UNIVERSITY OF HULL

A multi-dimensional framework of interactive value formation within complex, prolonged and technology-based self-services

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Dedication

To my parents, wife, and son and other family members

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Declaration

No portion of the work referred to in this thesis has been submitted in support of an application for any other degree or qualification from this, or any other, University or institute of learning. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person with the exception of where due reference is made.

Publications and Conferences

A submission titled "The Inseparability of Value Co-creation and Co-destruction: Two sides of operant resources" has been accepted for competitive paper presentation at the 2020 AMA Winter Academic Conference in February, 2020.

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Abstract

Firms attempt to co-create superior perceived value and/or avoid value co-destruction. There is, however, no guarantee of success especially within the consumption of complex, prolonged and technology-based self-services. In such services, the process of value co-creation and co-destruction may operate simultaneously to generate a multitude of tensions in each direction. As such, a multitude of interacting factors may be at play during this interactive value formation (IVF) process. Adopting a grounded theory approach and in-depth interviews of users of such services, the author investigates for the first time the IVF process during an indirect service interaction process and introduce the role of operant resources as mediators during the inter-play between value co-creation and co-destruction process, i.e. during the IVF process. This study's findings also identify factors that reduce and increase IVF intensity (customers' subjective perception of the extent of effort and time invested in the IVF process), suggesting strategies to mitigate IVF intensity. This is meaningful since high IVF intensity results in value co-destruction and low level of loyalty while low IVF intensity might bring about value co-creation and high level of loyalty. Therefore, managers who offer complex, prolonged and TBSSs, especially wellness apps should, for instance, not only position services with low IVF intensity which can generate self-efficacy, but also encourage users to involve in more resource integration activities to achieve medium/high level of resource integration, hence higher value co-created and consequently increasing level of loyalty. This study represents an initial foray into the complexity between co-creation and co-destructive factors during prolonged and complex services.

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List of abbreviations

CAGR	Compound Annual Growth Rate
Complex, Prolonged and TBSSs	Complex, Prolonged and Technology-based self-services
C-2-C	customer-to-customer
G-D logic	Goods-dominant logic
IVF	Interactive Value Formation
PEOU	Perceived Ease of Use
TBSSs	Technology-based self-services
S-D logic	Service-dominant logic
SL	Service logic

Chapter 1 Introduction and overview of the study

1.1 Introduction

This chapter presents an overview of this thesis for the purpose of obtaining a better understanding of the interactive value formation (IVF) process including resource integration and its outcomes in the context of complex, prolonged and technology-based self-services (i.e., wellness apps). Specifically, it outlines the rationale by identifying research voids for this study in Section 1.2. Following this, Section 1.3 summarises the research objectives of this thesis to address the identified research voids in the extant literature. Subsequently, Section 1.4 provides an overview of the research design including (1) rationale for choosing an increasingly relevant, but unexplored context; (2) and a purely qualitative study as a part of the interpretivist paradigm developed to address the research objectives. The managerial and theoretical implications of this research are then provided in Section 1.5. Next, this chapter provides an overview of the structure of the thesis in Section 1.6. Last, a conclusion of this chapter is provided.

1.2 Research rationale

Prior work holds that the customer is exogenous to the firm and is the passive recipient of service, while value is embedded in the products/services, added during the production process, produced by providers separating from the customer and objectively measured regarding money. In contrast to that exchange view, contemporary literature refers to the interaction view stipulating that value is co-created during the interaction between the customer and the firm (Vargo & Lusch, 2004; Echeverri & Skålén, 2011). This emergent interaction perspective therefore advocates the customer is active and endogenous to the value creation process (Vargo & Lusch, 2008b; McColl-Kennedy et al., 2012). Importantly, the concept of value co-creation has

achieved popularity (Bharti et al., 2015), and research on this field has demonstrated importance across different disciplines such as innovation and marketing (Sugathan et al., 2017; Ramaswamy & Ozcan, 2018).

Having said that, extant literature also reflects conflicting views on who participates in the value formation process, what their roles in this process are, how this process happens, and what its outcomes are, especially, four issues remain unaddressed (see Table 2.1). First, the extant research extensively focuses on the value co-creation, while research on value co-destruction (Echeverri & Skålén, 2011) and other related concepts such as conflictual value co-creation (Laamanen & Skålén, 2014), dysfunctional customer behaviour during co-creation (Greer, 2015), failure of co-created products or services (Sugathan et al., 2017) is sparse (Makkonen and Olkkonen 2017). Consistent with Echeverri and Skålén's (2011) contention suggesting that value co-creation is inseparable from co-destruction over time and space rather than a simple assumption that the two processes are bipolar in nature, this study addresses this knowledge gap by investigating the nature of value co-creation and co-destruction. Specifically, the author investigates interactive value formation (IVF), defined as "interplay between resource integration and a service system" (Makkonen & Olkkonen, 2017:518). The rationale behind adopting this term is that IVF is a neutral and integrative term which can describe both value co-creation and value co-destruction simultaneously (Echeverri & Skålén, 2011). Applying this term also avoids confusion about terminology usage and overly focusing on value co-creation (Makkonen & Olkkonen, 2017). In line with Quach and Thaichon (2017), who conceptualise value as an improvement in system well-being, and value co-destruction as an interactional process between service systems causing a decline in at least one of the systems' well-being, Makkonen and Olkkonen (2017) contend that the IVF process results in outcomes including value co-creation (the actors

are better off), value co-destruction (the actors are worse off), or value no-creation (the actors are indifferent). Therefore, the IVF process is ideal in capturing the nexus between value co-creation, value co-destruction, or value no-creation. Second, despite the importance of indirect interactions, defined as "when the customer consumes resources that are outputs of the firm's processes", the extant value (co)creation body of literature still retains a focus largely on direct interactions, defined as joint and dialogical processes between firms and their customers (Grönroos & Voima, 2013:142; Spanjol et al., 2015). Accordingly, it still remains unclear how and why value is destroyed, especially in the indirect interaction context. Moreover, resource integration is a key element in the value co-creation process especially within the wider process of IVF, there is, surprisingly, a paucity of research on this topic (Pfisterer & Roth, 2015; Caridà et al., 2018). Chief among the issues and last, the positive aspects of operant resources, especially those associated with human (e.g., competence, motivation and effort) have attracted significant academic attention, whereas their negative effects remain largely unexplored. Generally, last issue concerns if both the negative and positive effects of subjective perception of operant resources within resource integration and IVF process exists. If so, specifying what the effects are.

Moreover, additional complexity of the aforementioned issues can arise in the context of complex, prolonged and TBSSs. In other words, this provides an ideal context to explore interactions within and between both sides of value formation processes (VCC and VCD) or what Cabiddu et al. (2019, p.251) refer to as the "value variation space", i.e. the non-dichotomous relationship between VCC and VCD. The interactional nature of resource integration embedded in the formation of value, described as the Interactive Value Formation (IVF) process (Echeverri and Skålén 2011; Makkonen and Olkkonen 2017; Caridà et al. 2018), may result in multiple outcomes ranging from VCC

(Vargo & Lusch 2008a) to VCD (Plé and Cáceres 2010), with variants in between, including but not limited to value no creation or VNC (Makkonen & Olkkonen 2017). This study seeks to deconstruct the multidimensionality of the IVF process within complex, prolonged and TBSSs. In doing so, the thesis proposes a framework for developing a deeper understanding of the IVF process in a complex, prolonged and TBSS experience.

1.3 Research objectives

Based on those identified research gaps in the aforementioned literature, this study seeks to obtain a better understanding of IVF process including resource integration, selecting the context of complex, prolonged and technology-based self-services (i.e., wellness apps). Particularly, the purpose of this research is threefold:

- First, to develop our understanding of how customers integrate resources and further (2) to build a better understanding of the IVF process in a complex, prolonged and TBSS experience;
- Second, to explore whether both the negative and positive effects of subjective perception of operant resources within resource integration and therefore the IVF process exist, if yes, to discover what the effects are;
- Last, to build a theoretical framework(s) illustrating the emergent phenomena.

1.4 Overview of the research design

1.4.1 Research context

1.4.1.1 Complex, prolonged and TBSSs

There are five reasons for selecting the context of complex, prolonged technology-based self-services. The firs rationale rests on indirect interaction and value co-creation. That is, complex and prolonged services require customers to contribute a considerable range of resources within their own spheres during the service consumption, which represents indirect interactions between customers and firms to co-produce the service, often over prolonged periods of time under guidelines from the service provider and

consequently value created from it (Spanjol et al., 2015; Temerak et al., 2018). Hence, customer performance is important to ensure positive service outcomes (Guo et al., 2013). In addition, technology-based self-services (TBSSs), defined as self-services involving a technological component (e.g., Internet shopping services, banking apps), enable customers to take part in self-service behaviours without direct involvement of service employees representing indirect interactions while customers need to adopt a new role and need extra effort than traditional full service (van Beuningen et al., 2008). Particularly, TBSSs increase customer participation in the co-production process (Matthew L. Meuter et al., 2005; Hilton & Hughes, 2013; Haumann et al., 2015). Accordingly, Complex and prolonged services involve in self-services and a technological component (i.e., complex, prolonged technology-based self-services) provide a highly relevant context for investigating value co-creation and indirect interactions.

Second, the negative effects of operant resources and value co-destruction do matter. Complex and prolonged services involve multiple and contextualised behaviours, fluctuating over time (Spanjol et al., 2015). For example, a weight-management service often requires customers to repeatedly engage in goal-consistent behaviours (e.g., doing regular exercising), whilst minimising goal-inconsistent behaviours (e.g., stopping an enjoyable habit or eating junk food) over the long period of time (e.g., days, months, or even years). As such, in the long term there is not a point at which maintaining an open-ended or abstract goal (e.g., weight management, healthy eating goals) is finally achieved (Campbell & Warren, 2015). Meanwhile, customers also face challenges regarding technological perspective such as involving a new role without direct support of service employees and requirements of co-production activity, especially for those who try the services for the first time (Matthew L. Meuter et al., 2005). The complications arising from the complex, repeated tasks over prolonged time

are able to bring about negative experience and unexpected outcomes despite active participation. Thus, this setting provides an ideal context to investigate the negative effects of operant resources and value co-destruction.

Third, regarding this context (see **Table 3.1**), previous studies demonstrate its relevance to different types of customers with various experiences and evaluation during engaging in the IVF process. For instance, McColl-Kennedy et al. (2012) find a typology of different (five) practice styles in the value co-creation activities among those who engage in ongoing cancer treatment (i.e., complex and prolonged services). Specifically, patients who exemplify two practices namely "team management" and "partnering" are associated with high quality of life, followed by "pragmatic adapting" pertaining to moderate quality of life; and the others (i.e., "passive compliance" and "insular controlling") with relatively low quality of life. Similarly, investigating medication adherence in chronically ill (e.g., diabetes) individuals, Spanjol et al. (2015) find three different levels of co-production including both failure and success in adhering to recommended behaviours and emphasise the contextual nature of co-production. Accordingly, prior research on the context has witnessed the different perception and evaluation of customers during engaging in IVF process whereby it is likely to provide a good context to examine different types of customers with various experiences.

Chief among the issues is the lack of research on negative side of operant resources. Previous research (Dellande et al., 2004b; Guo et al., 2013; Spanjol et al., 2015; Temerak et al., 2018) find that customer motivations and capabilities are key determinants of firms' success in persuading customers to take part in recommended behaviours in the context of complex and prolonged services or TBSSs. Meanwhile, McColl-Kennedy et al. (2012) and Sweeney et al. (2015) account for what customers actually do when they co-create value, the positive side of effort in value co-creation

activities and how the effort links to quality of life as well as customer satisfaction. Therefore, despite the excellent setting, surprisingly, current research on the services has neglected the negative side of operant resources, focusing on their positive effects. Lastly, the lack of research on complex, prolonged and TBSSs has been identified. TBSSs frequently require co-production and new service behaviours (van Beuningen et al., 2008; Haumann et al., 2015), and in some extreme cases, TBSSs may be the only available delivery option, thereby requiring customer participation at a much higher level (Dong et al., 2014). Consequently, the customer is not only value co-creator, but also active co-producer of the core offering itself (Scherer et al., 2015). Surprisingly, the extant research on TBSSs has mostly focused on initial technology adoption, but less attention has been given to post usage behaviour (Djelassi et al., 2018). Therefore, value co-creation in the context of complex, prolonged and TBSSs remain limited at best.

Taken together, the first three justifications demonstrate that complex, prolonged and TBSSs are highly relevant to investigating the various experiences relating to value co-creation, the negative effects of operant resources, value co-destruction, and indirect interactions while the two last justifications illustrate the lack of research on the negative aspect of operant resources, especially within the complex, prolonged and TBSSs. As a result, these services are the increasingly relevant but unexplored context to address the identified research gaps and corresponding research objectives.

1.4.1.2 Wellness apps

Mobile apps are defined as software applications installed and executed on smart devices (Kuo-Fang et al., 2014), thereby health apps are those that offer health-related services for smart devices including smartphones, tablet PCs, watches. Health apps are classified into two categories. The first one includes exercise, weight loss, women's health, sleep and meditation, medication reminder and other apps, while the second

category consists of medical reference, and other applications like apps for mental health, dermatological treatment, and emergency response. In other words, health apps including a multitude of contexts including but not limited to applications for exercise, weight loss, women's health, sleep and meditation, medication reminders, medical references and mental health. Other apps offer toolkits for addressing specific health issues such as asthma (Kenner, 2015), weight loss (Maturo & Setiffi, 2015) and diabetes (García-Gómez et al., 2014; Jacques Rose et al., 2017) wherein self-management and monitoring are central (Molina Recio et al., 2016). Regarding value offerings, the popularity of these apps is evidently in enhanced access to healthcare and improved health outcomes (Whitehead & Seaton, 2016), and reduced cost of health-care delivery (Bhuyan et al., 2016). Especially, most health apps offer free trial versions (Lin & Bautista, 2017) even where apps require payment, costs are often lower than an average of $2 (Presswire, 2013). Despite the utility and variety of these apps, an essential requirement of repeated usage to optimise full value from users and attrition remain key problems, that is, a large number of health apps are abandoned within a short period of time (Krebs & Duncan, 2015; Baldwin et al., 2017) and 80% of health app usage lasts only two weeks (Nosta, 2014).

The extant health app literature tends to focus on particular contexts such as mental health (Radovic et al., 2016), asthma (Kenner, 2015), weight loss (Maturo & Setiffi, 2015) and on specific functional aspects including but not limited to the design-oriented user interfaces (Årsand et al., 2012; Fitzgerald & McClelland, 2016). Actual behavioural aspects are also employed to examine the effectiveness of use and key factors for health app development (Dennison et al., 2013b; Pierce et al., 2016; Singh et al., 2016; Armin et al., 2017; Teo et al., 2017); health app adoption (Cho et al., 2015; Kwon et al., 2016; Peng et al., 2016; Lin & Bautista, 2017). However, little is known about

the motivations behind adopting health apps (Cho et al., 2017), continued use (Cho, 2016), as such our understanding on post usage experience and user attrition dynamics and therefore the IVF process remain limited at best, with some exceptions. Cho (2016) for instance, find that perceived usefulness, perceived ease of use, confirmation, and satisfaction positively influence the intention to use health apps. Peng et al. (2016) do extend the value co-construction paradigm and explore value deconstruction by exploring the barriers to health app adoption (low awareness of health apps, lack of app literacy); barriers to continued use (required time and effort, lack of motivation and discipline); motivators to use health apps (i.e., social competition, tangible and intangible rewards, hedonic factor, internal dedication and motivation, information and personalised guidance, tracking for awareness and progress, credibility, goal setting, reminders, and sharing personal information). Although these findings are useful, Cho (2016) and Peng et al. (2016) lack deep insights into the dynamics involved in the IVF process, especially the multidimensional effects of operant resources in the context of complex, prolonged and TBSSs. This is where our key contribution lies (see Implications sections for further discussion on the multidimensional aspects of operant resources).

This study investigates the context of the general population and their relationship to wellness apps (fitness, lifestyle modification, diet and nutrition apps) excluding medical apps. The general population comprises 70% of the target audience for health apps (Molina Recio et al., 2016). General healthcare and fitness apps are also the largest segment in health app market (Presswire, 2016) while fitness and nutrition are found to be the most used in a survey of 1604 mobile phone users in the United States (Krebs & Duncan, 2015). In addition, fitness, lifestyle modification, and diet and nutrition services (e.g., a weight-loss programme) are considered as complex and prolonged services since a substantial amount of effort, competencies and motivation are required during a

prolonged period of time to maintain a healthy lifestyle (Campbell & Warren, 2015) and therefore to engage in co-productive behaviours (Temerak et al., 2018). Wellness apps are also described as TBSSs because mobile applications or apps represent an important manifestation of TBSSs (Newman et al., 2017).

Taken together, wellness apps (i.e., fitness, lifestyle modification, diet and nutrition apps) were selected as the specifically empirical setting for this study because they are considered as complex, prolonged and TBSSs and account for the largest segment in health apps market. As such, it provides opportunities to investigate the IVF process including both value co-creation and value co-destruction; both negative and positive aspects of operant resources (e.g., motivation, effort) in the customer sphere (i.e., representing indirect interactions among integrators/actors such as between the firm and the customer). The purpose of this research, thus, is to shed light on the context of prolonged, complex, and technology-based self-services (i.e., wellness apps) within the customer sphere to address the lack of research on indirect interaction and to obtain insights into the unexplored domain of IVF process including resource integration and IVF outcomes, especially the negative side of operant resources associated with human (e.g., competence, motivation and effort) as well as providing additional insights into user attrition. In short, despite the increasing importance and a plethora of studies in wellness apps, understanding on post usage experience and user attrition remain limited. Therefore, the specific context of wellness apps provides opportunities to achieve the research objectives and additional insights into user attrition.

1.4.2 Research design

This thesis carried out a critical review of available methodological choices to address the research problems and to achieve research objectives. Specifically, it, first, considers research philosophies and methodologies in general based on the identified research

gaps and the corresponding research objectives. Consequently, a research paradigm with its epistemological and ontological stance and research methodology is chosen - that is, an appropriate paradigm involving an inductive approach and a purely qualitative study as a part of the interpretivist paradigm. In addition, a rational justification for adopting a grounded theory with in-depth interviews has been given. Subsequently, theoretical sampling is employed, which means that the operational research design includes the simultaneous process of the data collection and data analysis. A special emphasis is on systematic, but creative procedures of building grounded theory, that is, that following the suggested procedures (e.g., constant comparison spiral throughout the research, developing and relating categories to subcategories in axial coding, etc.), but being flexible such as breaking through traditional assumptions, creating a new order out of old (Strauss, 1990).

1.5 Contribution to theory and practice

1.5.1 Managerial Implications of the research

This research yields deep insights into the IVF process especially within complex, prolonged and TBSSs, in particular, twelve resource integration activities were identified, which provides a basis for building a measurement scale of IVF process in the context of complex, prolonged and TBSSs, especially wellness apps. Moreover, customers engage in IVF process differently, showing a variety of combination among the resource integration activities and consequently different level of resource integration and outcomes. Therefore, firms need to understand that although the resource integration activities are imperative to co-create value, they might also bring about value no-creation or even value co-destruction. This helps managers clearly distinguish value propositions and other related concepts such as value and value co-creation. Despite offering the same value propositions, for example, customers are

contextually related to various resource integration activities and have different outcomes.

This study also identifies the central role of IVF intensity, that is, high IVF intensity results in value co-destruction and low level of loyalty, but low IVF intensity only brings about value co-creation and high level of loyalty when resource integration activities are adequate. Therefore, firms need to offer propositions facilitating the adequacy of resource integration activities to achieve medium/high level of resource integration and low IVF intensity. Without an understanding of the dynamics and contextualised nature of resource integration activities, firms are likely to be limited in their means of supporting customers in reducing IVF intensity. Particularly, there are two approaches arising out of this research' results that practitioners (e.g., wellness app providers) can employ to motivate consumers to engage in the resource integration activities and mitigate IVF intensity, thereby becoming loyal and/or reducing attrition rate. First, utilitarian strategies are based on (1) consistency and regularity in performing resource integration activities, especially in Core Integration; (2) making use of the positive effects of Internally Complementary Integration and Externally Complementary Integration (e.g., earning internal/external rewards); and (3) advanced technology (e.g., automatic tracking). Second, value co-destruction arises out of addiction to "Comparing and Challenging", whereas lower frequency of this activity and higher frequency of "Connecting Other Users" (e.g., making like-minded friends, sharing data & comments) predispose to bring about value co-creation, thereby designing hedonic strategy to maintain a balance between these two activities. Finally, previous studies (e.g., Chi Kin et al. (2012)) indicate the positive effects of customers' self-efficacy on customer participation, whereas this thesis finds that self-efficacy (one's belief in one's ability to succeed in tracking activities without health app support) causes discontinuity.

Therefore, managers who offer complex, prolonged and TBSSs, especially wellness apps should, for instance, not only position services with low IVF intensity which can end up self-efficacy, but also encourage users to involve in more resource integration activities to achieve medium/high level of resource integration, hence higher value co-created and consequently increasing level of loyalty.

1.5.2 Theoretical implications of the research

Deriving from the wide range of experience in using wellness apps, the thesis contributes to the service literature by identifying the approaches (e.g., successful IVF practices) in which consumers create value or even become better off (e.g., lose weight) after managing to consume complex, prolonged and TBSSs. Moreover, extant research on Perceived Ease of Use (PEOU) has ignored the attribute of accumulation which leads to the confusion. For instance, PEOU is considered as one of the most important factor of continued use of health apps (Peng et al., 2016), whereas the effect of PEOU might be insignificant when users feel accustomed to the new technology (Cho et al., 2015). In the study here, some participants also consider wellness apps as PEOU at first or PEOU with one-time/short-term experiences, but accumulated experience causes “tedium” (Lucas) or “a lot of work” (Jonathan), thereby identifying the dynamics of amassing time and effort in consumption (IVF intensity). Many other themes (e.g., consistency and regularity, and addiction to performing resource integration activities) also emerge in light of the attribute of accumulation. The study’s findings are unique to consumption of complex, prolonged and TBSSs (vs. other services such as those with one-time outcomes) and differentiate its work from others that disregard the impact of the embedded attribute of accumulation in consumption.

Responding to previous findings revealing either the one-sided (positive) effects of operant resources or the causes of co-destruction but restricting to collaborative and

dialogical process, the author identifies multidimensional aspects of the operant resources. First, extant research focusing on a unidimensional aspect of effort (considerable effort) finds its positive (Sweeney et al., 2015; Sugathan et al., 2017), negative (Haumann et al., 2015), or both negative and positive effects (Buechel and Janiszewski, 2013) in the value co-creation process, the current study identifies IVF intensity varying dimensionally (from low to high) cause both negative and positive effects on the wider process of IVF. Second, in lieu of deriving corporate communication strategies from a priori theory (equity theory; Haumann et al. (2015)), this study contributes to the nascent research on consumer-based strategy which derives from insights about consumers (Hamilton, 2016). Specifically, the author finds (intensity–reducing and intensity–increasing) factors that reduce and increase IVF intensity respectively from the data and consequently suggesting strategies or extending the scope or sources of approaches to mitigating the negative effects of effort or operant resources in the IVF process. Accordingly, to the wellness app literature, the findings in this study not only uncover the reasons or determinants of user attrition (e.g., self-efficacy, high IVF intensity), but also identify the mitigating strategies to reduce attrition rate. Third, extant research focuses on positive aspects of customer-to-customer (C-2-C) interactions such as on (online) brand communities on value co-creation process (Schau et al., 2009; Pace et al., 2015), this study finds the paradoxical effects of Externally Complementary Integration representing high number of interactions (beyond the firm and customer dyad to include other customers), as such identifying the double-edge sword of C-2-C interactions in the IVF process (e.g., positive effects of Earning External Rewards and negative effects of addiction to Comparing and Challenging).

To the best of the author's knowledge, no empirical research explores whether there is a link between inseparable existence of the creation and destruction of value and level of loyalty through the four loyalty conditions classified by Dick and Basu (1994). This is where the study's key contribution lies, that is, identifying a linear relationship between the IVF outcomes and level of loyalty.

