brown, D. J. (1987). Analyzing product innovations. *Research Management, 30*(4), 25-31.

29. Gonçalves, M., Cardoso, C., & Badke-Schaub, P. (2014). What inspires designers? Preferences on inspirational approaches during idea generation. *Design Studies, 35*(1), 29-53.

30. Goodell, J. (1994). Looking for the next revolution. *Rolling Stone Magazine, 1994*(684), 73-79.

31. Halskov, K., & Dalsgaard, P. (2007). The emergence of ideas: The interplay between sources of inspiration and emerging design concepts. *CoDesign, 3*(4), 185-211.

32. Harrison, S., Back, M., & Tatar, D. (2006). It's just a method! A pedagogical experiment in interdisciplinary design. In *Proceedings of the Conference on Designing Interactive Systems* (pp. 261-270). New York, NY: ACM.

33. Hekkert, P., Snelders, D., & van Wieringen, P. C. (2003). 'Most advanced, yet acceptable': Typicality and novelty as joint predictors of aesthetic preference in industrial design. *British Journal of Psychology, 94*(1), 111-124.

34. Heskett, J. (2002). *Toothpicks & logos: Design in everyday life.* Oxford, UK: Oxford University Press.

35. Inie, N., Endo, A., Dow, S., & Dalsgaard, P. (2018). The problem solver and the artisan designer: Strategies for utilizing design idea archives. In *Proceedings of the 10th Nordic Conference on Human-Computer Interaction* (pp. 397-406). New Work, NY: ACM.

36. Kaufman, J. C., & Beghetto, R. A. (2009). Beyond big and little: The four c model of creativity. *Review of General Psychology, 13*(1), 1-12.

37. Kleinschmidt, E. J., & Cooper, R. G. (1991). The impact of product innovativeness on performance. *Journal of Product Innovation Management, 8*(4), 240-251.

38. Kleinsmann, M., Valkenburg, R., & Sluijs, J. (2017). Capturing the value of design thinking in different innovation practices. *International Journal of Design, 11*(2), 25-40.

39. Kolko, J. (2007). The tenuous relationship between design and innovation. *Artifact, 1*(3), 198-203.

40. Kyffin, S., & Gardien, P. (2009). Navigating the innovation matrix: An approach to design-led innovation. *International Journal of Design, 3*(1), 57-69.

41. Lawson, B. (2006). *How designers think: The design process demystified.* (4th ed.). Burlington, MA: Elsevier.

42. Leech, N. L., & Onwuegbuzie, A. J. (2008). Qualitative data analysis: A compendium of techniques and a framework for selection for school psychology research and beyond. *School Psychology Quarterly, 23*(4), 587-604.

43. Markides, C. (2006). Disruptive innovation: In need of better theory. *Journal of Product Innovation Management, 23*(1), 19-25.

44. Marquis, D. G. (1969). The anatomy of successful innovations. *Innovation, 1*(7), 28-37.

45. Mamykina, L., Candy, L., & Edmonds, E. (2002). Collaborative creativity. *Communications of the ACM, 45*(10), 96-99.

46. McDonnell, J., & Lloyd, P. (2009). *About: Designing - Analysing design meetings.* Boca Raton, FL: CRC Press.

47. Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Thousand Oaks, CA: Sage.

48. Mortati, M. (2015). A framework for design innovation: Present and future discussions. *Design Issues, 31*(4), 4-16.

49. Motte, D., Yannou, B., & Bjärnemo, R. (2011). The specificities of radical innovation. In *Proceedings of the International Conference on Research into Design* (pp. 79-86). Bangalore, India: Research Publishing, Indian Institute of Science.

50. Na, J. H., Choi, Y., & Harrison, D. (2017). The design innovation spectrum: An overview of design influences on innovation for manufacturing companies. *International Journal of Design, 11*(2), 13-24.

51. Nelson, H. G., & Stolterman, E. (2012). *The design way: Intentional change in an unpredictable world* (2nd ed.). Cambridge, MA: MIT.