To the literature on goal pursuit, this study confirms that the closer the outcome to the desired goal is, the greater motivation behind striving for completing the goal is generated (Koo and Fishbach, 2012; Cutright and Samper, 2014; Wallace and Etkin, 2017). More importantly, the author discovers the negative effect of striving for goal complement, especially in complex, prolonged and TBSSs, that is, despite goal attainment, value co-destruction and/or dissatisfaction might occur(s) due to accumulated subjective perception of time and effort.

Finally, this study differentiates its work from a list of customer value co-creation activities (McColl-Kennedy et al., 2012; Sweeney et al., 2015), identifying RIAs which directly examine what customers actually do when they integrate resources in the IVF process.

1.6 Structure of the thesis

This thesis consists of five additional chapters. A brief outline for each chapter is provided below and summarised in **Figure 1.1**.

Chapter 2: Literature Review presents a review of research pertaining to fundamental preconceptions of value co-creation and related terms. Following this, different perspectives on value co-creation and value co-destruction as well as the resource integration process are discussed. Subsequently, this chapter identifies the key gaps and establishes the research objectives developed to address these knowledge gaps. Moreover, this thesis presents in true grounded theory fashion as it means that it does

not follow the traditional format of literature review, rather selecting the presentation of weaving the extant literature and the emergent categories/findings.

Chapter 3: Justification of the Research Context provides justification for the context in which the research is situated. That is, the complex, prolonged and technology-based self-services as the broad context while wellness apps as the specific context for this thesis.

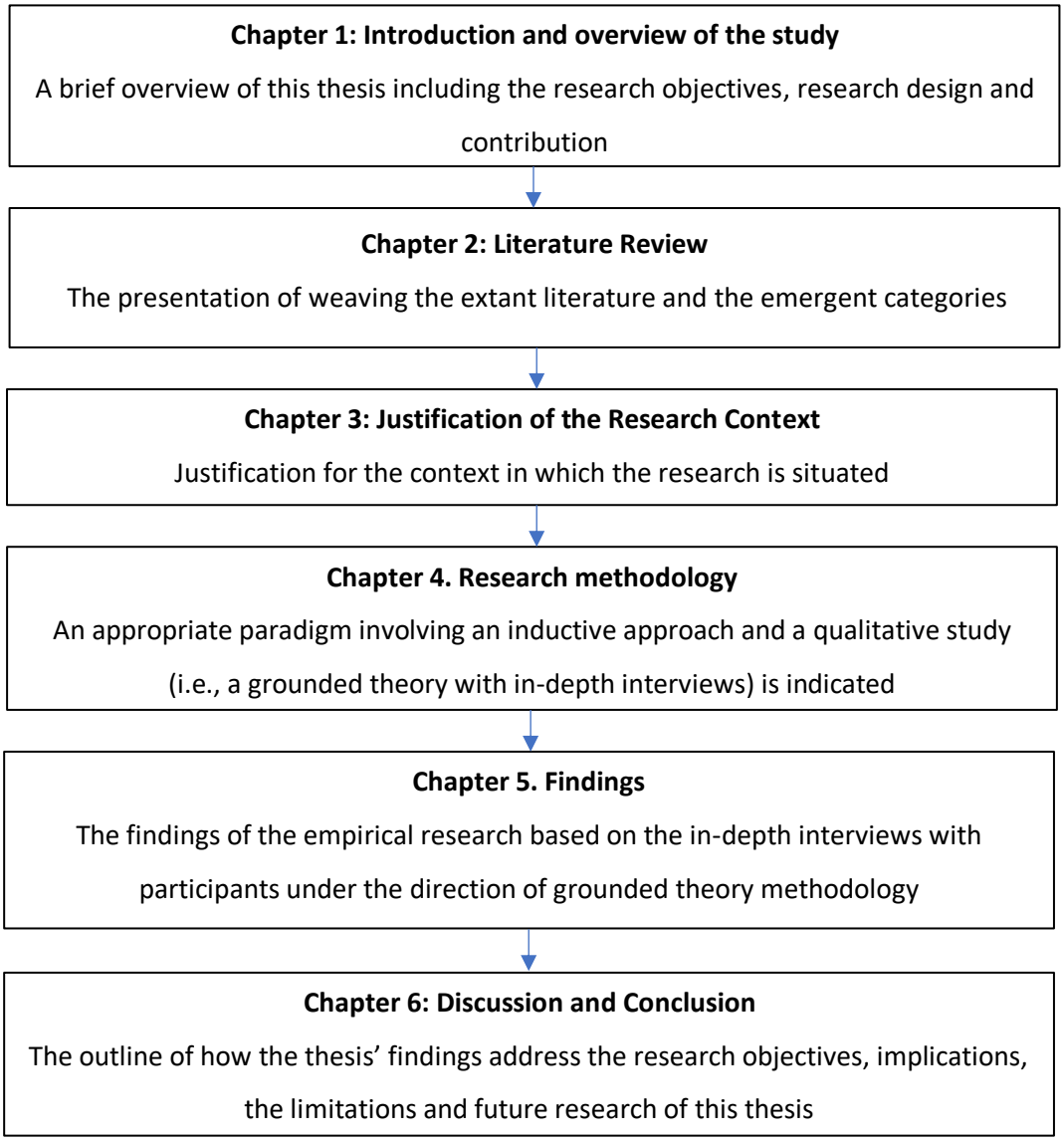


Figure 1.1. Summary of Thesis Structure

Chapter 4. Research methodology provides philosophical assumptions (i.e., ontological, epistemological and axiological assumptions) and methodological choices in general and

consequently come up with an appropriate paradigm involving an inductive approach and a purely qualitative study (i.e., a grounded theory with in-depth interviews). Then, the specific data collection, sampling and analysis methods are indicated. Last, Criteria for evaluating a grounded theory are discussed.

Chapter 5. Findings presents the findings of the empirical research based on the in-depth interviews with participants under the direction of grounded theory methodology. Importantly, a theoretical framework emerges in the light of the emergent categories and their relationships.

Chapter 6: Discussion and Conclusion outlines how the thesis' findings address the research questions/research objectives of this thesis. It also presents the theoretical and practical implications of this research as well as the limitations and future research.

1.7 Conclusion

This chapter provided an overview of this thesis. To begin, it provided the research gaps and objectives of this thesis. Following this, the author presented justification for the research context and an overview of the research program developed to achieve the research objectives. Subsequently, it provided the theoretical and managerial implications of this thesis. Last, a brief outline for each chapter and the structure of the thesis were presented. The subsequent chapter commences discussing a level of semi-ignorance about the literature review and the presentation of weaving the extant literature and the emergent categories/findings.

Chapter 2 Literature Review

> "The literature review and theoretical framework are ideological sites in which you claim, locate, evaluate, and defend your position." (Charmaz, 2014:305)

2.1 Introduction

This chapter presents an initial review of the literature, followed by its research gaps and research objectives accordingly. To begin with, Section 2.2 defends the position taken by this thesis on how to conduct and present the literature review. Given the assertions made by this section, it is necessary to explicitly discuss the place of the literature review in grounded theory research within this thesis.

After discussion of locating the literature review, Section 2.3 presents fundamental preconceptions regarding value co-creation and related terms, namely value propositions, value, value-in-use, value creation, value co-creation, value co-destruction and interactive value formation.

In the light of those concepts, the interactive value formation process is elucidated in Section 2.4 by investigating different perspective on value co-creation and value co-destruction, and the resource integration process within the wider process of interactive value formation. Thus, this section discusses how value is co-created or co-destroyed including the different role of operant resources.

Subsequent to Section 2.3 and Section 2.4, research gaps derived from the literature review are presented in Section 2.5, followed by the research objectives developed to address these gaps.

Lastly, Section 2.6 and Section 2.7 present key findings (IVF intensity and the relationship between IVF outcomes and level of loyalty) interwoven with the relevant

literature (see Section 2.2 below for justification) while Section 2.8 finalises this chapter with a conclusion.

2.2 The dilemma of literature review

As discussed later, especially in the 'methodology' chapter (see Chapter 4), theory could be systematically built from the data under the guidance of grounded theory (Gioia & Chittipeddi, 1991; Strauss, 1998; Gioia et al., 2012). Adopting the grounded theory methodology, however, engages in a long-standing dispute about when the researcher should delve into the literature, how the literature review is conducted and what is covered (Charmaz, 2014). According to the original version of grounded theory (Glaser, 1967; Glaser, 1978), the researcher should delay the literature review until analysis completion to avoid analysing data through the lens of earlier theory. Having said this, many scholars criticise or even reject this view, recognising that unfamiliarity with relevant literature by wiping out all prior knowledge is improbable (Goulding, 2017) and indefensible (Charmaz, 2014). In the second editions of Basic of Qualitative Research, Strauss (1998) refers to making theoretical comparisons between categories emerged from data with similar or different concepts recalled from the researcher's experience or from the literature. This constant comparative method is of paramount importance to sensitise the researcher to properties and dimensions when these are not evident to him or her. As such, the comparison at the property and dimensional level enables the researcher to derive strong support for spotting the subtle nuances and meanings in the data without putting his/her perspective or existing theory into the data. Also, this technique might show where and how the relevant literature illuminates the emergent categories and how the corresponding theoretical framework extends or contributes to the extant research (Charmaz, 2014). More specifically, with inspiration from the work of previous research (Gioia & Chittipeddi, 1991; Gioia et al., 1994; Gioia et al., 2012)

which follows the tenet of grounded theory (Glaser, 1967; Strauss, 1998), the researcher periodically supported by his supervisors made constant comparison spiral including the theoretical comparisons. Consequently, this study acknowledges a level of semi-ignorance about the literature review beforehand owing to the impossibility of gaining insights into the research problems or obtaining emergent concepts prior to examination. Initially, this study turns to the literature to "gain a feel for the issues" in question and to identify a relatively unexplored area (Goulding, 2017:68), thereby coming up with general (open and broad) research questions and research objectives. Then, the tentative research objectives become narrower and more focused as the research progress which entails discovering concepts and their relationships (Strauss, 1998). For example, this research first focused on different aspects of operant resources, especially those associated with human (e.g., competence, motivation and effort) which has been inadequately studied, then a narrowed and more focused concept emerged - that is, "IVF intensity" focusing on the effects of time and effort. The emerging concept (IVF intensity) is a core category discovered from the data. Therefore, literature comparison was also an integral part in the later phase of this thesis (during and after completion of data analysis). Consequently, this chapter of literature review presents an initial review of extant research (i.e., a general reading of the literature) and the identified research gaps; and then the findings of two emergent categories (emerging after completing the data analysis) in relation with the corresponding literature. As discussed in the chapter of methodology (see Chapter 4), it should note that the purpose of comparing the findings with extant literature is to validate and improve the theory that explained the phenomenon (Charmaz, 2014). It did not mean that the theory would be built independently from the data analysis, but rather allowing the data to direct the researcher to the literature on related concepts and theories and vice versa (Goulding,

2017). Once the phenomenon began to emerge from the data, the researcher returned to the literature to flesh out the author's understanding of that phenomenon.

In terms of writing the theory and the position of the literature, this thesis is consistent with the work of Gioia et al. (2012) and Goulding (2017), who believe that a grounded theorist should not present his/her work as it was conducted (e.g., initial literature/fundamental preconceptions, the research questions, a discussion of data collection and codes, followed by findings, theory, and recontextualisation in the literature). Instead, following these researchers, this research is presented in a conventional manner (i.e., literature but also including concepts emerging from the data analysis, problems, methodology, context, theoretical findings, discussion and conclusion) maintaining that concepts emerged from the data. Specifically, this chapter chose the illustration of weaving the extant literature and the emergent categories, which is threefold: (1) to elucidate how the research gaps and research objectives are identified from a general review of the literature; (2) to foreshadow the important contributions and emerging theory; (3) to relieve the audience's tedium of working through a lengthy qualitative data presentation. To be suitable with the chapter of literature review, however, the two sections (i.e., Section □ and Section 2.7) of these emergent categories only give brief introduction in comparison with similar existing concepts to illustrate the novelty of the conceptual framework (see Chapter 5 and Chapter 6 for details).

2.3 Value Co-creation and Related Concepts

There are a large number of studies have used the terms namely value, value creation and value co-creation without careful conceptualisation and clarification, thereby generating confusion such as how value is created, whether it is independently created or always co-created (Ramaswamy & Ozcan, 2018). For example, in their reviews of

value and value creation, Karababa and Kjeldgaard (2013) and Grönroos and Voima (2013) respectively indicate that value is a notoriously elusive concept. Specifically, Ramaswamy and Ozcan (2018:197) maintain that:

> "A large body of papers have gone on to use the term "value co-creation" without purposefully defining "co-creation", while simultaneously introducing another term "value" that diverts attention away from the very act of "creation" among actors, to instead debating value-in-use (vs. value-in-exchange) and whether "value" is created or always "co" created"

Hence, this section helps to illuminate this issue by describing and juxtaposing various concepts regarding value co-creation and related terms.

2.3.1 Value propositions

Despite the importance in gaining a sustainable competitive advantage (i.e., the superior value proposition offered brings about a long-term competitive advantage), there have been different views on the definition and the interpretation of value propositions (Pires et al., 2015). Goods-dominant logic (G-D logic) perspective of the 1980s and 1990s asserts that value propositions are produced by firms without any direct customer involvement and include the set of benefits intended to provide value for customers (Pires et al., 2015). In other words, in the context of value delivery and value exchange, value propositions position a firm and determine the promises of delivered value (Frow et al., 2014). An inward outward approach, therefore, is central to this school of thought.

Having said that, this perspective does not address the inherent participation of the customer in value creation, i.e., an outward inward perspective, due to focusing on uni-directional exchange of manufactured goods (Skålén et al., 2015). Thus, this perspective has recently faced the challenge of service-dominant logic (S-D logic) perspective (Vargo & Lusch, 2004; Vargo & Lusch, 2008a). Specifically, value propositions comprise all the attributes provided to customers from firms with the aim of shaping distinct perceptions of value (Pires et al., 2015). However, an actor might not

respond to all, but only several attributes of value propositions may be salient. In addition, different actors might potentially evaluate the same value proposition(s) in not the same ways. In other words, value propositions are uniquely and phenomenologically assessed by each actor. Consequently, value propositions are not always successful, although they are intended to provide the same solutions or promises in ways that customers appreciate (Chandler & Lusch, 2014) and offer promises of getting some value from offerings (Skålén et al., 2015). Therefore, value propositions offer opportunities of co-creating value (Frow et al., 2014).

There is surprisingly little consensus on the definition of this term. On the one hand, Pires et al. (2015) follow Ballantyne and Varey (2006:334-335) who consider only customer and supplier relationship to conceptualise value propositions as "reciprocal promises of value, operating to and from suppliers and customers seeking an equitable exchange". On the other hand, other researchers extend a customer–firm perspective to a broader view including multiple 'actors' that influence each other on value proposition formation hence the value is realised as a result of multi-interactions (Skålén et al., 2015). For example, Chandler and Lusch (2014:6) argue that value propositions contribute to joining actors (i.e., customers, firms, other stakeholders) together to create value, thereby defining "value propositions as invitations from actors to one another to engage in service" for the purpose of attaining (economic, financial or social) value. Similarly, Frow et al. (2014:14) also consider a service ecosystem perspective and emphasise the crucial role of value propositions in relationships and perceived value, then conceptualise this term as "a dynamic and adjusting mechanism for negotiating how resources are shared within a service ecosystem". Thus, this study adopts the broader view of multiple actors connected with others through value propositions which

provide value co-creation opportunities. This view is then reinforced and elucidated in the subsequent sections and sub-sections.

2.3.2 Value and value-in-use

Karababa and Kjeldgaard (2013:13) have contended that "use value, exchange value, aesthetic value, identity value, instrumental value, economic value, social values, shareholder value, symbolic value, functional value, utilitarian value, hedonic value, perceived value, community values, emotional value, expected value, and brand value are examples of different notions of value, which are frequently used without having an explicit conceptual understanding in marketing and consumer research." It would, therefore, appear that there is no unified consensus on the use of the term value. The following arguments address partly this confusion by (1) distinguishing the aforementioned notion of value propositions (see Section 2.3.1) and value/value-in-use; (2) giving the author's interpretation of value and value-in-use to clarify these terms.

There have been several rationales behind arguing that value propositions are distinct from value. First, the former can be created and produced by the firm or by customer and firm participation and other actors (Skålén et al., 2015), whereas the latter is assessed solely by firms or by customers (Pires et al., 2015). Whereas the value perceived by the firms is different from value perceived by the customers (Grönroos & Voima, 2013), this thesis focuses exclusively on value creation for the customer. Thus, the author takes the view, shared by many scholars that value is "always uniquely and phenomenologically determined" (Vargo & Lusch, 2008a:9) by the customer, though firm plays a role in facilitating (i.e., offering customers the necessary resources for the value formation processes) or even jointly co-creating value with other customers (Grönroos & Voima, 2013; Hilton & Hughes, 2013). Therefore, value uniquely experienced and determined by the customer, only emerges under consumer

acceptance (Navarro et al., 2014) and is realised in the customer's consumption — that is, value-in-use.

Second, contemporary literature demonstrates that customers contribute to the development of value propositions in the (co)production process (e.g., co-design), later value propositions are converted into value-in-use via active role of customers in integrating resources (McColl-Kennedy et al., 2012; Grönroos & Gummerus, 2014; Makkonen & Olkkonen, 2017). Thus, value is considered as value-in-use (Grönroos & Voima, 2013) or value-in-context (Scherer et al., 2015) since it is created (individually and collectively/socially) through usage, or the experiencial process (Hilton & Hughes, 2013). This process can be physical, virtual, mental, or merely possessive. Although both the terms (value-in-use and value-in-context) bring up perceived net benefits of resource integration and are often used interchangeably, the current research employs the term value-in-use for simplicity and a focus on the notion of value realised in the customer's consumption.

Last, in spite of the most ill-defined and elusive concept (Grönroos & Voima, 2013), this study and many others such as Echeverri and Skålén (2011); Roberts et al. (2014) and Skålén et al. (2015) concur with the view of Holbrook (2006) that value resides in actions and interactions between subjects (or subject and object). These interactions depend on a comparison among objects (e.g., products), a variation of subjects (e.g., from a consumer to another) and the circumstance surrounding the evaluation. Then, value is defined as an "interactive relativistic preference experience" to mean that value is associated with subjective hierarchical preferences resting upon a customer's situation-specific comparisons of one object with another. Accordingly, the firm can only offer value propositions, but cannot deliver value due to the dependence upon both the interaction and the customer context (Vargo & Lusch, 2004). Particularly, value

propositions can be only realised via interaction with the customer (Skålén et al., 2015), which leads to different perceptions of value (a complex and multidimensional concept) depending on time, situation, or consumer (Pongsakornrungsilp & Schroeder, 2011). As a result, the study here acknowledges the importance of a reciprocal relationship and contextualised behaviours in the value formation process. In summary, customers play a crucial role in ensuring transformation of potential value to value-in-use (Sweeney et al., 2018) hence value propositions are a distinct but related concept to value and value-in-use. In the subsequent sub-section, the author discuss in more detail the value related concepts, that is, value creation and value co-creation.

2.3.3 Value creation and value co-creation

Customer value and customer value creation have received considerable interest during the past decade (Pfisterer & Roth, 2015), but in various perspectives such as S-D logic (Vargo & Lusch, 2004; Vargo & Lusch, 2008a) or service logic (SL) (Grönroos, 2011; Grönroos & Voima, 2013; Grönroos & Gummerus, 2014). These perspectives achieve consensus on active participation of customers in the value creation process and firms only contributing partly to the customer's value formation process. However, S-D logic and SL hold divergent views on how value is actually created (Makkonen & Olkkonen, 2017). In SL literature, Grönroos and Gummerus (2014:209), who conceptualise value creation as "the customer's process of extracting value from the usage of resources". This definition means that value is accumulated, created and determined by customers (Ellway & Dean, 2016). In line with this, Grönroos and Voima (2013) conceptualises value creation as the customer's creation of value-in-use. Particularly, value co-creation entails a longitudinal, dynamic, experiential process which causes both positive and negative value experiences in social, physical, temporal, and/or spatial context. Moreover, SL suggests that value can be created independently in the customer's sphere

and value co-creation only takes place in a joint directly interactive process. In contrast, this study is in line with S-D logic considering that the customer is always a co-creator of value due to intrinsic involvement in the value creation process (McColl-Kennedy et al., 2012). Therefore, value co-creation not only occurs in direct but also in indirect interactions between firm and customer (Makkonen & Olkkonen, 2017). Specifically, direct interactions are associated with joint processes of merging actors' actions into one collaborative, dialogical process. Indirect interactions entail one actor (e.g., a customer) interacting with a standardised system or product hence taking place in customer sphere (Grönroos & Gummerus, 2014). In other words, indirect interaction reflects situations where the customer consumes or interacts with resources that are outputs (e.g., a product) of the firm's processes. Moreover, consistent with aforementioned conceptualisation of value, interactions (To et al., 2018) and activities of customers with the firms and others (e.g., other firms and customers) are considered as a locus, key source of value co-creation. Especially, McColl-Kennedy et al. (2012:370) and Sweeney et al. (2015) define value co-creation as ''benefit realised from integration of resources through activities and interactions with collaborators in the customer's service network." Within this definition, activities refer to the cognitive and behavioural performance or the active doing of things while interactions represent collaboration in the service network (Sweeney et al., 2015). The following will bring up another inseparable but opposite concept of value co-creation.

2.3.4 Value co-destruction

Customer's active participation is an integral part of value co-creation and value is defined as an improvement in system's well-being, which relates to a system's adaptiveness (e.g., the adaptiveness of individuals or organisations) or ability to fit in its environment (Vargo et al., 2008). Thus, value co-creation is mainly related to

"ubiquitously positive outcomes" of collaboration (Laamanen & Skålén, 2014:383). Recently, there have been, however, several researchers indicating that the customers can become worse off or lose a sense of well-being despite the active role. This decline in customer's well-being can be termed as value co-destruction (Echeverri & Skålén, 2011), which is distinct from other adverse situations, such as dysfunctional customer behaviour during co-creation (Greer, 2015), failure of co-created products or services (Sugathan et al., 2017). Specifically, value can be collaboratively co-destroyed during the interactions of actors, which causes diminishing value during the consumption process. In line with prior research (Pace et al., 2015; Quach & Thaichon, 2017), this study focuses exclusively on interactive value formation for the customer, thus, conceptualises value co-destruction as an interactional process between service systems, which leads to a decline in a customer's well-being. In spite of the presence of this concept, the extant literature extensively focuses on value co-creation and ignores value co-destruction (Echeverri & Skålén, 2011; Laamanen & Skålén, 2014; Makkonen & Olkkonen, 2017). In line with prior studies (Echeverri & Skålén, 2011; Makkonen & Olkkonen, 2017), importantly, this study suggests that there is no separation between the creation and destruction of value over time (since both may operate in tandem or simultaneously) and space in the case of interaction value, thereby addressing the lack of research on value co-destruction by investigating the nature of value formation process.

2.3.5 Interactive Value Formation

As discussed earlier, the central topic of this research is about value co-creation and value co-destruction or both sides of value formation processes whereby this research employs the concept of interactive value formation (IVF) (Makkonen & Olkkonen, 2017:16), defined as "interplay between resource integration and a service system". Within this definition, interaction involves resource exchange and resource

development while resource integration is the content of IVF and service system refers to configuring resources (e.g., people, information, and technology) that are connected to other systems by value propositions. As such, resource integration is the content while service system pertains to the context of IVF. The rationale behind adopting this term is that IVF is a neutral and integrative term, can describe both sides (i.e., value co-creation and value co-destruction) simultaneously (Echeverri & Skålén, 2011). Applying this term also avoids confusion about terminology usage and overly focusing on value co-creation. In line with previous studies such as (1) Quach and Thaichon (2017), who conceptualise value as an improvement in system well-being and value co-destruction as an interactional process between service systems causing a decline in at least one of the systems' well-being; and (2) Grönroos and Voima (2013), who argue that the interactions between the firm and the customer may bring about positive, or negative, or no effect on value co-creation, Makkonen and Olkkonen (2017) contend that the IVF process results in outcomes including value co-creation (i.e., the actors are better off), value co-destruction (i.e., the actors are worse off), or value no-creation (i.e., the actors are indifferent). Therefore, the IVF process is ideal in capturing the nexus between value co-creation, value co-destruction, or value no-creation. Critically, existing IVF applications remains within the direct interactions in the business-consumer and inter-organisational contexts (e.g., Echeverri and Skålén (2011) and Makkonen and Olkkonen (2017)), the current study extends its conceptualisation to examine indirect interactions between the firm and the customer as well as customer-to-customer interactions. The following sections will clarify the contributions of direct and indirect interactions to the interactive value formation process whose outcomes include value co-creation and value co-destruction.

2.4 Resource integration

2.4.1 Different perspectives on value co-creation

A unified consensus on defining value co-creation and co-destruction remains lacking. Table 2.1 provides a summary of key conceptualisations which can be divided according to two dimensions of number of integrators (dyad vs. multiparty) and type of interactions (direct vs. indirect), yielding a 2 x 2 matrix (four categories). First, from the outset of S-D logic perspective, the predominant focus has remained the notion of value co-creation and/or value co-destruction from direct interaction between firms and consumers and consider these actors as resource integrators (Guo et al., 2013; M. Smith, 2013; Yu & Sangiorgi, 2017). This view however has been criticised as narrow in its scope, since it occludes a wider range of multiparty actors such as other firms, peers, friends, family, other customers (McColl-Kennedy et al., 2012; Pace et al., 2015; Sweeney et al., 2015), though only direct interactions are examined in this category. An example of this category is McColl-Kennedy et al. (2012), who find that each individual can have different practice styles in the value co-creation process such as “team management” style. An individual representing this style might have a role of assembling and managing the team. As such, the person takes part in a variety of activities and has high number of interactions with various actors such as cooperating, seeking and providing feedback, combining complementary therapies, and connecting with others (e.g., family, doctors). In addition to this, several studies have identified the role of collective value co-creation within brand communities (Schau et al. 2009; Pace et al. 2015; Shen et al. 2018). Within this second category, Grönroos and Voima (2013), on the one hand, also acknowledge the contribution of direct interactions and multiple co-creators in the value co-creation process. On the other hand, these authors argue that an all-encompassing process involving activities by all actors can produce an effect to some extent, but brings about

a negative effect on analytical use and further limits theoretical and practical implications about the roles and scope of the service provider or the customer. For that reason, Grönroos and Voima (2013) assert that value can be created independently in the customer sphere or through indirect interactions (particularly between the firm and the customer) and this is under researched (Spanjol et al., 2015), whereas value co-creation can only occur in the joint process or direct interactions between firms and customers (or customers with other actors). In contrast, the third category such as Ranjan and Read (2016) and Dong and Sivakumar (2017) focuses only on dyadic interactions between the firm and the customer, maintaining that indirect interactions also contribute to value co-creation. As such, the customer and the firm can directly or indirectly interact to co-create value. Finally, other researchers including both theoretical and empirical studies (Hilton & Hughes, 2013; Kohtamäki & Rajala, 2016; Quach & Thaichon, 2017) are in line with Vargo and Lusch (2004) and Vargo and Lusch (2008a:7) indicate that all value creation is co-creation and "all social and economic actors are resource integrators". Accordingly, not only direct but also indirect interaction among firms, customers and other stakeholders contribute to value co-creation. Consistent with most studies agree that the interactions between firms and consumers are the key factors of co-creating value, the current study especially adopt the last category acknowledging the contributions of multiparty actors and indirect interactions to the IVF process. However, this is applied with caution of Grönroos and Voima (2013) regarding an "all-encompassing" process which involves activities by "all actors" in the IVF process. Therefore, the roles and scope of the firm and the customer in the IVF process are clarified. That is, this thesis stipulates that the customer subjectively, uniquely and phenomenologically determines value when consuming products/services, known as value-in-use (Grönroos and Voima, 2013) and is always a

co-creator of value (Vargo and Lusch, 2008a) due to intrinsic involvement in the value creation process (McColl-Kennedy et al., 2012). Moreover, whilst prior studies have theoretically advocated a multiparty indirect context, the author empirically investigates the IVF process in an indirect context.

In addition, as Table 2.1 highlights, IVF can operate in both value co-creation and co-destruction processes simultaneously (Plé and Cáceres, 2010). This shift from viewing IVF as purely co-creative to also encapsulating co-destructive variants arises from the possibility that interactional processes can lead to a "decline in at least one of the [service] systems' well-being (individual or organizational)" (Plé and Cáceres, 2010, p. 431). Specifically, a number of studies have investigated the downside side of value formation. Table 2.1 also demonstrates the variations in possible value outcomes, ranging from VCC (Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2004; 2008a; Neghina et al., 2014; Roberts et al., 2014) to VCD (Smith 2013), but also VNC (Makkonen and Olkkonen, 2017), unsuccessful VCC (a mild variant of VCD) (Skålén et al., 2015) and a combination of VCC and VCD (Echeverri and Skålén, 2011; Camilleri and Neuhofer, 2017). Importantly, Cabiddu et al. (2019) extend the traditional IVF logic to encapsulate the dynamic space between VCC and VCD as non-dichotomous, thus emphasizing its multidimensional nature. In the subsequent sub-section, the resource integration process deserves consideration in order to theoretically delve into the IVF process.

Table 2.1. Conceptualisation of value co-creation and value co-destruction

Author(s)	Conceptualisation	Integrators	Type of interactions	Outcomes of the relative value formation process	Context: complex and prolonged service and/or TBSSs
Current study	IVF as an interactional process resulting in multiple outcomes from positive (VCC) through neutral (VNC) to negative (VCD)	Multiple actors	Direct and indirect interactions	IVF outcomes and customer loyalty	Complex and prolonged service and TBSSs
Neghina et al. (2014)	Value co-creation as a joint collaborative activity between service employees and customers	Firms and customers	Direct interaction	Value co-creation	—
M. Smith (2013)	Value co-destruction as an interactional process between service systems (e.g., individuals and firms), which results in a decline in at least one of the system's well-being	Firms and customers	Direct interaction	Value co-destruction	—
Sugathan et al. (2017)	Co-creation involves customer participation in various stages of production and consumption processes through the application of operant resources	Firms and customers	Direct interaction	Value co-creation and co-destruction	—
Makkonen and Olkkonen (2017)	IVF as interplay between resource integration and a multilevel service system	Firms and customers	Direct interaction	Value co-creation, no-creation, co-destruction	—
Echeverri and Skålén (2011)	Value is jointly created by the consumer and the firm and is unique to the individual consumer	Firms and customers	Direct interaction	Value co-creation and co-destruction	—
Yu and Sangiorgi (2017)	Value is jointly created by providers and customers through interactions and determined by customers in their consumption process	Firms and customers	Direct interaction	Value co-creation	—
Guo et al. (2013)	Consumer co-production as consumers' participation in the production, delivery, and development of the service	Firms and customers	Direct interaction	Co-production	Complex and prolonged service

Author(s)	Conceptualisation	Integrators	Type of interactions	Outcomes of the relative value formation process	Context: complex and prolonged service and/or TBSSs
Ranjan and Read (2016)	Consumers are active and jointly create value with the firm through direct and indirect collaboration across one or more stages of production and consumption	Firms and customers	Direct and indirect interactions	Value co-creation	—
Dong and Sivakumar (2017)	Customer participation as the extent of customer involvement in service production and delivery by contributing effort, knowledge, information, and other resources. Furthermore, customer participation is used to replace co-production and co-creation	Firms and customers	Direct and indirect interactions	Customer participation	—
Dong et al. (2014)	Customer participation as the degree to which a customer contributes effort, preference, knowledge, or other inputs to service production and delivery	Firms and customers	Direct and indirect interactions	Customer participation	—
Spanjol et al. (2015)	Medication adherence is value-in-use generated by patients in their own customer sphere, independent of the service provider, through a system of co-production behaviours	Only customer sphere investigated	Indirect interaction	Adherence/ co-production	Complex and prolonged service
Grönroos and Voima (2013)	The customer is a value creator, but not always a value co-creator. Particularly, value co-creation represents the joint process/direct interactions between firms and customers (or customers with other actors) during usage of resources and processes	Firms and customers and customers with others	Direct interactions	Value co-creation	—
Ramaswamy and Ozcan (2018)	Value creation as a co-creation, defined as enactment of interactional creation across interactive system-environments	Multiple actors	Direct interaction	Value co-creation	—
Caridà et al. (2018)	Value is deriving from multiple actors' activities, interactions and collaboration hence value is co-created and assessed in use	Multiple actors	Direct interaction	Value co-creation and co-destruction	—

Author(s)	Conceptualisation	Integrators	Type of interactions	Outcomes of the relative value formation process	Context: complex and prolonged service and/or TBSSs
McColl-Kennedy et al. (2012)	Value co-creation as benefit realized from integration of resources through activities and interactions with collaborators in the customer's service network	Multiple actors	Direct interaction	Value co-creation	Complex and prolonged service
Schau et al. (2009)	Value resides in the actions, interactions, and projects that acquired resources make possible or support	Community members	Direct interactions	Collaborative value creation	—
Pace et al. (2015)	Value co-destruction implies that the brand community, the firm or their members are worse off after an interaction, whereas value co-creation implies that they are better off	Brand community members and firms	Direct interactions	Value co-creation and co-destruction	Prolonged service
Vargo and Lusch (2004)	Customers are active participants in relational exchanges and co-production	Multiple actors	Direct and indirect interactions	Co-production	—
Vargo and Lusch (2008a)	Value is phenomenologically determined, while the customer is always a co-creator of value	Multiple actors	Direct and indirect interactions	Value co-creation	—
Quach and Thaichon (2017)	Resource integration gives opportunities to obtain new resources hence the value is co-created and the development of the well-being of a system	Multiple actors	Direct and indirect interactions	Value co-creation and co-destruction	—
Marandi et al. (2013)	Value co-creation is the perceptual outcome of resource integration	Multiple actors	Direct and indirect interactions	Value co-creation and co-destruction	TBSSs
Roberts et al. (2014)	Consumer value co-creation is defined as collaborative work between a consumer and a firm in an innovation process, whereby the consumer and supplier engage (to varying degrees) in the activity of co-ideation, co-design, co-development and co-creation of new products or services	Multiple actors	Direct and indirect interactions	Value co-creation	—

Author(s)	Conceptualisation	Integrators	Type of interactions	Outcomes of the relative value formation process	Context: complex and prolonged service and/or TBSSs
Temerak et al. (2018)	Adherence as customers co-production activities that apply service guidelines, within the parameters for personalisation, to progress toward desired service benefits	Multiple actors	Direct and indirect interactions	Adherence/ co-production	Complex and prolonged service

2.4.2 Resource integration process

As mentioned earlier, the extant literature on value and value creation shifts the focus from value-in-exchange to value-in-use arising out of the move from the production to the resource usage and the combination process during the consumption process (Pfisterer & Roth, 2015). In nascent research studies resource integration was considered as equivalent to value co-creation (Findsrud et al., 2018) but they are not synonymous (Caridà et al., 2018). It should be clear that resource integration plays a vital role in creating value (Pfisterer & Roth, 2015) and this process entails combining resources into something new (Findsrud et al., 2018). This means that resources are integrated and not used in isolation (Vargo & Lusch, 2008a; Chandler & Lusch, 2014). Particularly, the customer participates in the value co-creation process by integrating resources obtained through a range of activities and interactions (Vargo & Lusch, 2004; McColl-Kennedy et al., 2012). Within this conceptualisation, activities defined as "performing" or "doing" (cognitive and behavioural) and interactions are the ways individuals engage with others (McColl-Kennedy et al., 2012). Consequently, new resources for potential recipients emerge and then value co-created (Quach & Thaichon, 2017).

In order to analyse the resource integration process, many authors take the view of Vargo and Lusch (2004) classifying the integrated resources into operant and operand resources. On the one hand, operant resources are associated with human (e.g., skills, knowledge and effort), organization (e.g., routines and cultures), information (e.g., knowledge of markets and technology), or relationships among actors. Thus, these resources are often intangible and capable of acting on other resources and known as the fundamental source of gaining competitive advantage (Vargo and Lusch, 2008a). On the other hand, operand resources are commonly physical and tangible such as natural

resources or goods whereby they are acted upon (Navarro et al., 2014). Both operand and operant resources are important, but these resources can only offer value potential (Hilton & Hughes, 2013). Value is realised in use only when the operant resources are activated (Echeverri & Skålén, 2011) and act on others (i.e., operand or other operant resources). Accordingly, operant resources are key to resource integration (Pfisterer & Roth, 2015) while value co-creation is the outcome of resource integration (Findsrud et al., 2018). Having said that, a failure of the resource integration process also triggers negative disconfirmation and dissatisfaction (Caridà et al., 2018) as well as value co-destruction (M. Smith, 2013). For that reason, this study is in line with the recent work of Makkonen and Olkkonen (2017) and Caridà et al. (2018), who propose that resource integration is a key element not only in the value co-creation process but also within the wider process of IVF, though the research on this topic is scant (Pfisterer & Roth, 2015).

2.4.3 Two sides of operant resources

2.4.3.1 Positive effects of operant resources

An increasing number of studies have been conducted for the purposes of gaining understanding of operant resources in the IVF process because of its importance such as “fundamental source of competitive advantage” (Vargo & Lusch, 2004; Vargo & Lusch, 2008a:6). Specifically, the value co-creation literature indicates the positive aspects of these resources, especially those associated with human (e.g., competence, motivation and effort). Previous studies, for instance, find that competence and motivation are necessary for compliance or adherence (Spanjol et al., 2015; Temerak et al., 2018); motivation is a driver of resource integration, is a determinant of effort regarding its direction, intensity, and persistence in value co-creation, and contributes to continuity of value co-creation in the future (Findsrud et al., 2018); motivation for participating social networking sites positively influences customer participation, then brings about effects on brand trust and brand loyalty, and consequently branding co-creation

(Kamboj et al., 2018); customers and employees' perceived efficacy of themselves (self-efficacy) positively moderates customer participation's impact on participation enjoyment (Chi Kin et al., 2012). Similarly, as an operant resource, effort which is considered as an attempt to do something brings about a positive effect on the value co-creation process, finding, for example, that customers' efforts can be utilised to tolerate failure of co-created products or services (Sugathan et al., 2017) and an increased effort in value co-creation enhances customer's well-being (Sweeney et al., 2015). As mentioned earlier, however, resource integration which is embedded in the IVF process can also result in value co-destruction (Quach & Thaichon, 2017; Caridà et al., 2018). As a point of departure, the subsequent sub-section is dedicated to the negative aspects of operant resources.

2.4.3.2 Negative effects of operant resources: An explored knowledge gap

Although there has been increasing research (Pace et al., 2015; Quach & Thaichon, 2017; Sugathan et al., 2017; Caridà et al., 2018) on value co-destruction, the phenomenon of indirect context remains in its infancy. Notwithstanding this paucity, some progresses are being made to understand value co-destruction. The burgeoning set of studies indicate the causes for value co-destruction include (1) resource misuse from firms (inability to provide expected resources) and/or from customers (failure of obtaining desired resources, or involving resource loss) (M. Smith, 2013); (2) the incongruent enactment of practices (Echeverri & Skålén, 2011; Caridà et al., 2018); (3) lack of fit between interacting parties (Pace et al., 2015); (4) collective–conflictual perspectives of beneficiaries on value co-creation (Laamanen & Skålén, 2014); and (5) negative disconfirmation or failing to satisfy the customer's desired usage expectation (Sugathan et al., 2017). Recognising the role of negative aspects of operant resources on value co-destruction notwithstanding, these studies limit themselves to the context of direct

interactions among resource integrators (e.g., between firms and customers; customers and other customers via brand communities). Consequently, their findings are most stemmed from the negative aspects of collaborative and dialogical process (e.g., failed or poor relationship between the firm and the customer) in the IVF process, whereas ignoring the negative effects of operant resources associated with human (e.g., competence, motivation and effort) especially in the indirect interaction context. This research therefore seeks to understand if or how negative and positive effects of operant resources' subjective perception on IVF process exists, if yes, to discover what the effects are. Consequently, this study here identifies the profound effects of IVF intensity and a relationship between outcomes of the IVF process and level of loyalty, which will be briefly discussed in the subsequent sections (Section 2.6 and Section 2.7). Recall (see Section 2.2), this study chose the illustration of weaving the extant literature and the emergent themes (Gioia et al., 2012; Goulding, 2017), which is threefold: to elucidate how the aforementioned research gaps and research objectives are identified from a general review of the literature; to foreshadow the important contributions and emerging theory; to relieve the audience's tedium of working through a lengthy qualitative data presentation. Before jumping into those sections, research gaps are brought up and consequently research objectives are derived in the next section.

2.5 Research gaps and research objectives

In the light of reviewing extant research, the author has identified a number of unaddressed issues. First, the vast majority of studies focus on value co-creation, while value co-destruction (Echeverri and Skålén, 2011) and other closely related concepts such as conflictual value co-creation (Laamanen and Skålén, 2014) remained largely unexplored (Makkonen and Olkkonen, 2017). Consistent with Echeverri and Skålén's (2011) contention suggesting that value co-creation is inseparable from co-destruction

over time and space rather than a simple assumption that the two processes are bipolar in nature, this study addresses this knowledge gap by examining IVF which is a neutral and integrative term can describe both value co-creation and co-destruction simultaneously (Echeverri and Skålén, 2011). The IVF process is ideal in capturing the nexus between value co-creation (the actors are better off), value co-destruction (worse off), or value no-creation (indifferent) (Makkonen and Olkkonen, 2017). Second, despite the importance of indirect interactions or "when the customer consumes resources that are outputs of the firm's processes", the extant value (co)creation body of literature still retains a focus largely on direct interactions or joint and dialogical processes between firms and their customers (Grönroos and Voima 2013:142; Spanjol et al., 2015). Moreover, there is, surprisingly, a paucity of research on resource integration which is a key element in the value co-creation process, especially within the wider process of IVF (Pfisterer and Roth, 2015; Caridà et al., 2018). In short, the interactional nature of resource integration embedded in the formation of value, described as the Interactive Value Formation (IVF) process (Echeverri and Skålén 2011; Makkonen and Olkkonen 2017; Caridà et al. 2018), may result in multiple outcomes ranging from value co-creation (Vargo & Lusch 2008a) to value co-destruction (Plé and Cáceres 2010), with variants in between, including but not limited to value no creation or value no-creation (Makkonen & Olkkonen 2017). The multidimensionality of the IVF process captures the extent of interactions between resources and actors engaged in service experiences. Despite the variations in outcomes which the IVF process can generate, existing studies within complex and prolonged services tend to focus on value co-creation (e.g. Temerak et al. 2018; Sweeney et al. 2015). However, and since Plé and Cáceres's (2010) original formulation, a growing number of studies have explored the paradoxical side of value formation including value co-destruction. Recently, research has also investigated both

sides of IVF processes within the same service context (e.g. Echeverri and Skålén 2011; Skålén et al. 2015). Such an approach avoids viewing value co-creation and value co-destruction as "mutually exclusive" (Cabiddu et al. 2019, p.251) and instead extends the notion of IVF as a multidimensional space with fluctuations within and between resources which interactively can formulate multiple variations in value. Deriving from the aforementioned research gaps, the author came up with the first research objective: to develop our understanding of how customers integrate resources and further (2) to build a better understanding of the IVF process in a complex, prolonged and TBSS experience.

Chief among the issues and lastly, while the positive aspects of operant resources, especially those associated with human (e.g., competence, motivation and effort) have attracted significant attention, their negative effects remain largely unexplored. Therefore, this identified research gap had been linked to the second research objective: to explore whether both the negative and positive effects of subjective perception of operant resources within resource integration and therefore the IVF process exist, if yes, to discover what the effects are.

To sum up, drawing on those identified research gaps in the literature, this study seeks to obtain a better understanding of IVF process including resource integration and IVF outcomes, selecting the context of complex, prolonged and technology-based self-services (i.e., wellness apps), which is an excellent setting for this topic (see Chapter 3 for further information). Particularly, the purpose of this research is threefold:

- First, to develop our understanding of how customers integrate resources and further (2) to build a better understanding of the IVF process in a complex, prolonged and TBSS experience;

- Second, to explore whether both the negative and positive effects of subjective perception of operant resources within resource integration and therefore the IVF process exist, if yes, to discover what the effects are;
- Last, to build a theoretical framework(s) illustrating the emergent phenomena.

2.6 IVF intensity

2.6.1 Extant research on effort

As discussed earlier, this section emerged in the light of data analysis. To begin with, the prior section indicates the ignorance of investigation into the negative aspect of operant resource in the IVF process. In other words, extant research focuses on the art of collaborative value creation in terms of active customers and their endeavour, but disregards the subjective perception of time and effort that the customers must contribute to the IVF process, especially within co-destructive context. In response to the negative aspects of operant resources, this study found the effects of time and effort invested in the IVF process, thus corroborating a number of other studies. Teichmann et al. (2016), for instance, refer to co-production paradox, that is, that while co-production produces benefits to customers and firms, it requires customers to invest a substantial amount of effort and time or implying its negative effects on co-production process and customer loyalty. Although this research is useful, the authors focus on the effects of co-production on customer loyalty, and the roles of process enjoyment and customer self-efficacy in affecting the co-production-loyalty relationship, which is inattentive to the "effort" phenomenon. Fusing the role of time and effort, Haumann et al. (2015:17-18) identify co-production intensity, defined as "customers' subjective perception of the extent of effort and time invested within a specific process of coproducing a product or service". These authors argue that effort and time refer to cost of obtaining goods or services hence greater perceived co-production intensity could lead to a negative effect

on evaluation of customer regarding a co-production process. Subsequently, the authors build on equity theory to examine how perceived co-production intensity affects customer satisfaction. This theory views that customers pursue a fair outcome/input ratio hence an inequitable ratio brings about dissatisfaction. As a consequent, it demonstrates that co-production intensity has negative effects on customer satisfaction with the co-production process. To remedy this effect, corporate communication strategies (i.e., value-enhancing communication strategies and intensity-reducing communication strategies) are suggested to mitigate these negative effects. In a similar vein, Luk et al. (2018) argue that time and effort pertaining to monetary costs, thereby hypothesising that the effort spent in using the service (i.e., effort-in-use behaviour) negatively affects the perceived value of a service. However, this hypothesis is not supported, specifically the effect of effort-in-use behaviour is unstable. As such, the effort spent in using the service does not necessarily have negative effects on the perceived value of a service. Furthermore, Buechel and Janiszewski (2013) indicate the existence of both negative and positive effects of (higher assembly) effort in customised assembly of a product on the value of the to-be-assembled product. Specifically, the study finds that in the customised assembly of a product when customisation decisions and assembly processes are segregated, more assembly effort brings about negative experience. In contrast, when customisation decisions and assembly processes are integrated greater effort results in positive experience in product assembly.

Notwithstanding the contributions, those studies investigate a unidimensional aspect of effort (focusing on considerable effort), and disregard the relationship between IVF outcomes (i.e., value co-creation, value co-destruction and value no-creation) and customer loyalty, especially in the context of complex, prolonged and TBSSs.

2.6.2 The emergent category: IVF intensity

This study addresses those limitations, identifying IVF intensity, defined as customers' subjective perception of the extent of effort and time invested in the IVF process. That is, high IVF intensity results in value co-destruction and low level of loyalty. Low IVF intensity does not lead to value co-destruction and only brings about value co-creation and high level of loyalty when resource integration activities are adequate. In other words, IVF intensity varying dimensionally from low to high, produces both negative and positive effects on IVF process and level of loyalty. In other words, not only the effects of high but also the effects of low IVF intensity have found in the resource integration process or the IVF process and IVF outcomes and level of loyalty.