52. Nielsen, J. (1999). *Designing web usability: The practice of simplicity.* Thousand Oaks, CA: New Riders.

53. NN (2008). Stakeholder analysis (general). *National health service (NHS) institute for innovation and improvement - Quality improvement tools* [Web page]. Retrieved from http://www.institute.nhs.uk/quality_and_service_improvement_tools/quality_and_service_improvement_tools/stakeholder_analysis.html

54. Norman, D. A., & Verganti, R. (2014). Incremental and radical innovation: Design research vs. technology and meaning change. *Design Issues, 30*(1), 78-96.

55. Olson, G. M., Olson, J. S., Carter, M. R., & Storrøsten, M. (2009). Small group design meetings: An analysis of collaboration. *Human-Computer Interaction, 7*(4), 347-374.

56. Porter, M. E. (1998). *Competitive strategy: Techniques for analyzing industries and competitors* (2nd ed.). New York, NY: Free Press.

57. Ralph, P., & Wand, Y. (2009). A proposal for a formal definition of the design concept. In K. Lyytinen, P. Loucopoulos, J. Mylopoulos, & B. Robinson (Eds.), *Design requirements engineering: A ten-year perspective* (pp. 103-36). Berlin, Germany: Springer.

58. Rampino, L. (2011). The innovation pyramid: A categorization of the innovation phenomenon in the product-design field. *International Journal of Design, 5*(1), 3-16.

59. Rhodes, M. (1961). An analysis of creativity. *The Phi Delta Kappan, 42*(7), 305-310.

60. Rindova, V. P., & Petkova, A. P. (2007). When is a new thing a good thing? Technological change, product form design, and perceptions of value for product innovations. *Organization Science, 18*(2), 217-232.

61. Ryan, G. W., & Bernard, H. R. (2000). Data management and analysis methods. In N. Densin & Y. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed.) (pp. 769-802). Thousand Oaks, CA: Sage.

62. Saldaña, J. (2015). *The coding manual for qualitative researchers* (3rd ed.). Thousand Oaks, CA: Sage.

63. Schön, D. A. (1983). *The reflective practitioner.* New York, NY: Basic Books.

64. Schön, D. A. (1992). Designing as reflective conversation with the materials of a design situation. *Knowledge-Based Systems, 5*(1), 3-14.

65. Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle.* Cambridge, MA: Harvard University Press.

66. Silk, E. M., Daly, S. R., Jablokow, K. W., & McKilligan, S. (2019). Incremental to radical ideas: Paradigm-relatedness metrics for investigating ideation creativity and diversity. *International Journal of Design Creativity and Innovation, 7*(1-2), 30-49.

67. Simon, H. A. (1973). The structure of ill structured problems. *Artificial Intelligence, 4*(3-4), 181-201.

68. Spradley, J. P. (2016). *Participant observation.* Long Grove, IL: Waveland Press. (Original work published 1980)

69. Srivastava, P., & Hopwood, N. (2009). A practical iterative framework for qualitative data analysis. *International Journal of Qualitative Methods, 8*(1), 76-84.

70. Tidd, J., & Bessant, J. (2009). *Managing innovation: Integrating technological, market and organizational change* (4th ed.). Hoboken, NJ: John Wiley & Sons.

71. Ulrich, K., & Eppinger, S. D. (2016). *Product design and development* (6th ed.). New York, NY: McGraw-Hill.

72. van der Panne, G., Van Beers, C., & Kleinknecht, A. (2003). Success and failure of innovation: A literature review. *International Journal of Innovation Management, 7*(3), 309-338.

73. Whetten, D. A. (1989). What constitutes a theoretical contribution? *Academy of Management Review, 14*(4), 490-495.

74. Zaltman, G., Duncan, R., & Holbek, J. (1973). *Innovations and organizations.* New York, NY: John Wiley & Sons.