This study further finds (1) intensity–increasing factors (increasing IVF intensity) including tedious task of manually inputting data; inconsistency and irregularity in performing resource integration activities, especially in Core Integration (displaying low number of interactions with regularity of resource integration activities); the lack of additional motivation from Earning Internal Rewards and Earning External Rewards; and the negative effect of Externally Complementary Integration (e.g., addiction to Comparing and Challenging); and (2) intensity–reducing factors (reducing IVF intensity), that is, consistency and regularity in performing resource integration activities and the positive aspects of Internally Complementary Integration (representing low number of interactions, accompanied by irregularity of resource integration activities) and Externally Complementary Integration (including high number of interactions while resource integration activities can be regular or irregular). As such, this study finds factors that reduce and increase IVF intensity, and consequently suggesting utilitarian and hedonic strategies to mitigate the negative effects of IVF intensity.

Importantly, this is among the first to find a linear relationship between the IVF outcomes and level of loyalty through four loyalty conditions, namely the true loyalty condition (high relative attitude and high repeat purchase), the no loyalty condition (low relative attitude and low repeat purchase), the latent loyalty condition (high relative attitude and low repeat purchase), and the spurious loyalty condition (low relative attitude and high repeat purchase), which is the model of loyalty proposed by Dick and Basu (1994). Thus, a discussion of customer loyalty including loyalty conditions in the next section sheds more light on the dynamics of the emerging theoretical framework.

2.7 IVF outcomes and level of loyalty

2.7.1 Extant research on customer loyalty

Similar to the previous section, this section also emerged in the light of data analysis. To begin with, both practitioners and academics have carried out the quest for customer loyalty (Oliver, 1999a; Taylor et al., 2006) mainly due to its contributions. For instance, it differentiates product and service offerings, attracting new customers (Karise et al., 2015), and retaining customers from competitors' offerings (So et al., 2013). Loyalty also mitigates the effects of infrequent service failure (Yi & La, 2004) and reduces marketing costs as well as gives positive word of mouth (Ruben Chumpitaz & Nicholas, 2007). In addition, it contributes to increasing revenue (Regan & Suzan, 2006; Wieseke et al., 2014), profitability (Liu, 2007; John & Shiang-Lih Chen, 2015) and leading to the success of business organisations (Kim et al., 2013).

Notwithstanding these contributions (Ha & Park, 2013), it remains a lack of a unified conceptualisation on loyalty definition (Magnus, 2006; Watson et al., 2015). The existing definitions tend to remain elusive (Agustin & Singh, 2005) or emerge from different perspectives (Taylor et al., 2006). In other words, loyalty has been interpreted differently depending on the context where it is used (Melnyk et al., 2009). Having said

that, the definition proposed by Oliver (1999a:34) appears to be the most widely accepted:

> "A deeply held commitment to rebuy or repatronise a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behaviour."

In this view, customer loyalty consists of both attitudinal and behavioural aspects. On the one hand, behavioural loyalty includes repeated purchases which have a beneficial effect on firms' financial performance (Wilkins et al., 2009). Nevertheless, this perspective is not enough, since the reasons for repurchase might be favourable attitude, switching barriers and sunken costs (Dick & Basu, 1994). Therefore, customers might feel dissatisfied and spread negative word-of-mouth (WOM) in spite of repurchase (Leisen Pollack, 2017). On the other hand, attitudinal loyalty, which is considered more important than behavioural loyalty, refers to a degree of dispositional commitment. This is because behavioural loyalty depends on situational factors such as availability of a brand while behaviour is driven by attitude behind the purchase (Ruben Chumpitaz & Nicholas, 2007; Lerzan, 2013; Thaichon et al., 2016). Similarly, Umashankar et al. (2017) find that increasing behavioural loyalty makes customers pay more attention to price sensitivity and subsequently decrease in customers' spending and firms' revenue, whereas enhancing attitudinal loyalty causes opposite outcome. However, Watson et al. (2015) contend that attitudinal or behavioural loyalty alone is not as efficient as a combination. As a result, loyalty should not only include purchase repetition or the behavioural dimension but also psychological meaning or attitudinal loyalty (Asunción et al., 2004).

In addition, Oliver (1999a) suggests four levels of loyalty, which clarifies the above definition of loyalty, namely cognitive, affective, conative, and action loyalty. Of these,

consumers can become loyal at any stage and each successor is more loyal than its predecessor; hence cognitive loyalty is deemed to be the first and weakest state of loyalty. At this level, consumer loyalty hinges on whether a brand has competitive advantages or outstanding points such as perceived value, quality and benefits compared to others. In other words, customer loyalty is based only on brand beliefs or factual information, thereby being potentially vulnerable to marketing efforts of competitors, especially in terms of costs and benefits. Affective loyalty, the second phase, uses a liking or attitude to assess and choose a brand. It means that customers use both "brand belief" or information (cognitive level) and a positive attitude toward a brand in order to repurchase. Having said that, dissatisfaction at the cognitive level or even satisfaction that is not necessarily to become loyal (Chitturi et al., 2008), together with attractiveness of alternatives make switching continue occurring. Next, a deeper commitment to repurchase or pursue a preferred brand is exhibited in the third phase (conative loyalty or behavioural intention). Oliver (1999a) also emphasises that this commitment is the behavioural intention, but not real behaviour to repurchase. Therefore, this intention in the last stage is converted into "readiness to act" (Oliver, 1999b:34) in the highest state of customer loyalty (action). This stage also exhibits a desire to overcome obstacles such as marketing efforts of competitors to achieve the intended action. Although this stage has the deepest commitment to rebuy, the vulnerabilities still exist due to insurmountable unavailability.

In a similar and related manner, Dick and Basu (1994) introduce four types of loyalty deriving from two dimensions of repeat patronage and relative attitude. These loyalty conditions include the true loyalty condition with high relative attitude and high repeat purchase, the no loyalty condition with low relative attitude and low repeat purchase, the latent loyalty condition with high relative attitude and low repeat

purchase, and the spurious loyalty condition with low relative attitude and high repeat purchase. This integrated conceptual framework has received considerable attention and has received support in numerous studies (Johnson & Bove, 2009; Møller Jensen, 2011; Ngobo, 2017). Importantly, both theoretical and empirical research (Dick & Basu, 1994; Ngobo, 2017) indicate that customers can move among different loyalty conditions over time, which is meaningful especially suggesting that managers can change loyalty conditions of customers (e.g., from no loyalty condition to the more desirable ones). In addition, the next sub-section extends the scope by an interdisciplinary approach rather than extensively focusing on customer loyalty.

2.7.2 An interdisciplinary approach

Several studies have identified the benefits of customer participation regarding quality of life (McColl-Kennedy et al., 2012), customers' satisfaction (Dellande et al., 2004b; J. Cossío-Silva et al., 2013), well-being and satisfaction (Guo et al., 2013), quality of life and satisfaction (Sweeney et al., 2015). In line with this trend, some other researchers also find positive short-term effects of customer participation on brand loyalty (Apenes Solem, 2016), significant effects of co-production (Auh et al., 2007) and value co-creation (Cossío-Silva et al., 2016) on attitudinal loyalty, whereas Teichmann et al. (2016) discover curvilinear effects of co-production on customer loyalty, that is, that a positive linear relationship between co-production and customer loyalty can become negative after a certain level. In addition, extant research on value and value co-creation also demonstrate the decisive, but varying, role of customer in transforming potential value into value-in-use (Sweeney et al., 2018). Particularly, although the customer always uniquely and phenomenologically determines value, each person has different approaches to involving in the value creation process (McColl-Kennedy et al., 2012) and cause different outcomes such as different IVF outcomes, namely value co-creation,

value co-destruction, or value no-creation (Makkonen & Olkkonen, 2017). Moreover, customer effort in value co-creation activities are linked to quality of life and satisfaction (Sweeney et al., 2015) while greater perceived co-production intensity (substantial amount of time and effort in the co-production process) could lead to a negative effect on customer's evaluation, and consequently customer dissatisfaction with the co-production process (Haumann et al., 2015). It therefore is useful to gain insights into whether the IVF process and its outcomes affect the four loyalty conditions (Dick & Basu, 1994) and vice versa.

Despite the aforementioned importance of loyalty and meaningful findings of extant research on customer loyalty and value (co)creation, no empirical research explores whether there is a link between inseparable existence of the creation and destruction of value and level of loyalty through the four loyalty conditions classified by (Dick & Basu, 1994). This is where this study's key contribution lies, that is, that a linear relationship between the IVF outcomes and level of loyalty emerges. Specifically, individuals tend to have high level of loyalty (e.g., true loyalty) if they perceive the high value co-created and vice versa low/medium extent of IVF outcome (e.g., perception of value diminished or even destroyed) only leads to low/medium level of loyalty (e.g., no loyalty).

2.8 Conclusion

In conclusion, this chapter commenced by delineating the adoption of a level of semi-ignorance about the literature review at the first phase of this thesis, then literature comparison was performed to validate and improve the theory that explained the phenomenon. Subsequently, the chapter presented a review of research pertaining to fundamental preconceptions of value co-creation and related terms (e.g., value propositions, value-in-use). Following this, different perspectives on value co-creation

and value co-destruction as well as the resource integration process are discussed, then this research gave its own interpretation. Next, this chapter summarised the knowledge gaps in the examined literature and declared the research objectives developed by this thesis to address these knowledge gaps. Importantly, this thesis presents in true grounded theory fashion not only in this chapter but also throughout this research (see also Chapter 5). Particularly, this chapter does not follow the traditional format of literature review (e.g., key concepts, discussion of extant research, research gaps, research objectives/questions, conclusion, etc.), rather follows the presentation of weaving the extant literature and the emergent categories/findings (i.e., the key preconceptions, discussion of extant research, research gaps, research objectives/questions, the emergent categories/findings, and conclusion). Following this, the next chapter describes the research context and justification for this selection.

Chapter 3 Justification of the Research Context

3.1 Introduction

The previous chapter, Chapter 2, introduced fundamental preconceptions, followed by the identified research gaps and research objectives to address these gaps. Importantly, two key findings were presented to foreshadow the important contributions and to relieve the audience's tedium of working through a lengthy qualitative data presentation. This chapter presents the justification of the research context to address these research objectives. As such, complex, prolonged and TBSSs are introduced and justified as an ideal research context for this study.

The following section, Section 3.2, begins by introducing and clarifying the differences among services related to the phenomena of interest, namely complex and prolonged services (Sub-section 3.2.1), technology-based self-services (Sub-section 3.2.2), and complex, prolonged and technology-based self-services (Sub-section 3.2.3) which represent complex and prolonged services involving a technological component. Subsequently, Sub-section 3.2.4 provides rationale for situating the research within the broad context of complex, prolonged and technology-based self-services.

Following this, Section 3.3 raises global health issues and consequently introduces health apps, especially wellness apps as the specific context selected for this study and provides justification for that. Last, Section 3.4 gives a summary of this chapter.

3.2 Complex, prolonged and TBSSs

3.2.1 Complex and prolonged services

A healthy lifestyle including healthy eating and physical activity plays a key role in weight loss and disease prevention such as heart disease, stroke, cancer, and diabetes (Jamison et al., 2006; Bolton et al., 2008). In addition, successfully managing financial debt (e.g., reduced spending) protects oneself against an undesirable situation and enhances one's

well-being. However, the continuation of these good behavioural habits can be challenged on a daily basis such as to cook or not to cook, to smoke or to quit smoking, to save for the future or to spend for an immediate need. Consequently, services related to well-being (i.e., general health and happiness) and behavioural change/management including healthcare (e.g., weight management), personal financial management (e.g., debt reduction), and others (e.g., smoking cessation) have become increasingly common (Guo et al., 2013). For instance, a large number of individuals are seeking help to manage their weight, specifically the Weight Loss and Weight Management Market held a value of $168.95 billion in 2016 and is expected to grow to $278.95 billion at the end of 2023 (Dallas, 2018).

Having said that, Guo et al. (2013) indicate that success rates of utilising these services to change customer's behaviours and ensure well-being are very low. One justifiable reason for this low success rate resides in the strict requirements of services or requiring a considerable range of resources (i.e., cognitive, emotional and physical inputs) to coproduce the service often over long periods of time by adhering to instructions furnished by firms for the purpose of goal attainment. These services are, thus, different from services entailing simple service delivery and one-time transactions. Consistent with prior research (Guo et al., 2013; Spanjol et al., 2015; Temerak et al., 2018), these services (e.g., weight management, education and sports) are termed complex and prolonged services, i.e., they require long-term usage and typically, higher levels of customer participation in multiple service encounters for ensuring the desired benefits. In other words, substantial resources (e.g., knowledge, effort, motivation) and customer adherence to the firm's guidelines are needed for co-production and positive outcomes over long periods of time. In the subsequent sub-section, other related

services (i.e., technology-based self-services) are discussed to clarify the context of this research.

3.2.2 Technology-based self-services

Self-services represent services which demonstrate extensive customer involvement, requiring customers' active participation in the service co-production process (e.g., pumping gas at a gas station) in which the customer performs all aspects of the service with minimal firm employees' support (Haumann et al., 2015). Therefore, these self-service contexts require customers to use more resources during the resource integration process compared to traditional-full service types (Pfisterer & Roth, 2015).

With the rapid advances and widespread acceptance of technology, technology-based self-services (TBSSs), defined as self-services involving a technological component (e.g., Internet shopping services, automated hotel checkout, banking apps), have been likely to grow (Drennan et al., 2013). TBSSs have also increasingly replaced traditional full service (Reinders et al., 2008) and drawn attention to both practitioners and scholars (Scherer et al., 2015). TBSSs enable customers to take part in self-service behaviours without direct involvement of service employees while customers need to adopt a new role and need extra effort than traditional full service (van Beuningen et al., 2008).

Particularly, TBSSs, according to S-D logic, are operand resources owing to their commonly physical and tangible characteristics as well as demand for acting from operant resources (e.g., customer uses effort to adopt TBSSs) to create value. The operant resources (e.g., skills, effort, motivation of the customer) and the operand resources (e.g., TBSSs) facilitated by the firm (Hilton & Hughes, 2013) are integrated to engage in the IVF process, which can lead to either value enhancement or value destruction (Marandi et al., 2013). These characteristics of TBSSs require customers to play a more active role rather than passive roles in service co-creation (Marandi et al.,

2013). In other words, instead of co-creating with service employees representing direct interaction, value is created during the usage of TBSSs or customers indirectly co-create value with the firm by serving themselves. This view is reinforced by previous findings indicating that customers activate co-production process when engage in TBSSs (Meuter et al., 2005; Haumann et al., 2015) or TBSSs increase customer participation in the co-production process (Hilton & Hughes, 2013). In addition, value is uniquely and contextually determined by the customer (Vargo & Lusch, 2008a) whereby different customers potentially evaluate the same service offering and the same technology in different ways. Consequently, technology is not only considered as the distinct features and capabilities, but is also embedded in the context of usage (Scherer et al., 2015). Deriving from those two services (complex and prolonged services and TBSSs), the next sub-section presents the selected context of a complex and prolonged service involving a technological component.

3.2.3 Complex, prolonged and technology-based self-services

With the development of technology, complex and prolonged services with an involvement of a component of a self-service technology(ies), which are coined complex, prolonged and technology-based self-services (i.e., complex, prolonged and TBSSs), have become increasingly common. The traditional complex and prolonged services (e.g., weight management, education and sports) can take advantage of self-service technologies, such as an increased productivity for firms, an increased convenience and an improved control in the usage process for customers (Scherer et al., 2015) to attract both managers and customers. Indeed, these services have been diffused rapidly and have found their way into the current service economy. An example can be seen in the mobile health app market where a large number of health apps have been downloaded and used for various purposes (Istepanian, 2016), with, for instance,

approximately 260,000 health apps available and 3.2 billion downloads globally in 2016 (Research 2 Guidance, 2016). This segment is most likely to grow, with a Compound Annual Growth Rate (CAGR) of 35% in the UK and 49% worldwide in the period 2014-2018 compared with merely 12.5% of the growth rate of the global mobile apps market in 2016 (Min-Woo et al., 2016). Because of its burgeoning diffusion, the following sub-section provides further insights and justification for selecting complex, prolonged and TBSSs as an ideal research context for this study.

3.2.4 Rationale for research context

3.2.4.1 Revisiting the research objectives

The previous chapter, Chapter 2, indicates four issues remaining unaddressed in the literature whereby the study here seeks to fulfil this knowledge gap. Recall, first, value co-destruction (Echeverri and Skålén, 2011) and other closely related concepts such as conflictual value co-creation (Laamanen and Skålén, 2014) remained largely unexplored (Makkonen and Olkkonen, 2017). Second, the extant value (co)creation literature still retains a focus largely on direct interactions or joint and dialogical processes between firms and their customers in spite of the importance of indirect interactions (Grönroos and Voima, 2013; Spanjol et al., 2015). As such, it still remains unclear how and why value is destroyed, especially in the indirect interaction context. Next, resource integration is a key element not only in the value co-creation process but also within the wider process of IVF, there is, surprisingly, a paucity of research on this topic (Pfisterer & Roth, 2015; Caridà et al., 2018). Importantly, the positive aspect of operant resources, especially those associated with human (e.g., competence, motivation and effort) has attracted significant academic attention, whereas its negative aspect has not been adequately studied. Consequently, the purpose of this research is threefold:

- First, to develop our understanding of how customers integrate resources and further (2) to build a better understanding of the IVF process in a complex, prolonged and TBSS experience;
- Second, to explore whether both the negative and positive effects of subjective perception of operant resources within resource integration and therefore the IVF process exist, if yes, to discover what the effects are;
- Last, to build a theoretical framework(s) illustrating the emergent phenomena.

3.2.4.2 The rationale for complex, prolonged and TBSSs

After considering the research objectives, the current research selects the context of complex, prolonged technology-based self-services because they are an increasingly relevant but unexplored context. Specifically, below are five reasons why this context is chosen.

a) Suitable context for investigating indirect interaction and value co-creation

Complex and prolonged services (e.g., weight management and education) require customers to contribute a considerable range of resources within their own spheres during the service consumption process representing indirect interactions, often over prolonged periods of time, and consequently value created from it (Spanjol et al., 2015; Temerak et al., 2018). Hence, customer performance is crucial to ensure positive service outcomes (Guo et al., 2013). In addition, technology-based self-services (TBSSs) enable customers to take part in self-service behaviours involving a technological component without direct involvement of service employees representing indirect interactions while customers need to adopt a new role and extra effort than traditional full service (van Beuningen et al., 2008). Critically, TBSSs have been noted to increase customer participation in the co-production process (Meuter et al., 2005; Hilton and Hughes, 2013; Haumann et al., 2015), enabling value co-creation (Scherer et al., 2015).

Accordingly, complex and prolonged services involving self-service and a technological component (i.e., complex, prolonged and TBSSs) provide an ideal context for investigating value co-creation and indirect interactions.

b) Suitable context for investigating value co-destruction and the negative effects of operant resources

Complex and prolonged services also involve multiple and contextualised behaviours, fluctuating over time (Spanjol et al., 2015). For example, a weight-management service often requires customers to repeatedly engage in goal-consistent behaviours (e.g., doing regular exercising, eating healthy food), whilst minimizing goal-inconsistent behaviours (e.g., stopping an enjoyable habit or eating junk food), over the long period of time (e.g., days, months, or even years). As such, in the long term there is not a point at which maintaining an open-ended goal (e.g., weight management, healthy eating goals) is finally achieved (Campbell & Warren, 2015). At the same time, customers may also face considerable challenges in adopting and embracing technological competences, especially if this involves a new consumer role. Compounding this effort is the lack of direct support of service employees (Meuter et al., 2005). Therefore, the complications arising from participating in complex, repeated tasks over prolonged time might bring about negative experiences and unexpected outcomes despite active participation. Thus, this setting is highly relevant to investigate value co-destruction and the negative effects of operant resources.

c) Suitable context for investigating various experiences

Regarding the context (see Table 3.1), previous studies demonstrate its relevance to different types of customers with various experiences and evaluation during engaging in IVF process. For instance, McColl-Kennedy et al. (2012) find a typology of different (five) practice styles in value co-creation activities among those who engage in ongoing

cancer treatment (i.e., complex and prolonged services). Particularly, patients who exemplify two practices namely “team management” and “partnering” are associated with high quality of life, followed by “pragmatic adapting” with moderate quality of life; and the others (i.e., “passive compliance” and “insular controlling”) with relatively low quality of life. Similarly, investigating medication adherence in chronically ill (e.g., diabetes) individuals, Spanjol et al. (2015) find three different levels of co-production including both failure and success in adhering to recommended behaviours and emphasise the contextual nature of co-production. Accordingly, it is likely to provide a good context to examine different types of customers with various experiences such as value co-creation, value co-destruction, positive and negative effects of resources.

d) Lack of research on negative side of operant resources

The extant research on the context of complex and prolonged service or TBSSs has neglected the negative aspects of operant resources, focusing on its positive aspects, particularly finding that customer motivations and capabilities are determinants of firms’ success in persuading customers to engage in recommended behaviours (Dellande et al. 2004b; Guo et al. 2013; Spanjol et al. 2015; Temerak et al. 2018), customer effort in value co-creation is linked to quality of life and customer satisfaction (Sweeney et al. 2015).

e) Lack of research on complex, prolonged and TBSSs

The current research on TBSSs has mostly focused on initial technology adoption, but less attention has been given to post usage behaviour (Djelassi et al., 2018), especially post usage customer experiences and therefore value creation. This is surprising since TBSSs frequently require co-production and new service behaviours (van Beuningen et al., 2008; Haumann et al., 2015), and in some extreme cases, TBSSs may be the only available delivery option, thereby requiring customer participating at a much higher

level (Dong et al., 2014). Consequently, the customer is not only value co-creator, but also active co-producer of the core offering itself (Scherer et al., 2015). Accordingly, there is limited research investigated value co-creation despite its relevance in the context of complex, prolonged and TBSSs (see Table 3.1).

Taken together, the first three justifications demonstrate that complex, prolonged and TBSSs are highly relevant to investigating the various experiences relating to value co-creation, the negative effects of operant resources and value co-destruction in the customer sphere representing indirect interactions while, surprisingly, the last two justifications illustrate the lack of research on this topic, especially the negative aspect of operant resources within the complex, prolonged and TBSSs. Consequently, complex, prolonged and technology-based self-services are selected as an increasingly relevant but unexplored context in order to address the identified research gaps and achieve corresponding research objectives.

Table 3.1. Empirical research on value co-creation in the context of complex and prolonged service or TBSSs

Author(s)	Type of service	Research setting	Domain	Focus/findings	Outcomes
Current study	Complex, prolonged and TBSSs	Wellness apps	Value co-creation, no-creation, co-destruction	The two-sided aspects of IVF intensity on IVF process including IVF outcomes and customer loyalty	IVF outcomes and customer loyalty
McColl-Kennedy et al. (2012)	Complex and prolonged service	Ongoing cancer treatment	Co-creation	Activities of value co-creation in health care. Then, customer roles, activities, and interactions are highlighted in the five practice styles of health care customer value co-creation.	Quality of life
Sweeney et al. (2015)	Complex and prolonged service	Three prevalent chronic diseases—cancer, heart disease, and diabetes	Co-creation	Customer Effort in Value Co-creation Activities (EVCA) and links between customer EVCA and quality of life, satisfaction with a health care service and behavioural intentions.	quality of life, satisfaction
Spanjol et al. (2015)	Complex and prolonged service	Medication adherence in chronically ill (e.g., diabetes) individuals	Adherence/ co-production	Participants' consumption behaviours and routines around medication taking and disturbances in medication adherence and resolutions examined. Consequently, a system of nested and interdependent co-production behaviours in individuals' medication adherence suggested	Not focus
Temerak et al. (2018)	Complex and prolonged service	A weight-loss programme	Adherence/ co-production	The role of educational and emotional support provided by the firm and other customers through non-personal and personal service interfaces and their impact on customer adherence.	Not focus

Author(s)	Type of service	Research setting	Domain	Focus/findings	Outcomes
Dellande et al. (2004a)	Complex and prolonged service	A weight-loss programme	Compliance	Provider expertise and attitudinal homophily are vital to cause customer role clarity, ability and motivation and consequently compliance. This also leads to goal attainment and satisfaction.	Customer satisfaction
Guo et al. (2013)	Complex and prolonged service	Debt management programs	Compliance /co-production	The effect of role clarity, task mastery, and goal congruence on different types of consumer co-production behaviours, consumers' well-being as well as satisfaction	Financial well-being & Customer satisfaction
Marandi et al. (2013)	TBSSs	One time services: self-service checkouts, or self-service kiosks	Co-creation & co-destruction	Potential risks and challenges of *relying on the operant resources* of customers, who lack the tacit knowledge of employees and are less easy to manage TBSSs; and the need to *manage a new employee role*: "self-service education, support and recovery	Not focus
Meuter et al. (2005)	Prolonged and TBSSs	Consumers' prescription refill ordering through a mail-order pharmacy	Co-production	Role clarity, motivation, and ability determine successful TBSS co-production and the likelihood of trial	Not focus

3.3 Wellness apps

3.3.1 Global health issues

Better living conditions, improved medical treatment (Whitehead & Seaton, 2016), and the rapid advances in technologies over the past decade have contributed to better health-care and consequently increases in average life expectancy worldwide by 5 years over the period 2000-2015 (WHO, 2017a). It is predicted that this trend will continue to rise in the elderly until 2020 (Lee et al., 2017). While this trend is encouraging overall, it also presents critical challenges for human beings given that living longer as well as improving treatments in therapeutic areas and rising labour costs lead to increased health care expenditures. That is, the expenditures of health care are predicted to reach $8.7 trillion by 2020 from $7 trillion in 2015 globally (Deloitte, 2017). Furthermore, Anderson et al. (2016) suggest that living longer also causes more pressure on the healthcare system and increased self-care requirements. Apart from rising labour costs, workforce shortages are also the other factors of rising hospital cost or expense on health care. For example, recruiting and maintaining permanent medical staff have been an important issue in the United Kingdom, which has a demand of about 50,000 full-time employees (Deloitte, 2017). Similarly, physicians are overloaded with work in Turkey (Sezgin et al., 2017) and healthcare cost is also an issue in the United States because it is substantially increasing (Platt et al., 2016).

Another challenge for global health is noncommunicable diseases, such as cancer, strokes, cardiovascular diseases, chronic respiratory diseases and diabetes, which accounted for 70% (nearly 40 million) of deaths in 2015 (WHO, 2017a). As such, these diseases are also the main cause of mortality in the world (WHO, 2017c). The main causes of these diseases which are unhealthy lifestyle (e.g., unhealthy diets and a lack of physical activity) and an ageing population (WHO, 2017b). From a healthcare

spending perspective, noncommunicable diseases cause economic losses (National Institute on Aging National Institutes of Health, 2011) which could reach $47 trillion by 2030 (Kelland, 2011). Moreover, Deloitte (2017) predicts that cardiovascular diseases, cancer and respiratory diseases will need approximately $4 trillion or 50% of global health care expenditures by 2020. Last but not least, University of Rochester Medical Center (2017) states top 10 most common health issues, namely physical activity and nutrition, overweight and obesity, tobacco, substance abuse, HIV/AIDS, mental health, injury and violence, environmental quality, immunization and access to health care, and then indicates their detrimental effects and possible solutions. Fortunately, doing regular exercise and have a healthy lifestyle can help prevent or delay diseases such as cancers, heart disease and diabetes (Jamison et al., 2006). The following section will, therefore, examine the role of health apps and related technology in terms of addressing these issues.

3.3.2 Health apps

3.3.2.1 Definition

Mobile apps are defined as software applications installed and executed on smart devices (Kuo-Fang et al., 2014), thereby health apps are those that offer health-related services for smart devices including smartphones, tablet PCs, watches. For the purpose of improving health, these apps tend to provide information, advice, instruction, prompts, support, encouragement, and interactive tools for individuals to track, record and reflect (Dennison et al., 2013a). Health apps are also known as mHealth apps, health-related apps (Istepanian, 2016), but it will be referred to as health apps in this research for consistency.

3.3.2.2 Categorisation

Currently, there are various kinds of health apps available on different devices (e.g., smartphones, smartwatches) and different mobile operating systems such as iOS or

Android. Accordingly, there are different ways to classify health apps. For instance, they can be divided into those for general population, patients and those for healthcare professionals (Presswire, 2016). Istepanian (2016:80) summarises the extant literature and provides following categories of health apps:

- Support users improve health by prevention; interaction and social networking;
- Consist of functions related to managing, tracking and assessing diseases. For example, apps that provide tools for trend analysis or medication reminders;
- Related to ageing and living independently, such as smart home living, supporting patients with mental disease, and monitoring and assisting elderly people;
- Include functions to support remote diagnostics and radiological imaging;
- Target healthcare services worldwide, electronically tracking user behaviour via patient records, disease prediction, and prevention;
- Provide self-assistive and behavioural change tools, psychological support, and interactive health games; and
- Provide support for medical staff, education, and clinical assessments.

Commonly, health apps can be classified into two categories. The first one includes exercise, weight loss, women's health, sleep and meditation, medication reminder and other apps, while the second category consists of medical reference, and other applications like apps for mental health, dermatological treatment, and emergency response. Of these, exercise apps are dominating the health apps market (Presswire, 2013) while in a more recent study, Kao and Liebovitz (2017) suggest that wellness apps (i.e., fitness, lifestyle modification, diet and nutrition apps) and chronic disease apps are the most common.

3.3.2.3 Health apps as a potential solution

In a Technology Trends 2014 report, Deloitte University Press (2014:55) suggests that technological advances including wearable devices may offer great opportunities for empowering healthcare users (Wiederhold, 2015) as below:

> "The mobile revolution placed powerful, general-purpose computing in our hands, enabling users to take actions in the digital world while moving about in the physical world."

Global health problems are complicated and changing, thereby resolving these issues needs contributions from various sources and solutions. The advent of new technology and the increase in smartphone adoption (Kwon et al., 2016) have enabled health apps to become an increasingly vital method of enhancing the lives of not only vulnerable and existing patients/users from various diseases, but also general population who uses health apps to adopt and maintain a healthy lifestyle. With approximately 6.1 billion smartphone owners worldwide before 2020 (Lunden, 2015), the adoption rate is notable among young generations (Kwon et al., 2016). For example, 77% of Americans now own smartphones (92% of young adults aged 18–29; 88% of 30–49 adults; 74% of 50–64 adults, but of 65+ only 42%) (Pew Research Center, 2017). In a similar vein, 81% of adults, and 91% of people from 18 to 44 years old in the UK own at least one smartphone (Deloitte, 2016). Smartphones and the faster speed of 3G, 4G and 5G networks can be a useful tool to support users in healthcare development. For example, there are about 62% of smartphone users in the United States using their smartphones to look up health information in 2014 (Smith, 2015), compared to 52% in 2012 (Einarsen, 2012). More specifically, there are more people interested in looking for health information in smartphone apps (Kwon et al., 2016) and utilizing digital data for both disease and health-related tracking (Baldwin et al., 2017).

Recent studies indicate that health apps can be a useful tool for addressing the health issues. First, Savitz (2012) predicts that health apps will improve access to care

(Whitehead & Seaton, 2016) since the smartphone apps reduce the requirements of meeting at the same time among patients and doctors and increase patient engagement by avoiding discouraged aspects, such as wait in the physician's office or complexity. Second, health communication between patients, families, care providers and health outcomes can be improved by health app use (Whitehead & Seaton, 2016; Lin & Bautista, 2017). Next, health apps can provide effective tools for self-management and monitoring among people with chronic diseases (Molina Recio et al., 2016), addressing non-compliance which costs about $290 billion per annum in the United States, intervening health-related behaviour (Dennison et al., 2013b) and changing health behaviour for social good (Kwon et al., 2016). The flexibility of health apps is also manifested in delivering health care to remote and undeserved areas so that chronic diseases can be treated outside hospital (García-Gómez et al., 2014). Consequently, in the long-term users can become more independent and confident (Anderson & Emmerton, 2016) while the cost of health-care delivery may be reduced and the quality of care improved (Bhuyan et al., 2016). More importantly, health apps offer toolkits for general health care and supporting fitness and healthy eating behaviour which play a crucial role in preventing noncommunicable diseases (Bendegul & Anil, 2014) and preventing perinatal depression (Osma et al., 2016).

As a consequence, health apps have seen as healthcare innovations (Wiederhold, 2015) and have applied in diverse empirical studies to support users while their number continue to proliferate (Boudreaux et al., 2014; Deloitte, 2015; Singh et al., 2016). Many kinds of health apps are now downloaded and used for various purposes (Istepanian, 2016), with approximately 260,000 health apps available and 3.2 billion downloads in 2016 globally (Research 2 Guidance, 2016). This reflects the potential for targeting heterogeneous customers and addressing specific needs for various health issues

(Whitehead & Seaton, 2016). Although it is currently the smallest segment in the digital health market, this segment is most likely to grow, with a CAGR of 35% in the UK and 49% worldwide in the period 2014-2018 (Deloitte, 2015). These rates, however, seem to be substantial since they are significantly higher than the growth rate of the global mobile apps market which is 12.5% in 2016 (Min-Woo et al., 2016).

Despite the high growth rates, revenue is a challenge due to low levels of reimbursement. Specifically, most health apps offer free trial versions (Lin & Bautista, 2017) while paid apps often cost lower than $2 (Presswire, 2013), though this low-cost strategy contributes to reduced cost of health-care delivery (Bhuyan et al. 2016) and is likely to increase adoption rate. In addition, there are a large number of small providers (e.g., over 50% of the current apps had less than 500 downloads) hence the health app market is highly fragmented. Importantly, there are a very low frequency of usage among most health apps (Economist, 2016) and a large number of health apps abandoned within a short period of time (Krebs & Duncan, 2015; Baldwin et al., 2017). For example, 80% of health app usage lasts only two weeks (Nosta, 2014). This is a significant challenge since using repeatedly overtime is an essential requirement in many health apps to achieve goals (e.g., weight loss) or to optimise full value from users. This study therefore seeks to additional insights into user attrition in the specific context of health apps and consequently contributing to better understandings of the IVF process including the resource integration process and the effects of subjective perception of operant resources. In so doing, the subsequent sub-section provides a critical review on current health app literature which is of paramount importance to provide further insights into the research context and to complement the identified research gaps.

3.3.2.4 Extant studies on health apps

The extant health app literature tends to focus on particular contexts such as mental health (Radovic et al., 2016), asthma (Kenner, 2015), weight loss (Maturo & Setiffi, 2015) and on specific functional aspects including but not limited to the design-oriented user interfaces (Årsand et al., 2012; Fitzgerald & McClelland, 2016). Actual behavioural aspects are also employed to examine the effectiveness of use and key factors for health app development (Dennison et al., 2013b; Pierce et al., 2016; Singh et al., 2016; Armin et al., 2017; Teo et al., 2017); health app adoption (Cho et al., 2015; Kwon et al., 2016; Peng et al., 2016; Lin & Bautista, 2017). However, little is known about the motivations behind adopting health apps (Cho et al., 2017), continued use (Cho, 2016), as such our understanding on post usage experience and user attrition dynamics and therefore the IVF process remain limited at best, with some exceptions. Cho (2016) for instance, find that perceived usefulness, perceived ease of use, confirmation, and satisfaction positively influence the intention to use health apps. Peng et al. (2016) do extend the value co-construction paradigm and explore value deconstruction by exploring the barriers to health app adoption (low awareness of health apps, lack of app literacy); barriers to continued use (required time and effort, lack of motivation and discipline); motivators to use health apps (i.e., social competition, tangible and intangible rewards, hedonic factor, internal dedication and motivation, information and personalised guidance, tracking for awareness and progress, credibility, goal setting, reminders, and sharing personal information). Although these findings are useful, Cho (2016) and Peng et al. (2016) lack deep insights into the dynamics involved in the IVF process, especially the multidimensional effects of operant resources in the context of complex, prolonged and TBSSs. This is where this study's key contribution lies (see Implications sections for further discussion on the multidimensional aspects of operant resources).

3.3.3 Rationale for wellness apps

This study investigates the context of the general population and their relationship to wellness apps (fitness, lifestyle modification, diet and nutrition apps) (see Appendix 4, Appendix 5, and Appendix 6 for examples of wellness apps), excluding medical apps. Wellness apps, or apps designed to improve overall health such as those encouraging fitness, lifestyle modifications and nutrition. Given earlier IVF explorations utilising physical health consumption contexts as prototypical examples of complex and prolonged services (Guo et al. 2013; Temerak et al. 2018), we utilize wellness apps to encapsulate the extended TBSS element. The general population comprises 70% of the target audience for health apps (Molina Recio et al., 2016). General healthcare and fitness apps are also the largest segment in health app market (Presswire, 2016) while fitness and nutrition are found to be the most used in a survey of 1604 mobile phone users in the United States (Krebs & Duncan, 2015). In addition, fitness, lifestyle modification, and diet and nutrition services (e.g., a weight-loss programme) are considered as complex and prolonged services since a substantial amount of effort, competencies and motivation are required during a prolonged period of time to maintain a healthy lifestyle (Campbell & Warren, 2015) and therefore to engage in co-productive behaviours (Temerak et al., 2018). Wellness apps are also described as TBSSs because mobile applications or apps represent an important manifestation of TBSSs (Newman et al., 2017).

Taken together, wellness apps (i.e., fitness, lifestyle modification, diet and nutrition apps) were selected as the specifically empirical setting for this study because they are considered as complex, prolonged and TBSSs and account for the largest segment in health apps market. As such, it provides opportunities to investigate the IVF process including both value co-creation and value co-destruction; both negative and

positive aspects of operant resources (e.g., motivation, effort) in the customer sphere (i.e., representing indirect interactions among integrators/actors such as between the firm and the customer). The purpose of this research, thus, is to shed light on the context of prolonged, complex, and technology-based self-services (i.e., wellness apps) within the customer sphere to address the lack of research on indirect interaction and to obtain insights into the unexplored domain of IVF process including resource integration and IVF outcomes, especially the negative side of operant resources associated with human (e.g., competence, motivation and effort) as well as providing additional insights into user attrition. In short, despite the increasing importance and a plethora of studies in wellness apps, understanding on post usage experience and user attrition remain limited. Therefore, the specific context of wellness apps provides opportunities to achieve the research objectives and additional insights into user attrition.

3.4 Conclusion

In conclusion, this chapter commenced by discussing different services (complex and prolonged services, TBSSs, and complex, prolonged and TBSSs) to justify the selection of the complex, prolonged and technology-based self-services as the broad context of this thesis.

To begin with, Section 3.2 introduced and clarified the differences among services related to the phenomena of interest and further demonstrated the selected context is excellent to fulfil the research objectives. Specifically, it indicated that these chosen services are increasingly relevant to investigating the various experiences relating to value co-creation, the negative effects of operant resources, value co-destruction, and indirect interactions. Increasing relevance notwithstanding, this context is unexplored due to the lack of research on this topic, especially the negative aspect of operant resources within the complex, prolonged and TBSSs.

Following this, Section 3.3 indicated the important contribution of using health apps to dealing with unresolved global health issues. Moreover, a summary of the extant research on health apps were made to complement the need for choosing health apps and the need to gain a better understanding of user attrition phenomenon. Consequently, wellness apps representing complex, prolonged and TBSSs were chosen as the specific context for this study. In order to solve the research problems, the next chapter establishes appropriate philosophical assumptions and as a consequence to choose a specific paradigm, including a specific research methodology and approach for this thesis. In addition, a qualitative approach (grounded theory) and in-depth interviews are adopted to delivering answers to the research objectives.

Chapter 4 Research methodology

4.1 Introduction

In the previous chapter, the selected context of complex, prolonged and TBSSs (i.e., wellness apps) was established and its corresponding justification was offered. In light of the identified research gaps, the corresponding research objectives and the selected context presented in previous chapters (Chapters One to Three inclusive), this chapter presents a critical review of available methodological choices to address the research problems and to achieve the research objectives.

Specifically, Chapter 4 is structured in four parts. First, Section 4.3 considers research philosophies and methodologies in general. This is done through reiterating the identified research gaps and the corresponding research objectives in Section 4.2. Consequently, an appropriate research paradigm with its epistemological and ontological stance, research methodology is chosen. The second part of the chapter gives rationale for choosing specific approaches (i.e., grounded theory and in-depth interviews) in Section 4.4. In line with the underpinning principles of the selected approaches (i.e., grounded theory and in-depth interviews), the subsequent part outlines the operational research design to answer which methods for data collection and data analysis are relevant for the current research. Specifically, this part includes sampling in Section 4.5, data collection in Section 4.6 and data analysis in Section 4.7. Following this and last, Section 4.8 suggests criteria for evaluating grounded theory research while Section 4.9 provides a brief summary of this chapter.

4.2 Research objectives and research questions

At this point it is important to reiterate the main aims of this study. That is, in the light of reviewing extant research, the author has identified four unaddressed issues and established the corresponding research objectives in Chapter 2. Recall, first, value co-

destruction (Echeverri and Skålén, 2011) and other closely related concepts such as conflictual value co-creation (Laamanen and Skålén, 2014) remained largely unexplored (Makkonen and Olkkonen, 2017). Second, the extant value (co)creation literature still retains a focus largely on direct interactions or joint and dialogical processes between firms and their customers in spite of the importance of indirect interactions (Grönroos and Voima, 2013; Spanjol et al., 2015). As such, it still remains unclear the IVF process, especially how and why value is destroyed in the indirect interaction context. Next, resource integration is a key element not only in the value co-creation process but also within the wider process of IVF, there is, surprisingly, a paucity of research on this topic (Pfisterer & Roth, 2015; Caridà et al., 2018). Importantly, the positive aspect of operant resources, especially those associated with human (e.g., competence, motivation and effort) has attracted significant academic attention, whereas its negative aspect has not been adequately studied.

Based on those identified research gaps in the literature, this study seeks to obtain a better understanding of the IVF process including resource integration and its outcomes, selecting the context of complex, prolonged and technology-based self-services (i.e., wellness apps), which is an excellent setting for this topic (see Chapter 3 of 'Justification of the Research Context' for further information). Particularly, the purpose of this research is threefold:

- First, to develop our understanding of how customers integrate resources and further (2) to build a better understanding of the IVF process in a complex, prolonged and TBSS experience;
- Second, to explore whether both the negative and positive effects of subjective perception of operant resources within resource integration and therefore the IVF process exist, if yes, to discover what the effects are;

- Last, to build a theoretical framework(s) illustrating the emergent phenomena.

4.3 The research philosophy and approach

Saunders et al. (2016:124) define research philosophy as "a system of beliefs and assumptions about the development of knowledge" which might not be necessarily as huge as creating a new important theory, but can deal with a specific problem in a particular context. There are three types of assumptions, namely ontology referring to the nature of reality, epistemology concerning knowledge and axiology relating to the role of values and ethics within the research process. These assumptions will be made at each stage of the research (Burrell & Morgan, 1979) and play a fundamental role in supporting others (e.g., methodological choice, strategies) to solve the research problems. Importantly, establishing appropriate philosophical assumptions at the early stages of the research is of paramount importance to identify the research methodology, research strategy(ies), time horizon, data collection and data analysis. Accordingly, this process assists the researcher to achieve the research objectives. The research onion illustrated in Figure 4.1 (Saunders et al., 2016) is adopted as a theoretical framework to shape clear direction of the thesis. This section presents the two outer layers of the research onion including the research philosophy and approach, then the appropriate paradigm representing the philosophical assumptions is selected. The subsequent sections present the other stages. To begin with, ontology and epistemology are discussed in the following sub-section.

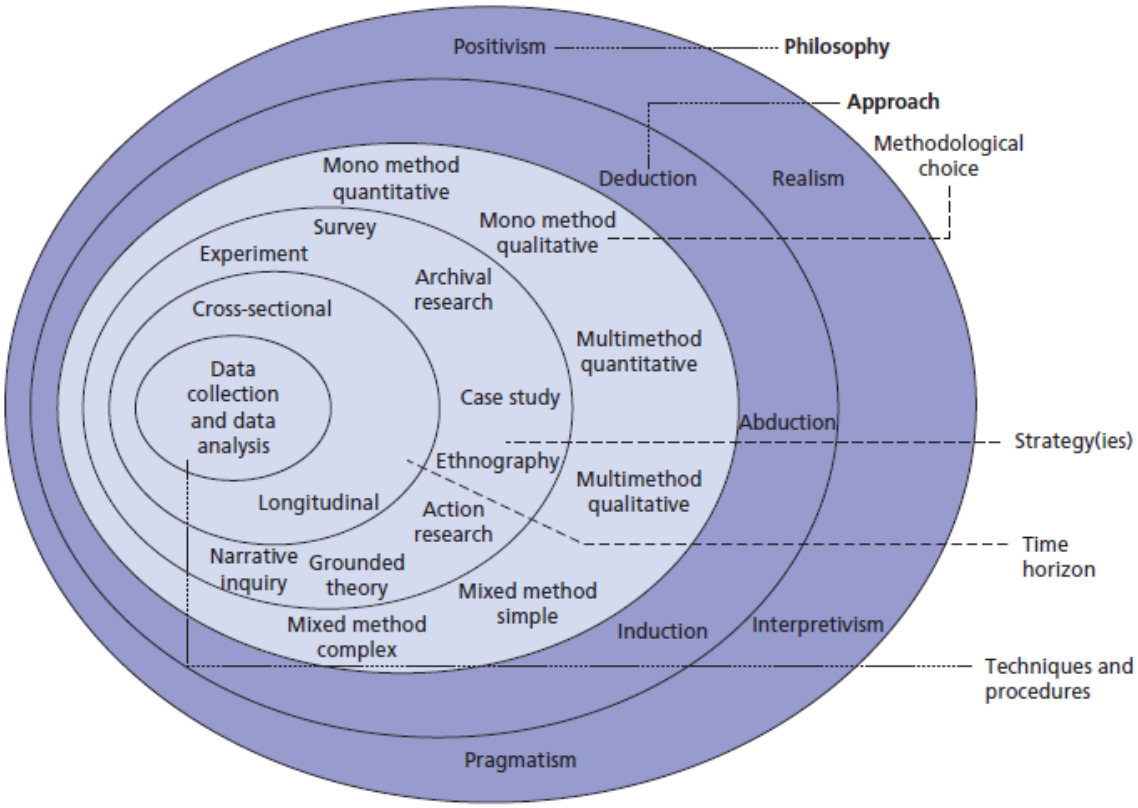


Figure 4.1. The research onion (source: Saunders et al. (2016:124))

4.3.1 Ontological and epistemological assumptions

Ontology is a branch of metaphysics that concerns itself with 'what is' and is a framework for understanding the nature of reality. In other words, ontological perspectives refer to what we think reality looks like and how we view the world (Hennink, 2011). Epistemology investigates the nature of knowledge, as such how individuals understand the world and how they communicate knowledge to others (Burrell & Morgan, 1979). Consequently, the philosophical assumption concerns the question of what is the nature of the relationship between the knower (the inquirer) and the known (or knowable) (Guba, 1990:18). In order to illustrate the perspective of various ontology, epistemology, human nature and methodology, Burrell and Morgan (1979) suggest a following sketch regarding the two dimensions of objectivism and subjectivism (i.e., on the right and the left of Figure 4.2 respectively). The former, related to natural sciences, contends that social reality is external to us and others whereas this

research adopts the latter which concerns the arts and humanities argues that social reality is comprised of the perceptions and consequent actions of social actors (Saunders et al., 2016). The following subsections will justify this selection.

4.3.1.1 Realism and nominalism

There has been an ontological discourse on whether social entities are objective entities that have a reality external to social actors or whether they are social constructions (Bryman, 2016). In other words, the social world reflects two contradictory standpoints: realism and nominalism (Burrell & Morgan, 1979; Bryman & Bell, 2015). Ontologically, realism considers that the social world is independent of our social factors and there are no differences in experiences and perceptions of social actors. As such, only one true social reality exists. In contrast, nominalism argues that the social phenomena are comprised of names, labels, categories and concepts used to describe and structure reality (Burrell & Morgan, 1979). Therefore, nominalists also support the existence of multiple realities (relativism), which contend that each individual has their own experiences and perceptions of social actors (Saunders et al., 2016).

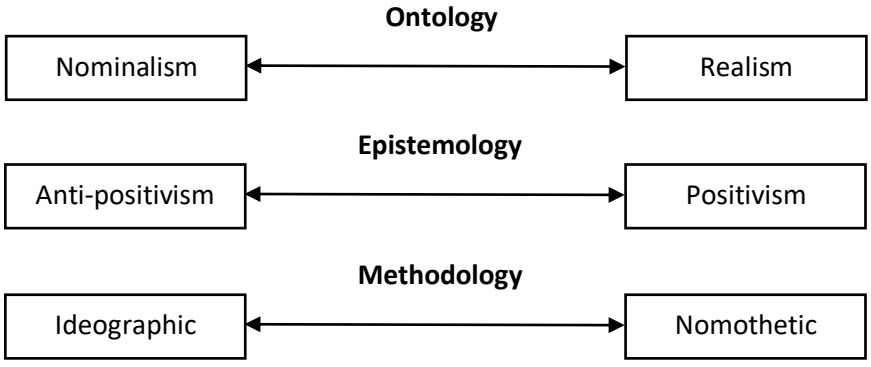


Figure 4.2. The subjective-objective dimension

Source: Based on Burrell and Morgan (1979)

Aforementioned discussion from the prior chapters are examined further to identify the appropriate research ontology in this sub-section (4.3.1.1), followed by the epistemology and methodology in the subsequent sub-sections (4.3.1.2 and 4.3.1.3 respectively). Specifically, as discussed in Chapter 2, the customer always uniquely and

phenomenologically determines value, and each person has different approach(es) to involving in the value creation processes (McColl-Kennedy et al., 2012) as such acknowledging the importance of a contextual and phenomenological perspective. In addition, Milward et al. (2016) found that young users of health apps are motivated by other users both in groups and online use. On the contrary, some studies argue that health-related information might be relatively private in nature whereby subjective norms (i.e., the perceived social pressure to perform or not to perform the behaviour from the important referents such as parents, spouse, close friends) have insignificant influence on health app use (Kwon et al., 2016) and users dislike sharing the personal information with others except in circumscribed contexts (Dennison et al., 2013b; Peng et al., 2016). One possible explanation for the difference is that research participants in each study have different views on what reality is. Taken together, depending on the context, it might be a sensitive topic and health app users have different experience and perceptions on how others affect their usage on the value formation process.

Ontologically, multiple meanings and realities are adopted in the current research with the aim of studying subjective meanings; creating new and rich understandings and interpretations of the current research context, which implies assumptions of the arts and humanities. As such, this thesis adopts nominalism approach which turns on the assumption of subjective meaning. The next sub-section will discuss the implications of this assumption and the relationship between the knower and the known or the relationship of the researcher to that researched.

4.3.1.2 Positivism and anti-positivism/interpretivism

Epistemologically, positivism and anti-positivism are two opposite standpoints (Burrell & Morgan, 1979; Collis & Hussey, 2009; Bryman, 2016) and two dominant paradigms (Hennink, 2011). Positivism is a belief system derived from practices in the natural

sciences (Brand, 2009). It exists independently of the individuals who construct the world, and is used to explain and predict what occurs in the social world by searching for regularities and causal relationships (Burrell & Morgan, 1979). Therefore, positivist epistemology is considered to be objective and measurable. These perspectives, however, are often criticised for lacking contextual influences on people's lives; and limiting the interactive and co-constructive nature of data collection with humans.

In contrast, anti-positivism refers to subjectivity and understanding (Burrell & Morgan, 1979). Epistemologically, anti-positivist also known as interpretivism (Brand, 2009) refers to studies created by understanding the nuances of human behaviours, attitudes, perceptions and experiences. This philosophical strand also acknowledges that different people have not the same circumstances (e.g., age, sex, cultural background). Thus, interpretivism criticises application of universal laws to everybody, thereby taking a subjective or constructive view, holding that interpretation is subjective and constructed by human experience and perception. Also, interpretivists seek to derive deep understandings from the inside rather than the outside or from the view of participants that being researched (Burrell & Morgan, 1979; Näslund, 2002). Consequently, based on the research context (i.e., wellness apps) and the research objectives, the author bases this thesis on the assumption of the arts and humanities and seeks for deep understandings of phenomena (the IVF process including resource integration and its outcomes), but not for regularities and causal relationships. Epistemologically, this research adopts multiple meanings and realities and accepts the assumption of subjective meaning as discussed earlier, which represents the second objective of this research, that is, that investigating subjective perception of operant resources within the VF process. Thus, "society is understood from the standpoint of the participant in action" (Morgan, 1980:608) whereby this research needs to be

interpretive in nature, which implies that subjective beliefs, values, reasons and understandings determine knowledge and experience shapes social reality. As such, reality is essentially socially constructed.

4.3.1.3 Nomothetic and idiographic theory

The chosen epistemological and ontological assumptions, in turn, influence methodological decisions which deals with how we gain knowledge about the world (Näslund, 2002) and design methods for collecting data (Denzin & Lincoln, 2012). Specifically, in the light of the epistemological and ontological assumptions employed, nomothetic and idiographic theory are discussed to clarify this research's methodological strategy. The nomothetic approach refers to systematic protocol and technique. This approach often employs scientific tests and quantitative research methods to collect and analyse data. On the subjective dimension, the ideographic theory suggests that first-hand knowledge of the subject under research plays a vital role in examining and understanding the social world hence qualitative research is adopted (Burrell & Morgan, 1979). Moreover, qualitative and quantitative research are often associated with interpretivism and positivism respectively (Meredith, 1998; Sarantakos, 2005; Hennink, 2011; Saunders et al., 2016). In addition, qualitative and quantitative research have different consumptions and consequently have different characteristics (see Table 4.1) (Creswell, 1994). They can be distinguished by objective, purpose, type of data, study population, data collection methods, analysis and outcome. For example, the purpose of quantitative research is to generalise the findings, whereas the purpose of qualitative research is to get insight into understanding of people's behaviours, beliefs and experiences (Hennink, 2011). Moreover, Silverman (1993:8-9) suggests four primary methods used in qualitative research: "observation, analysing text and documents, interviews, and recording and transcribing".

Table 4.1. Quantitative and qualitative assumptions

Assumption	Question	Quantitative	Qualitative
Ontology	What is the nature of reality?	Objective and singular, apart from the researcher	Subjective and multiple
Epistemology	What is the relationship of the researcher to that researched?	Researcher is independent from that being researched	Researcher interacts with that being researched
Axiological	What is the role of values?	Value-free and unbiased	Value-laden and biased
Methodology	What is the process of research?	Deduction Cause and effect Static design-categories isolated before study Context-free Generalisations leading to prediction, explanation, and understanding Accurate and reliable through validity and reliability	Induction Mutual simultaneous shaping of factors Emerging design-categories identified during research process Context-bound Patterns, theories developed for understanding Accurate and reliable through verification

Source: Creswell (1994)

As presented in Chapter 2, the research gaps and the research questions stemmed from unaddressed issues in the extant literature, especially the negative aspect of operant resources associated with human (e.g., competence, motivation and effort), thereby being considered as an "unknown" or "new research topic". In addition to that, the chosen setting of complex, prolonged and TBSSs (i.e., wellness apps) is highly relevant but unexplored (see Chapter 3). Moreover, as Colm et al. (2017) elaborate, qualitative approach offers the advantage of deconstructing meaningful patterns in a given context and can therefore uncover underlying causal links amongst constructs within a nomological context. As such, qualitative approach is ideal in capturing the complexities in resource integration activities, and consequently the underlying nature of the IVF process. Therefore, a purely qualitative study as a part of the interpretivist paradigm is employed to build or develop theory from the fieldwork, rather than a priori

theorisation in new areas of research. The subsequent subsections and sections discuss the research's methodology in more detail. Particularly, an axiological assumption is first examined in the following subsection.

4.3.2 Axiological assumptions

This assumption is associated with the role of the researcher's judgment about the values. From an objectivist view point, researchers keep their research free of values due to a separation of facts from values (Hennink, 2011) and make an attempt to detach from their own values and beliefs, thereby avoiding influences on the findings. In contrast, this thesis is conducted in value-bond way (i.e., facts and values are inextricably linked) while reflexivity of the researcher is of vital importance (Saunders et al., 2016). The reflexivity includes reflection of the researcher on his subjectivity and reaction of research participants to the researcher and the research context.

4.3.3 Approach

There are three types of approaches to theory development including deduction, induction and abduction. Saunders et al. (2016) contend that deductive approaches are concerned with 'testing theory' while inductive strategies are associated with 'theory building'. In between, modifying an existing theory is related to abductive approach which is considered as a combination of deduction and induction.

This study does not aim to generalise the findings or search for regularities and causal relationships, but acquires deep understandings of the new phenomenon/new, especially sensitive research topic. Thus, survey methods, deductive and even abductive approach cannot adequately reveal the nature and complexity of the IVF process including resource integration and the ambivalent effects of operant resources in the unexplored context of complex, prolonged and technology-based self-services (i.e., wellness apps). As discussed earlier, this research adopted an epistemological position

of understanding the nuances of human behaviours, attitudes, perceptions and experiences which is in line with an inductive approach for capturing the complexities of the IVF process. Such approach requires the researcher carefully construct guiding research questions, but adjustments (e.g., reframing research questions) can be made during the research progress (Corley, 2015). Epistemologically and moreover, in order for obtaining insights into the relationship of the researcher to that researched (Creswell, 1994), the heart of this thesis is the semi-structured interview or the interactions of the researcher with that being researched. In other words, the in-depth interviews help to obtain both retrospective and real-time accounts by wellness app users who experienced the phenomenon of interest (Gioia et al, 2012). This inductive approach therefore is different from the others (e.g. deductive approach) in which the researcher is independent from that being researched (Burrell & Morgan, 1979; Näslund, 2002).

4.3.4 Selecting an appropriate paradigm for the research study

A paradigm consisting of a methodological ideal (Alvesson, 1987) is a way of thinking about and conducting research and is a philosophy of guiding how the research might be conducted (Gliner et al., 2009). Paradigms include three premises, namely ontology, epistemology and methodology. Also, this term is widely used to describe the ultimate framework within which a piece of research is located (Brand, 2009). Therefore, the following discussion focuses on seeking and adopting an appropriate research paradigm(s) in the light of the aforementioned philosophical assumptions, thereby underpinning research strategy and methods (Saunders et al., 2016).

Specifically, the researcher commenced with very limited knowledge in relation to the identified issues in the aforementioned literature, thereby lending itself to the interpretive paradigm, which typically use an inductive approach to theory development

(Saunders et al., 2016). Having said that, extant theories and literature also contribute to the current research at some extent, especially at the initial stages of the research process (Strauss, 1998; Hennink, 2011; Charmaz, 2014). For example, the review of extant theories and literature contributes to exploration of the research gaps and consequently shaping the research objectives and guiding other steps of the research process (e.g., data collection, especially initial interviews). Nevertheless, inductive reasoning, rather than abductive and deductive approach, is the central of the current research whilst a purely qualitative study as a part of the interpretivist paradigm is employed. The subsequent sections discuss a specific approach of qualitative (i.e. grounded theory rationale for the approach) and its corresponding methods (e.g., data collection, data analysis).

4.4 Grounded theory methodology

4.4.1 The historical context

Grounded theory was initially emerged in the 1960s from the tensions between qualitative and quantitative researchers in sociology and from the successful collaboration of the two sociologists Barney Glaser and Anselm Strauss at the University of California (e.g., Glaser and Strauss (1964), Glaser et al. (1965), especially, Glaser and Strauss (1967) – *The Discovery of Grounded Theory: Strategies for Qualitative Research*). In their publication (Glaser & Strauss, 1967), the authors advocated building theory grounded in data rather than forcing from existing theories. Charmaz (2014) indicates that Glaser (1978) and Strauss (1987) are consistent with the 1967 publication regarding the components of grounded theory: conducting simultaneously data collection and analysis, conceptualising concepts and categories from data, employing constant comparison method during the analysis, iterating theory development throughout the process of data collection and analysis; using memo-writing to facilitate data analysis,

adopting theory sampling, conducting literature review after data analysis. These tenets aim to develop or build theory from abstract and conceptual understandings from data rather than from a descriptive or causal level (Charmaz, 2014). Despite the collaboration between the two authors and their respective contribution, they came from different philosophical traditions, and then followed different approaches in terms of implementing grounded theory. Glaser adopted a less systematic approach to grounded theory methodology, whereas Strauss preferred a more systematic one. Especially, the former emphasises emergence, whereas the latter develops a new coding process which focuses on conditions, context, action/interaction strategies, and consequences (Goulding, 2017). However, the differences between these versions are largely technical rather than epistemological, specifically they both follow a post-positivist paradigm (Guba & Lincoln, 1994), and an objectivist epistemology (Charmaz, 2000). Another branch of Grounded Theory known as constructivist grounded theory emerged by Charmaz (2006), which criticises both the approaches of ignoring the role of the researcher in the research process and often removing the interactions between researchers and their informants while constructivist grounded theory is socially constructed (Goulding, 2017). Therefore, there have been three major versions of grounded theory, which are different in ontological foundations (Goulding, 2017) or philosophical approaches (Mills et al., 2006).

- The original version/ classic grounded theory (Glaser & Strauss, 1967; Glaser, 1978; Glaser, 1992)
- The more systematic 'Straussian' approach/ evolved grounded theory (Strauss, 1990; 1998).
- The constructivist approach/ constructivist grounded theory (Charmaz, 2006; Charmaz, 2014).

In the second edition of Constructing Grounded Theory, Charmaz (2014) distinguishes these three approaches in relation to positivist and interpretive traditions. This book contends that the original version (Glaser & Strauss, 1967; Glaser, 1978; Glaser, 1992) leans towards strong positivist tradition, whereas the constructivist approach (Charmaz, 2006; Charmaz, 2014) adopts explicit constructionism. In other words, the objectivist approach keeps researchers separate and distant from informants while the constructivist study is dependent upon the researcher's view. In between objectivist and contructivist poles, the first and second editions of *Basic of Qualitative Research* (Strauss, 1990; 1998) contain post-positivist leanings. As such, the 'Straussian' approach seeks a balance between the other two apporaches.

4.4.2 Rationale for grounded theory and in-depth interviews

4.4.2.1 A grounded theory approach

Within the qualitative tradition there are various strategies to approach qualitative inquiry. For example, while Wertz et al. (2011) suggest five main approaches including phenomenological psychology, grounded theory, discourse analysis, narrative analysis, and intuitive inquiry, Patton (2015) investigates 16 different approaches such as ethnography, autoethnography, grounded theory, realism, phenomenology, heuristic inquiry, narrative inquiry. However, this thesis does not attempt to distinguish or introduce a typology of all the types of qualitative inquiry, but providing rationale for adopting a specific approach instead.

To understand how wellness apps are embedded into participants' daily lives and how the IVF process is enacted within the customer sphere, as such to address the research objectives, this thesis leans towards a grounded theory approach from Strauss (1998) in which data collection, analysis and emergent theory are strongly inter-related, especially theory derived from data. This methodology was selected as the appropriate methodology in this study for several reasons. First, grounded theory is qualitative

research that is inductive (Strauss, 1998), even is most suited toward inductive approaches seeking profound understandings of a phenomenon (Corley, 2015). Therefore, the power of grounded theory enables the author to choose inductive approach for this research. Second, given the ability to inductively builds theory from the fieldwork, rather than a priori theorisation in new areas of research (Locke, 2001; Krush et al., 2015), grounded theory (Strauss, 1998) is instrumental in achieving this research's objectives. That is, the author gave voice to the participants to grasp considerable opportunities for discovering new concepts (Gioia et al., 2012). Given that grounded theory can capture the complexities in relationships and interactions, it is also ideal in uncovering the complexity of the interactive nature in the IVF process and adds to the flexibility required to navigate between divergent views on value co- and de-construction. Next, action and interaction are also two important factors linking the research topic (interactive value formation including value and value co-creation) to grounded theory approach. On the one hand, taken the view shared by many authors (Holbrook, 2006; Echeverri & Skålén, 2011; Grönroos & Voima, 2013; Roberts et al., 2014; Skålén et al., 2015) that value resides in actions and interactions, McColl-Kennedy et al. (2012:370) conceptualise customer value co-creation as ''benefit realized from integration of resources through activities and interactions with collaborators in the customer's service network.'' On the other hand, grounded theory is an appropriate methodology for studying processes and social interactions, even more than other interpretive approaches (Darach & Susi, 2006). As such, the study here employed grounded theory (Strauss, 1990; 1998) which can help to explain interactions between the customer and the phenomenon under examination, given the paucity of existing knowledge on the IVF process. Last, grounded theory widely accepted in various disciplines including health study, marketing, and consumer research (Goulding, 2005;

Oriol et al., 2011; Goulding, 2017), particularly value co-creation (Healy & McDonagh, 2013), grounded theory even is the most commonly used paradigm for qualitative research in the social science (Patton, 2015). Note that, despite the similarities especially in data collection methods, phenomenology begins with a research question, whereas "grounded theory is conducted to discover a research question for testing … to generate or discover a theory" (Sayre 2011). Therefore, to address the complexity including the evolving research objectives and discovering new theory from the data, grounded theory is an appropriate methodology for this research.

4.4.2.2 In-depth interviews

Prior studies argued that health-related information could be relatively private in nature since health app users dislike sharing the personal information with others except in clearly defined contexts (Dennison et al., 2013b; Peng et al., 2016). Therefore, seeking in-depth and sensitive information concerning personal experiences is more appropriate than focus group (Hesse-Biber, 2006). Furthermore, this research seeks subjective perception of users who have experience in using wellness apps. Therefore, getting closer to the informants' perspective through detailed interviewing as conversations of daily life helps the author to encourage interviewees to share their experiences or articulate their reasons for action, especially through the personal inter-action and the inter-view knowledge (i.e., knowledge is constructed through the personal interaction) (Brinkmann, 2015). Therefore, in-depth interviews can perfectly reveal the lived experience of informants and the meaning they make of that experience (Seidman, 2006), that is, that the experience in the IVF process consisting of integrating operant resources (e.g., motivation, effort) with operand resources (e.g., wellness apps on smartphones or smartwatches), and its outcomes (e.g., the negative or positive effects of operant resources, value co-creation, value co-destruction).

Furthermore, it is impractical to observe what health app users are doing with the app on small screens of wearable devices whereby in-depth interviews (i.e., an effective means) enable the researcher to gain great insights into the phenomenon of interest from the informant perspectives (McColl-Kennedy et al., 2012). Also, Charmaz (2014:85) noted that "intensive qualitative interviewing fits grounded theory methods particularly well", because they are "open-ended yet directed, shaped yet emergent, and paced yet unrestricted." This is consistent with Gioia et al. (2012), who consider the heart of grounded theory is the semi-structured interview gaining retrospective and real-time accounts by those who experience the phenomenon of theoretical interest.

4.5 Sampling

To address the research questions or the research objectives, purposeful sampling that is deliberate and flexible was employed (Hennink, 2011) to target adult individuals who had experiences in wellness apps including fitness, lifestyle modification, diet and nutrition apps. Non-experienced users were excluded because the aim of this study is to gain experience of those who had already used the wellness apps, as such engaging in IVF behaviours. It was acknowledged that such the population presented future research opportunities to discover the IVF behaviours in other contexts and then making comparison with the emergent theory in this research, for example. The research protocol followed the ethical guidelines and was approved by the researcher's institutional review board before the outset of the data collection. Particularly, this study first used purposive sampling (Hennink, 2011) to ensure that field data was collected from participants that were familiar with the phenomenon. Thus, the first three participants were selected according to the criteria of adult individuals who had experiences of wellness app usage. In this initial sampling, the data was gathered in a broad area of interest. After emerging some preliminary categories, additional

participants were selected based on theoretical sampling to seek pertinent data deemed important by prior interviewees (Gioia et al., 2012). Specifically, data collection and analysis were conducted in alternating sequences whereby the analysis drove the data collection (Strauss, 1998). Consequently, this process led to an evolving sample of interviewees and increased data for developing emerging theory (Strauss, 1998; Corley & Gioia, 2004; Charmaz, 2014). The iterative process of recruitment, interviewing and coding stopped until attaining theoretical saturation; that is, no new and substantial themes emerged (Feiereisen et al., 2019) or no new properties of core categories emerged in the data (Charmaz, 2014). Where necessary, the participants were contacted again to clarify information and in total 11 over 19 follow up interviews via email were received responses.

A multi-faceted recruitment approach was utilised. First, a newsletter was distributed to over 2000 members of staff at a University in the United Kingdom. Second, advertisements (see Appendix 7) were also sent by email to students and staff members, but the static text advertisements posted on the Sports and Fitness Centre bulletin board attracted more participants, with five and seven interviewees recruited respectively. Due to the sensitive topic, snowball recruitment was also employed to increase the number of participants. Nine interviewees were recruited this way. Next, all participants were assured of their personal anonymity, in return, gave their permission, and provided their informed consent (see Appendix 8 for the sample of Consent form, Appendix 9 for Invitation Form). Moreover, the venue depended on where interviewees felt most comfortable and this typically was a booked room in the university's library, or in interviewees' office rooms or the campus cafeteria. The average length of interviews was 50 minutes, with a maximum of 67 minutes. As health-related information is personal and wellness app users can be reluctant to share

information with others (Dennison et al. 2013; Peng et al. 2016), the participants were provided £10 cash incentive which has been becoming increasingly common (Head, 2009). This recruiment approach combined with others (e.g., snowbal sampling) are effective in improving the participation rate (Lavrakas, 2008). Indeed, a pilot study with six participants found an incentive approach was viewed by participants as appropriate to encouraging their participation. In total, 21 individual face-to-face in-depth interviews (i.e., unstructured at first and semi-structured after emerging some categories) were conducted between February and August 2018. The participants included thirteen female and eight male Britons, ranging in age between 18 and 50 years old, with an average age of 32.8 years old at the time of the interview.

The average length of participant app usage was 3.53 years, but the sample was also comprised of a wide range of experience usage, ranging from two months to over ten years, allowing the researcher to uncover the accumulated complexity in user experience and therefore a deeper understanding of the dynamics inherent in the IVF process. Three participants (14.3%) were not affiliated with the university, though the majority were students (33.3%) and staff members (52.4%) such as lecturers, a marketing assistant, personal instructors, a fitness manager, and an analyst. This was in line with previous research (Krebs & Duncan, 2015; Min-Woo et al., 2016; Carroll et al., 2017) reported that individuals who were younger, more educated, reported good health, and had higher incomes tended to use health apps. Additional characteristics of the interviewees are illustrated in Table 4.2.

Table 4.2. Interviewee Information

Interviewee[1]	Age	Time of usage	Cost	Employment	Gender	Number of apps	Purpose of usage	Type of app	Wearable device	Health status
Emma	50	2 months	Free Trial	Sales	F	1	Hedonic	E	Yes	N/A
Olivia	25	2 years	Free Trial	Student	F	3	Lose weight	N	Yes	N/A
Andrew	44	3 years	Free Trial	N/A	M	1	Lose weight	E	Yes	Ov
Isabella	44	10 years	Free Trial	Administrator	F	1	N/A	E	Yes	He
Samuel	37	3 years	Free Trial	Marketing assistant	M	1	E performance	E	Yes	Ov
Sophia	18	2 years	Paid and free	Student	F	3	Lose weight	N and E	No	He
Charlotte	23	4 years	Free Trial	Student	F	1	Body image	E	Yes	He
Amelia	18	1.5 years	Free Trial	Student	F	4	Lose weight	N and E	No	Ov
Mia	37	4 years	Paid and free	Lecturer	F	6	E performance	E	Yes	He
Jackson	48	2 years	Free Trial	Unemployment	M	Several	Body image	E	No	Ov
Emily	40	3 years	Free Trial	Academic	F	2	Keep fit	E	Yes	He
Elizabeth	47	7 years	Paid	Analyst	F	3	Lose weight	N and E	Yes	Ov
David	19	1 year	Free Trial	Student	M	3	Hedonic	E	No	He
Scarlett	23	2.5 years	Free Trial	Administrator	F	2	Lose weight	N and E	No	Ov
Benjamin	33	6 years	Paid and free	Lecturer	M	7	E performance	N and E	Yes	He
Lucas	31	4 years	Free Trial	Fitness Manager	M	3	E Improvement	N and E	Yes	Ov
Victoria	26	4 years	Free Trial	Coordinator	F	1	E Improvement	N	No	N/A
Madison	22	3 years	Free Trial	Student	F	1	Lose weight	N	No	Ob
Lily	50	3 years	Free Trial	Lecturer	F	3	Keep fit	E	Yes	He
Thomas	28	1 year	Paid and free	Student	M	2	Keep fit	N and E	Yes	Ov
Jonathan	26	8 years	Free Trial	Administrator	M	2	Keep fit	N and E	No	Ov

Notes: N/A = not applicable; M = male; F = Female; E = Exercise; N = Nutrition; Ob = Obese; Ov = Overweight; He = Healthy weight.

[1]Interviewees have been assigned pseudonyms to preserve confidentiality.

4.6 Data collection

As discussed in the previous section, this research, specifically data collection and data analysis, relied on theoretical sampling (Strauss, 1998; Gioia et al., 2012). Thus, the data were gathered, compared, and analysed simultaneously (Goulding, 2017), as such data collection and analysis proceeded iteratively (Glaser & Strauss, 1967) until theoretical saturation was attained (Charmaz, 2014). This preocess, therefore, allow participants to lead the discussion based on their expressed preferred topic. Probing questions were employed to deconstruct particular issues in more depth (Lincoln and Guba, 1985; Brinkmannand and Kvale, 2015). In doing so, participants found it easier to recall and relate their retrospective and practical experiences with their user engagement. This approach also facilitated rapport building and allowed the interviewer to build an overall picture of the participants' experiences with additional deeper probing uncovering details in relation to their views on the various stages of engagement, their experiences of integrating resources, benefits and difficulties arising from behaviours, routines and social interactions. Our interview protocol was based on a general set of questions such as "How do you use wellness apps in a normal day", "Does your usage change over time" , "What are the main benefits of using your app", "How difficult is to use your app?", "What has been the cost in terms of both effort and time in using your app? and "Do you involve other people in your usage?" (see Appendix 1 for more examples of interview questions). However, the full set of interview questions was guided by the participant's voice. After each interview, field notes were incorporated into memos that helped to identify emergent themes to explore further in subsequent interviews (Glaser, 2014).

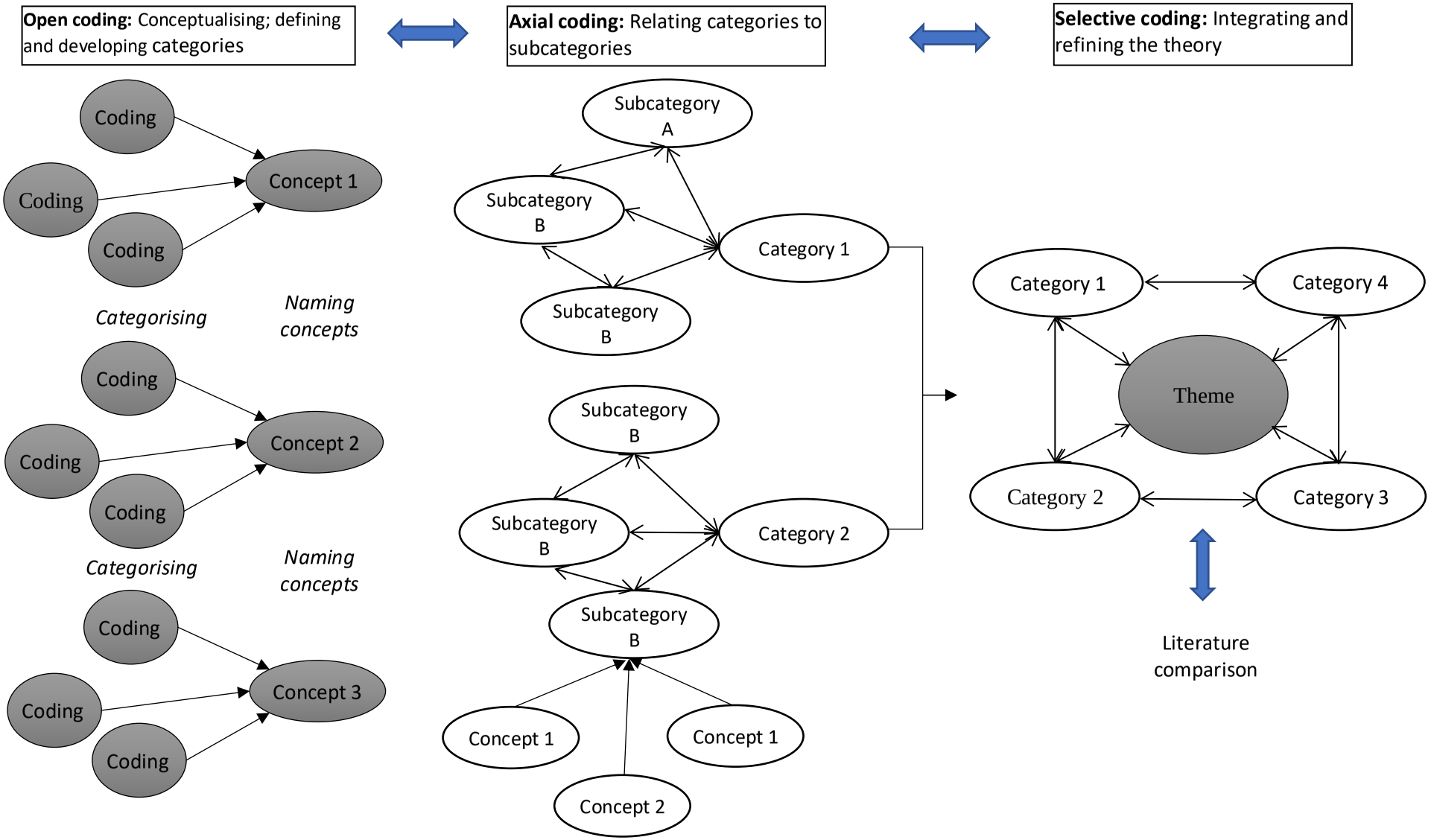
4.7 Data analysis

4.7.1 A brief overview

Data analysis was guided by the recommendations of leading scholars in grounded theory (Glaser, 1967; Strauss, 1990; 1998; Goulding, 2002; Gioia et al., 2012; Charmaz, 2014), which was carried out in three stages of open, axial and selective coding (see Figure 4.3). Particularly, the data, in the open coding stage, were broken down to identify concepts, their properties and dimensions, which are similar to Gioia et al.'s (2012) notion of a first-order analysis reporting participant voice (i.e., using terms, codes). Next, focus was shifted to the inter-relationships between emerging categories and subcategories in axial coding, which are similar to Gioia et al.'s (2012) notion of a second-order analysis reporting researcher voice (i.e., using concepts, themes, and dimensions). Extending this, the thesis added a third-order analysis in a nested manner to present the major categories and subcategories with direct support from the participant voice. The emergent second- and third-order themes were integrated into more abstract aggregate dimensions. In addition, in the final stage (selective coding), the emerging relationships were grouped into the abstraction of categories to build the theoretical framework. Furthermore, inductive thematic analysis and constant comparative method in grounded theory (Strauss, 1998) were adopted, thereby constantly moving back and forth between and within comparisons (Shabbir et al., 2007). Importantly, the researcher periodically supported by his supervisors made constant comparison spiral including the theoretical comparisons. During this process of analysis, the researcher conducted several rounds of coding while using records, tabulations, charts, and other documentation to build and revise findings. Also, field notes (see Appendix 2 for some examples) and memos (see Appendix 3 for some examples) were imperative to construct after each interview, thereby supporting data

analysis such as identifying any emergent themes to provide directions for further data collection (Trees & Dean, 2018). NVivo software was used to facilitate data analysis in organising textual data, searching, comparing data segments for similarities and differences, summarising and presenting codes and categories in conceptual frameworks. For the purpose of validation and improvement of the theory that explained the phenomenon, the findings were compared with existing literature (Charmaz, 2014). It did not mean that the theory would be built independently from the data analysis, but rather allowing the data to direct the researcher to the literature on related concepts and theories and vice versa (Goulding, 2017). Once the phenomenon began to emerge from the data, the researcher returned to the literature in order to flesh out our understanding of that phenomenon.

Figure 4.3. The coding procedures



Source: Based on Oriol et al. (2011)

4.7.2 The coding procedures

4.7.2.1 Open coding

The purpose of this first stage in the coding procedures was to identify concepts and their development regarding their properties and dimensions from data. In so doing, data were fractured in discrete parts (i.e., incidents, ideas, events and acts) and were then given a conceptual name/a concept which were abstract representations of these fractured data (Strauss, 1990; Charmaz, 2014). Then, comparative analysis played a role in classifying the "discrete parts" through giving the same or different names for them based on their properties. This process is termed conceptualising or abstracting (Hemmington et al., 2006). Meanwhile, other analytic tools namely microanalysis (i.e., close investigation of data such as line-by-line or word-by-word analysis) and "memos", that is, "the researcher's record of analysis, thoughts, interpretations, questions, and directions for further data collection" were also employed to find anything new in data and acquire better understandings (Strauss, 1998:110; Charmaz, 2014). Specifically, all the field notes, memos and especially transcripts of the 21 in-depth interviews were carefully analysed line by line in the open coding process in which the data were broken down to identify concepts. That is, for every interview, the researcher read each line of transcription and highlighted all points of interest.

This stage (i.e., open coding) is akin to Gioia and Chittipeddi (1991)'s and Gioia et al. (2012)'s notion of a first-order analysis reporting participant voice (i.e., using terms, codes), which is not unusual to make the researcher become overwhelming due to the emergence of informant terms, codes, and categories. "There could easily be 50 to 100 1st-order categories that emerge from the first 10 interviews" (Gioia et al., 2012:20). The next step was to accumulate the emerging concepts to discover categories (i.e., more abstract explanatory terms) that represented phenomena. The categories were then developed by specifying their properties and showing how they vary dimensionally

along those properties. To clarify, properties are the general or specific characteristics or attributes of a category while dimensions represent the location of a property along a continuum or range. Moreover, a category can be broken down into subcategories which also have properties and dimensions and explain the phenomenon about the when, where, why, and how and so on. Therefore, a subcategory is a category, but the difference is that a category stands for a phenomenon while a subcategory only contributes to explaining the phenomenon. Taken together, this initial stage of the coding procedures includes "conceptualising, defining categories, and developing categories" on the basis of their properties and dimensions (Strauss, 1998:121). The abundant number of the recognised concepts in this study were defined and those that were very similar regarding their properties were grouped into higher-order concepts (i.e., subcategories, categories). Consequently, a list of resource integration activities (concepts) emerged from the data. These activities represent resources employed by participants to act upon other resources to achieve benefits (e.g., using health apps to track exercise for progress and awareness). Twelve broad themes of resource integration activities were identified, namely Inputting Data/Recording, Analysing Activities and Related Statistics, Adhering (goal, instruction, reminder), Connecting Devices and Combining Different Means, Planning (Goal Setting, Making Schedule), learning, Adapting to Changes, Earning Internal Rewards/Incentives, Earning External Rewards, Connecting Other Users, Comparing and Challenging and Giving or Receiving Support. Table 4.3 provides examples of the open coding (see Table 5.1 for more examples). In this example Core Integration (a subcategory) displays low number of interactions (mainly between firms and customers) with regularity of resource integration activities of resources. This subcategory was identified or derived from the integration of the four concepts, namely Inputting Data/Recording, Analysing Activities

and Related Statistics, adhering (goal, instruction, reminder), Connecting Devices and Combining Different Means. As such, the process of grouping the concepts depended on the properties of the emerging subcategories are frequency of occurrence and the number of interactions and their dimensions (see Chapter 5 for detailed findings).

4.7.2.2 Axial coding

In line with Strauss (1998), there were four primary tasks in the axial coding including (1) setting out the properties and their corresponding dimensions of a category; (2) specifying the conditions, actions/interactions, and consequences; (3) relating a category to its subcategories; (4) identifying cues for relating major categories from the data. Notice that axial and open coding were not sequential analytic steps, but proceeding together at some point. Importantly, this stage of axial coding aimed to reassemble data that were broken down during the previous stage, that is, developing and relating categories to subcategories in terms of their properties, especially at a dimensional level. This process is important for the purpose of building theory. Moreover, this stage reduces the first-order categories to a more manageable number such as 30 (Gioia et al., 2012) and is to offer an explanation of the phenomenon under study (Goulding, 2005). It is noted throughout the data analysis that there are two level of explanations including (1) the actual words from informants and (2) their corresponding conceptualisation from a researcher(s) (Strauss, 1998; Gioia et al., 2012). The first level is systematically translated into and defined the second level or the researcher's interpretation. Thus, it was important to look for the cues in the data that denote the possible relationships among categories, then the actual linking involved not at a descriptive, instead at a conceptual level. As such, the data were linked at the property and dimensional levels.

Table 4.3. Illustration of open coding

Subcategories Integration category	Concepts Integration activities	Definition of concepts Description of activities	Quotations
Core Integration	Inputting Data/Recording	Data from performing the expected activities (e.g., eating, exercising, etc.) is manually or automatically inputted into the app.	You see in the building, my area's sport health and exercise science so I am an active person and I'm interested in my health so I think that's I just wanted something to monitor it on daily bases (want to use other resources for the purpose of *tracking data including inputting and analysing data for awareness and progress*). I wasn't to make a lifestyle change. I think lots of people might buy it to try start, you know, some kind of change in their life to become active. I'm already active, but I just want to keep track of it (*tracking*). Maybe a bit more regularly and app is very visual and I really like the app sort of allow me to keep track of my training (*tracking*). So as I said for me I was already active, it wasn't necessarily to become more active. It could be to maybe try conscious to do more steps per day sometimes (want to *count steps, which further conceptualise as concepts of inputting and analyzing data for awareness and progress*). Because although I'm active, I also work in an office so I do sit down a lot during a day, so the app encourages you to get up every hour and you can use it (*Earning Internal Rewards/Incentives*). You know you should get up and walk 250 steps at least every hour, you can personalize that, you can make 500 steps (*goal setting*) if you want so it does encourage you, it can encourage you to move so I think things like that. I was conscious that I was sitting quite a bit as well as, you know, in addition to doing sports for the activity that I do. I'm also aware that I spend a lot of hours of a day sitting so one of the thing I guess the Fitbit helps a little bit. It tries to encourage, you know, few more steps, yeah, a bit more movement during the day. (*Earning Internal Rewards/Incentives*) (Interviewee 11).
	Analysing Activities and Related Statistics	The app provides the data (e.g., how many calories the user has been consumed/burnt) for the user to analyse or evaluate.	
	Adhering (goal, instruction, reminder)	Compliance with the app's instruction or reminder or the goal/plan	
	Connecting Devices and Combining Different Means	Connecting devices and combining the apps to make those work together and get desired outcomes/goal.	

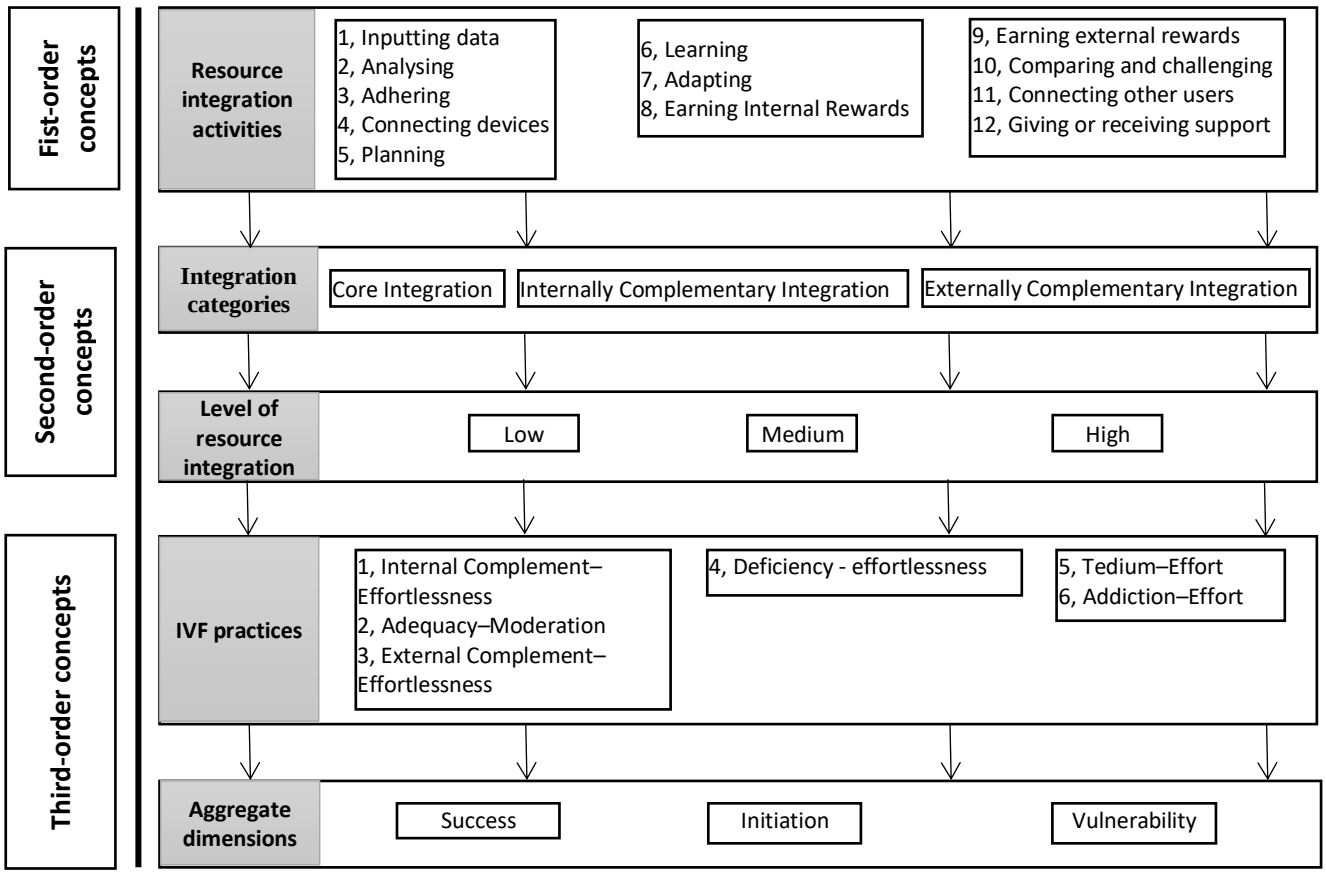


Figure 4.4. Data structure of the IVF process.
Source: Reproduced from Gioia et al. (2012)

Specifically, the emergent twelve resource integration activities which were identified throughout the open coding were classified according to the number of interactions (low vs. high) and frequency of occurring resource integration activities (regular vs. irregular). Subsequently, three integration categories emerged including Core Integration, Internally Complementary Integration and Externally Complementary Integration. Participants in this research's sample tended to combine the integration categories to emerge a range (low, medium and high) of Level of Resource Integration. Moreover, at this stage, which is similar to Gioia and Chittipeddi (1991)'s and Gioia et al. (2012)'s notion of a second-order analysis, researcher voice (i.e., using concepts, themes, and dimensions) was reported. The study here added a third-order analysis in a nested manner to present the major categories and subcategories with direct support from the participant voice. As such, considering (1) Level of Resource Integration (low,

medium and high) and (2) IVF intensity (low, medium and high), six IVF practices or third-order themes were identified, namely Tedium–Effort, Addiction–Effort, Deficiency–Effortlessness, Adequacy–Moderation, Internal Complement–Effortlessness, and External Complement–Effortlessness. The emergent second- and third-order themes could be integrated into more abstract aggregate dimensions. As a result, the full set of first-, second- and third-order themes and aggregate dimensions could be coordinated to build a data structure which reported the data into a sensible visual aid (Gioia et al., 2012). Figure 4.4 is a demonstration of the data structure deriving from the data in this study (see Chapter 5 for more information of the emergent concepts and their relationships as well as their properties and dimensions).

4.7.2.3 Selective coding

The final stage of the coding procedures was selective coding in which a core category was constructed and pulled together all the concepts with the power of explaining the phenomenon (Goulding, 2005). Specifically, this study adopted the conceptualisation of selective coding as "the process of selecting the core category, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement and development" (Strauss, 1990:116) or in a more abstract manner as "the process of integrating and refining the theory" (Strauss, 1998:143). Within this conceptualisation, integration pertains to deciding a central/core category which all the other categories are organized around, thereby representing the central theme of the research. However, this process of integrating and refining the emerging theory was time-consuming, requiring the researcher to move back and forth among the stages of the coding procedures, among the techniques of integrating and refining (e.g., memos, diagrams which evolved over time). In addition, the author also followed a seminal paper Gioia et al. (2012:21) suggesting that "cycling between emergent data, themes,

concepts, and dimensions and the relevant literature, not only to see whether what we are finding has precedents, but also whether we have discovered new concepts."

The researcher devoted Chapter 5 of this thesis to present the findings which describe the emergence of concepts, subcategories, and categories and their relationships in terms of their properties and dimensions in the "dynamic and fluid process" of the coding procedures (i.e., open, axial and selective coding). Therefore, to avoid repetition the reader(s) is/are directed to Chapter 5 for further illustrations of all three stages of the coding procedures. Importantly, despite offering "a systematic set of procedures to develop an inductive derived grounded theory about a phenomenon", creativity is a key element of this approach (Coviello & Carson, 1996:53). In terms of coding procedure, Strauss (1998) emphasises that these stages are not sequential analytic steps, but proceeding together at some point. Therefore, it is important to move back and forth between and make constant comparison spiral during the all three stages of coding procedures to valid the emerging theoretical framework. Consequently, these techniques and principles of coding procedures were applied. These three coding procedures, however, were presented separate and in sequential analytic steps in this chapter to launch into an initial explanation of the data analysis. The integrated and dynamic illustration of these procedures are provided and clarified in Chapter 5 to evoke what they were conducted.

4.8 Criteria for Evaluating a Grounded Theory

In line with Lincoln (1985), Wagner et al. (2010) suggest criteria for evaluating grounded theory research by replacing the traditional notion of *internal validity, external validity*, *reliability, objectivity* with *credibility*, *transferability*, *dependability*, and *confirmability* respectively. These researchers also add *applicability* as a fifth criterion to evaluate grounded theory research. (1) Credibility deals with the question of whether the

research results deriving from the subjects under investigation or from the informant's eyes. (2) Transferability allows research findings to approach a broader population or to investigate "if the case generates concepts or principles with obvious relevance to some other domain" (Gioia et al., 2012:24). Constant comparison spiral with the relevant literature, and discussion with supervisors regarding emergent categories improve construct definitions, and consequently credibility (internal validity) as well as transferability (external validity) by establishing the domain to which the study's findings can be applied (Hemmington et al., 2006). (3) Dependability refers to the probability of achieving the same results when a study is replicated. (4) Confirmability is the degree to which the results could be confirmed by others. (5) Applicability deals with the context in which a method should be used. For instance, in terms of potential source of data, Strauss (1990) and Charmaz (2014) refer to all sources (e.g., interviews, observations, documents, books), which can be used for grounded theory. In addition to applying those criteria, this study is also in line with Strauss (1998:269), who suggests a list of following questions relating to criteria for evaluating the research and analytic process in grounded theory. As such, these questions will be addressed when analysing and discussing the findings.

- How was the original sample selected? On what grounds?
- What major categories emerged?
- What were some of the events, incidents, or actions (indicators) that pointed to some of these major categories?
- On the basis of what categories did theoretical sampling proceed? That is, how did theoretical sampling guide data collection? After the theoretical sampling was done, how representative did these categories prove to be?

- What were some of the hypotheses pertaining to conceptual relations (i.e., among categories), and on what grounds were they formulated and tested?
- Were there instances when hypotheses did not hold up against what was actually seen? How were these discrepancies accounted for? How did they affect the hypotheses?
- How and why was the core category selected? Was this collection sudden or gradual, difficult, or easy? On what grounds were final analytic decisions made?

4.9 Conclusion

This chapter discussed different philosophical assumptions (i.e., ontological, epistemological and axiological assumptions) and methodological choices in general and consequently came up with the philosophical position of the research, especially an appropriate paradigm involving an inductive approach and a purely qualitative study as a part of the interpretivist paradigm. Particularly, a rational justification for adopting a grounded theory with in-depth interviews was given. Following this, it described the operational research design, focusing on the justification for the simultaneous process of the data collection and data analysis, which was consistent with theoretical sampling. Within data analysis, three stages of open, axial and selective coding were not sequentially conducted, but these analytic steps proceeded together at some point. Therefore, the author moved back and forth between and made constant comparison spiral during all three stages of the coding procedures to valid the emerging theoretical framework.

A special emphasis was on systematic, but creative procedures of building grounded theory, that is, that following the suggested procedures or principles (e.g., constant comparison spiral throughout the research, developing and relating categories to subcategories in axial coding, etc.), but being flexible such as breaking through

traditional assumptions, creating a new order out of old (Strauss, 1990). The next chapter presents findings reporting both the participant and the researcher voice, especially a theoretical framework is identified from emergent themes or concepts and their relationships.

Chapter 5 Findings

5.1 Introduction

This chapter presents the findings of the empirical research based on the in-depth interviews with participants under the direction of grounded theory methodology. As discussed in the previous chapters, especially Chapter 4, building theory is the goal of the research which employs grounded theory approach hence the findings are presented not just the descriptive details or a listing of themes, but as a set of interrelated concepts including a core/central abstract category. These concepts are constructed out of data by the researcher. By "constructed", the researcher means that "an analyst reduces data from many cases into concepts and sets of relational statements that can be used to explain, in a general sense, what is going on" (Strauss, 1998:145).

Accordingly, the rest of this chapter is structured as follows: a discussion and a selection of how to present grounded theory findings are made in the next section. In the light of the selection, first-order analysis which reports participant voice is presented in Section **Error! Reference source not found.** whilst second-order analysis which reports researcher voice is presented in Section 5.4 and 5.5. Section 5.6 and 5.7 present the emerging six IVF practices and three corresponding aggregates. Especially, this section illustrates the relationship among properties and dimensions of these practices and aggregates, and consequently comes up with a theoretical framework. Last, Section 5.85.8 provides a brief summary of this chapter.

5.2 The art of presentation

As discussed earlier, especially in the methodology chapter (see Chapter 4), the purpose of this research is to systematically build theory from the data under the guidance of grounded theory (Gioia & Chittipeddi, 1991; Strauss, 1998; Gioia et al., 2012). Recall, the

collected data were analysed in three stages (i.e., open, axial and selective coding). During these coding procedures, the researcher conducted several rounds of coding and constantly moving back and forth between and within comparisons (Shabbir et al., 2007) while using records, tabulations, charts, and other documentation to build and revise findings. Also, the author immersed himself in the data to gain insights into the informant's perspective and make unbiased and accurate interpretation of the events (i.e., adopting an objective stance), but trying to perceive the subtle nuances and meanings in the data as well as understand and define phenomena in abstract terms (i.e., developing sensitivity). In so doing, the author is seeking a balance between objectivity and sensitivity. Furthermore, "to avoid either straight description or a wild jump from verbatim accounts", the researcher is required to interpret the data theoretically or to produce high-level abstract theory (Goulding, 2017:68).

In a similar manner, Gioia et al. (2012) distinguish and link perspective of a researcher who immerse himself in data and perspective of the informants with perspective of the researcher who objectively analyses to discover new theory from the data, thereby suggesting a compromise solution to present the views. That is, first-order analysis reports participant voice (i.e., using terms, codes), while second-order analysis reports researcher voice (i.e., using concepts, themes, and dimensions). In line with this, the study here presents first- and second-order analysis, but adds also another (i.e., third-order analysis) in a nested manner of the first- and the second- order analyses. The addition is meaningful to present the theoretical framework with direct support from the participant voice and vice versa (i.e., the participants' narratives are objectively illustrated by the emerging framework). Therefore, the findings are presented in three sections representing the 1st- (Section 5.3); 2nd- (Section 5.4, 5.5 and 5.7) and 3rd-order analysis (Section 5.6).

5.3 Resource integration activities

In the first stage of data analysis a list of resource integration activities emerged from the data. These activities represent resources employed by participants to act upon other resources to achieve benefits or desired outcomes (e.g., using health apps to track exercise for progress and awareness). It should be noted that these activities are integrated by more than one source of resources since these resources in isolation only offers value propositions (Hilton & Hughes, 2013; Caridà et al., 2018). This is similar to McColl-Kennedy et al. (2012), who consider "customer's self-generated activities" (e.g., having a positive attitude by accessing one's own personal knowledge and skill sets and through his or her cerebral processes) as a potential source contributing to value co-creation. Consequently, they are excluded from resource integration activities.

Twelve broad themes of resource integration activities which work and interact with each other were identified namely Inputting Data/Recording, Analysing Activities and Related Statistics, Adhering (goal, instruction, reminder), Connecting Devices and Combining Different Means, Planning (Goal Setting, Making Schedule), Learning, Adapting to Changes, Earning Internal Rewards/Incentives, Earning External Rewards, Connecting Other Users, Comparing and Challenging, and Giving or Receiving Support. There is a note about two resource integration activities: (1) Inputting Data/Recording, (2) Analysing Activities and Related Statistics, which can be integrated into another integrated activity known as "tracking" used in other studies such as Peng et al. (2016). This study keeps this division due to its nature and its usefulness in identifying and analysing IVF intensity, a core theme, that will be discussed later. In line with prior research (Makkonen & Olkkonen, 2017), the emergent outcome of engaging in these integrated activities is not only value co-creation, but also value no-creation or even value co-destruction. Table 5.1 details the resource integration activities which lists the

names, the descriptions, quotations of value co-creation, value co-destruction and value no-creation.

Table 5.1. Resource integration activities

Integration activities	Description	Value co-creation	Value co-destruction or value no-creation
Inputting Data/Recording	Data from performing the expected activities (e.g., eating, exercising, etc.) is manually or automatically inputted into the app.	What I really like is when I adding food, you can search them and then also you can do like a barcode scanner so that's so great, that's so easy to add things. (Sophia). I didn't really see the value in it when I first started using it, I was quite new to enduring sports. But now I've done more research, and take it more seriously, now I see the value in recording the resting heart rate that's why I do that. (Benjamin). Quick, quick and easy, I don't have to type anything at all. I can literally just go right, I can just kind of zone out go what I'm doing, it'll [a workout app - Myfitnesspal] tell me exactly what I'm doing and it just click, click, click and I really like these as well, so these just like real, you scroll for it rather than it's been typing, I just like the fact that I don't have to type anything. (Jonathan). Now I figure out how to like scanning things, I don't have to manually put information on, it's got all data for me, wasn't on my old account when I had to manually put it in I didn't put in like the average pace or things. (Amelia).	Just a bit boring, it does get a bit tedious and it'll a lot easier if you just take a picture of food and it did it for you then rather than having to type it in and find the right food. (Lucas). sometimes I find that even though I've done a workout, a message to say I've done a workout it doesn't register, it sometimes seems a bit funny with that and what I don't like about it … And think we all a little bit of the opinion that it's addicted because if you do a run, you forgot to take a Fitbit you feel the run doesn't count, it's silly. I know it's silly but actually we feel it has to be log. (Lily). and thinking of I actually eat a lot of fat in my diet compared to other things, you wouldn't know that if you didn't track it. You have to do it every day, the problem that's why it's not stable, so I would do for a period of time and then as soon as I'm on holiday goodbye … Unlike Jefit, Myfitnesspal is a lot of work. Every time you eat something you have to type it in or scan, even if you scan a barcode, it's often not right so it takes a lot of time in a day so when I say I use it for next two years, and it has always been for short period of time because it just so much work to use it consistently, so it's just right I'm gonna use it for 6 weeks or 8 weeks and then I'll drop out for few months, and then I come back to when I want to use it again, yeah. (Jonathan).
Analysing Activities and Related Statistics	After inputting data, the app provides the output to analyse for progress and awareness	A lot of time you eat food and you don't understand what you eating. With this one it does tell you what you eat in ... It's just helpful. (Lucas) It's just so helpful to know how far I'm running outdoor because when I train for Hull half-marathon and I have to do 10 or 12 miles and doing it on treadmill it's just boring and I don't want to do it, going outside makes a lot easier but I can see how far I actually go because, you know, I don't have 10 miles posting on the road so if	I found I've got a bit too obsessed that's why I stopped using it. (Samuel). I feel it doesn't really like compare, or give you progress. The progress that I know that I made that examines manually looking through my exercise that doesn't tell me. That makes some progresses. (Amelia).

Integration activities	Description	Value co-creation	Value co-destruction or value no-creation
		I get a rough journey and how far I can go then it gives me specific. (Scarlett). I think so, yeah. It's special when you keep tracking and you training and then you do racing and see you improve this year and you know you training and it's improving so that means your performance is getting better. (Benjamin).	if I'm doing a fitness workout sometimes I do forget to track that so on Samsung app I have to tap into icon and then press star sometimes I always forget to do that. (Victoria).
Adhering (goal, instruction, reminder)	Compliance with the app's instruction or reminder or the goal/plan	it shows you exactly what to do, it tells you, it is really clear, it's not too much on there so when I'm in the gym, I'll go right first thing I got to do this, I'll click on it, it shows you how to do it in case you forget. (Jackson). Myfitnesspal just tell you the calories restricted, you can see that, if you eat in too many, the topic goes red like a you know you're eating too much, kind of like your mum telling you like you eating too much kind of thing and it's very like black and white you can't really lie to it, you can't put it in, you can't be like oh actually I don't think I've done all of that, it's just simply this is how much facts in it, this is how many calories in it and stuff like that. (Madison).	I really want to hit 3000 miles last year. I sort push myself, you know raise myself down, up certain hill or down certain hill. I really enjoyed that but as I said I can find myself riding for the app rather just going on because I really running my bike. Now I'm not riding so much, I decided, I just stop doing that. (Samuel). One of my friends actually got heart condition, she's always conscious of using the Fitbit app and she normally work 12,000 steps per day and if she doesn't hit that 12,000 steps and she does feel quite upset so it's kind of like she's really obsessed with the app actually … I feel like with my friend she's getting a bit upset sometimes she feels that she cannot relax until she's done it, so sometimes that's quite worrying because on a relaxed day she feels that she has to do a lot more just to achieve the daily goal. (Victoria).
Connecting Devices and Combining Different Means	Devices and apps are connected and work together to get desired outcomes	I like use them together because the Myfitnesspal [app] track you stuff so I chose how many calories I've just burn, do I walking and then on the Aflete [app] one it shows you like average amount of calories spend for each exercise as well so it works well together. (Sophia). everything links to Garmin, so once I finish exercise and then uploads, it shares it for about three or four different things immediately so you don't have to, the only that takes time if you go in each app and writing about it up and stuff on there, maybe take 5 minutes, but it is quite good when you finish your exercise	I would like Fitbit and Garmin to sync but they don't because they are rival companies probably. I did google it quite a lot. (Elizabeth). They need Bluetooth, always need Bluetooth phone. So Bluetooth drains my battery on my phone so it's annoying because when I was in the gym, I want to be all connected. (Charlotte).

Integration activities	Description	Value co-creation	Value co-destruction or value no-creation
		because it automatically uploads it you can just sit down get a little bit of breath, and just update everything before you go have shower or something, just got a bit of time stop and relax. (Benjamin).	
Planning (Goal Setting, Making Schedule)	An app facilitates its user to create a specific goal/schedule in a period of time (a day, a week, etc.)	setting the goal and just the fact again on a daily base you can regulate what you suppose to eat in without have to think about the bigger picture too much, so you can break it down (Jonathan). I set, yeah 13,000 steps I set every day, and the other one I think I had pretty much left it, standard ones are, it was 10,000 but I all succeeded it, actually 10,000 is minimum I should do in the day so I might sort of a bit 13,000 and on a day I don't quite do that I push myself to maybe walk to the shop or do something … I really like them, I think with sport it's very mental thing and you have to know you've got a goal otherwise you don't do it and it's quite useful to think actually this's what I did before and that's what I need to do next and see how you go I think otherwise it can be very to do too little or to not push yourself enough or in fact, yeah I think it would be, I just went for a run for an hour, I wouldn't have any data on, whether I run any faster, whether my heart rate is any lower so I think it informs you. I feel beneficial and I would be a bit lost without them. (Lily).	At the moment, not really often, I only use it a couple of days a week, I don't use it every day. Some people would use it every day, so I don't use it for goals because I've got the point where I know what I need to be doing, I use it just for double check things really, so the goal that it's on here now, it's not completely relevant, I've got my own goal which I work to not on Myfitnesspal, I just use it for double check thing, help educate other people. (Thomas). I don't set the goal with the aim of finishing the goal. I just set the goal because I have to, the app gives me know choice (S-health force user to set the goal before cycling). When you want to start using cycling, you have to set the goal before you start so it doesn't any matter. (David). → no value created
Learning	The user learns behaviours based on information or knowledge (visual or text content) provided by the app.	With the gym specifically that app that's kind of by watching the videos I know what to do and I can do it properly rather just watching other people and doing it. I guess it helps in that way if you learn doing exercise as well and not just guess it and guess it wrong. (David). it can be like training fact instead of doing on your own, it can be motivating you. For me, that's quite important for doing it. Especially, training on your own, motivation, you need motivation so I put that video and I say right let's do that again, instead of	that's the Nike training, that'll take into there and tell me the different workouts to do, but there are lots of other workouts on there but I never bother with them, just the one that tells me to do. (Lily). → no value created

Integration activities	Description	Value co-creation	Value co-destruction or value no-creation
		doing in your own even it's not there, it's on the app, it's video so it's good. (Jackson).	
Adapting to Changes	- Personalized Experience: based on user's information the app creates user's own foods, recipes, and meals; customized workouts and courses - Users contextually adapt to health app features	I look online for training plan but it never seems to be quite right for me, other it's too easy or too hard and I thought it's quite good because the other good thing about training plan is it look what you've done in the previous week and it adapts the plan so if you missed the few run, it would adapt the plan to suit you … I like the fact that it will adapt and it gives the personalised schedule and changes and I think it's quite good, it's sort of a bit like a personal trainer but one you don't have to pay. I need I have to go and see, it just tells you what to do and then to see what you already done and then they optimise schedule for you so I find that really useful. (Lily). also allows me to understand sleep patterns, so that's what I like about between the new watch and the old watch. You know the upgraded sleep function on it. You could see the difference sleep stages that you have the deep sleep, the light sleep. The old watches, they didn't have those differences. It was just sleep or no sleep or restless. (Emily).	Do a lot of update, I have to synchronise a lot so it has to put in the computer a lot, the battery lasts two or three days which is quite annoying. (Thomas). I'm more mentally tracker than anything else because I try to track on the app it's I have more calories in the day so I feel it encourages me eat more so exercise try more mentally tracking it … if you put more exercise in, so you have more calories than you do, I want kind of like lose weight, I want to create more like a deficit … I kind of use that for many years on and off [this user does not follow or adhere to the app's instruction of tracking exercise]. (Madison).
Earning Internal Rewards/Incentives	Getting financial or non-financial rewards (film tickets, badges, positive messages) for self-accomplishments from the firms without presence of other	if I do certain amount of activities each week with the Vitality I get a free cinema ticket every week and free Starbucks every week. So incentive way to keep doing exercising as you get rewards from Vitality. (Benjamin). The Fitbit, it's a nice app. It tells you, you can change it, you can take it office. It nudges me through the day I'm not moving enough because my job is basically like that. And you can choose what you see it goes yea you've done three sessions out of three and it's a prize, it's nice to get your screen when you've done steps, it is an award thing I suppose. (Elizabeth).	Probably Sweatcoin [a step app] to be honest. I use a little bit of it to get protein, powder or something, customise for you so I used to do that monthly, so I used to get 20 or 30 sweat coins per month to keep they're going, but I stop it because I found it easier to buy protein shakes from the union because when you buy the customised powder, you have to pay for shipping as well, so it's not free exactly. (David).

Integration activities	Description	Value co-creation	Value co-destruction or value no-creation
	stakeholders (i.e. other customers).		
Earning External Rewards	Getting financial or non-financial rewards (film tickets, badges, positive messages) for accomplishments with presence of other stakeholders (i.e. other customers).	I do personal challenges so like this one it's a five-day challenge, so you can start it now and it'll tell you what you need to do everyday so one day say you need to walk 10,000 steps or something like that, and when you've done that it will give you a badge then all you friend can see your badge. And know you've done that as well. (Charlotte).	Strava has challenges, but I don't often enter those, because you don't get anything in return apart from a virtual certificate. There may be a challenge to do, I don't know, have marathon in April that maybe the challenges or to run 100 miles in a month, but I don't think that they motivate me because probably you don't get anything for it, apart from maybe a notification or Strava say well-done. I don't need that. (Mia).
Connecting Other Users	Making like-minded friends, sharing data & comments, receiving feedback from the app, etc.	when you upload activity it's like Facebook for people that exercise so I do an exercise it goes on, everyone else should follow me on Strava can say I've done it and I can like it or write comments about it so I use that every day … you get notifications that people like what you've done, you can go on and just see what other people are doing … I like being able to interact with other people on Strava when you see what exercise they've done. (Benjamin). I don't really, I don't really post anything, but I like reading it. And like sometimes people post like photos, their transformation like at the microwave … I like them all that too and get support (Sophia).	I'm not gonna expect them to ask me about my fitness apps so I don't ask them. It's a bit intrusive. I think it's just personal things. (Amelia). but the danger is some other ladies in my running club found it as well that if you find yourself in a period or when you find yourself in a period where you're not at pick fitness and you're not your best and doing your best performances because a lot of these things share with anybody else, especially Strava because you share your speed and your time with anybody else sometimes people think I'm not going out, I'm not going to do a run because I know it will be bad, everybody will see it, so sometimes sharing things with anybody else can be demotivating and it can be hard to not go out and see what you doing. I get in trouble in looking in my watch all the time and see how fast I'm running when I should concentrate on running. My coach tells me to stop looking on my watch so the danger can be that we get too focused on our performances, especially when we are not

Integration activities	Description	Value co-creation	Value co-destruction or value no-creation
			professional athletes. We should do that for enjoyment of doing it. Sometimes, this data can be a bit too much when you are in a period of not doing very well. (Mia). The other issue when it keeps asking me to share the results to Facebook or something like that, that's annoying. (David).
Comparing and Challenging	Challenging other users Directly or indirectly comparing data with other users	When I use app daily, you know I competed with my son because he was using it as well to see who get more steps in a day. That was good a competition. (Emma). I think other people like it and use it because it's nice to see what other people are doing. I think we like to compare each other. (Mia).	that's an activity app, again all kind of sports and things and everybody follow each other on 'Strava' and I would come away for my session, I worked really hard of that, I was really pleased with this but then I see what somebody else has done that session I think ohh and it started to get things down, if you like, that constant comparing yourself to other people so I just thought like no more. (Isabella).
Giving or Receiving Support	Giving or Receiving Support from other customers or personal trainers	I got the apps under the recommendation of a personal trainer I know. He knew I wanted to lose weight and I was explaining how I'm good at doing the exercise but often fall of track when it comes to eating well and tracking calories. (Olivia). What I can then do, I can show them exactly everything that they eating, I can show them how many calories and everything that they eating, I can show them what they need to stop eating, how much they need. (Thomas). When I training other people in the gym, I just telling them to use it because I see their accounts, so I could see what they eat in, they would do, tracking a bit more as well, so it's good when I am a personal trainer. (Lucas)	I said to him oh I'm doing new exercise that's really good and he'll say oh what the routine and I try to send it to him and I can't figure out how to do on it, just doesn't make sense. (Jonathan).

5.4 Categorisation and level of integration category activities

5.4.1 Integration category

The emergent twelve themes of resource integration activities are classified according to their properties and dimensions - that is, the number of interactions (low .vs high) with different individuals and frequency of occurring resource integration activities (regular .vs irregular) (see Table 5.2 for further information).

Table 5.2 Categorisation of resource integration activities

Types of integration category	Resource integration activities	Frequency of occurrence	The number of interactions
Core Integration	Inputting Data/Recording	Regular	Low
	Analysing Activities and Related Statistics	Regular	Low
	Adhering (goal, instruction, reminder)	Regular	Low
	Connecting Devices and Combining Different Means	Regular	Low
	Planning (Goal Setting, Making Schedule)	regular	Low
Internally Complementary Integration	Learning	Irregular	Low
	Adapting to Changes	Irregular	Low
	Earning Internal Rewards/ Incentives	Irregular	Low
Externally Complementary Integration	Earning External Rewards	Regular/irregular	High
	Connecting Other Users	Regular/irregular	High
	Comparing and Challenging	Regular/irregular	High
	Giving or Receiving Support	Regular/irregular	High

Specifically, the twelve resource integration activities are classified into the three Integration Categories including Core Integration, Internally Complementary Integration and Externally Complementary Integration (see Table 5.3 for further information). First, Core Integration displays low number of interactions (mainly between firms and customers) with regularity of resource integration activities. This category comprises five resource integration activities, namely Inputting Data/Recording, Analysing

Activities and Related Statistics, Adhering (goal, instruction, reminder), Connecting Devices and Combining Different Means, and Planning (Goal Setting, Making Schedule). Second, Internally Complementary Integration represents low number of interactions, accompanied by irregularity of resource integration activities. There are three resource integration activities feature in this category, that is, Learning, Adapting to Changes and Earning Internal Rewards/Incentives. Last, Externally Complementary Integration includes high number of interactions (i.e., beyond the firm and customer dyad to include other customers) while resource integration activities can be regular or irregular (e.g., some users regularly tracking steps for the purpose of gaining cinema tickets or digital money while others irregularly take part in running events to get gifts). Earning External Rewards, Connecting Other Users, Comparing and Challenging, and Giving or Receiving Support constitutes this category.

Table 5.3. Types of integration category

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="2">The number of interactions with different individuals</td></tr>
<tr><td>Low</td><td>high</td></tr>
<tr><td rowspan="2">Frequency of occurring resource integration activities</td><td>Regularly</td><td>Core Integration
• Inputting Data/Recording
• Analysing Activities and Related Statistics
• Adhering (goal, instruction, reminder)
• Connecting Devices and Combining Different Means
• Planning (Goal Setting, Making Schedule)</td><td rowspan="2">Externally Complementary Integration
• Earning External Rewards
• Connecting Other Users
• Comparing and Challenging
• Giving or Receiving Support</td></tr>
<tr><td>Irregular</td><td>Internally Complementary Integration
• Learning
• Adapting to Changes
• Earning Internal Rewards/Incentives</td></tr>
</table>

5.4.2 Level of resource integration

In this research's sample, participants tend to not follow only one type of integration category, they instead combine those to emerge a range of "*Level of Resource*

Integration" (*low, medium and high*). In so doing, value is created or even destroyed with the customer through a unique combination of the customer's, the focal provider's, other providers' and other customers' resources. In other words, this underlines the context-specificity of self-service technologies and their impact on relationships between customer and others (Scherer et al., 2015). Three combinations of these integration categories emerged. The first symbolises *low Level of Resource Integration* as one or two activities within the scope of Core Integration category, followed by one or rarely two more activities in other Integration Categories are performed. This combination describes low number of activities and firm-customer/dyadic interaction. The second or *medium Level of Resource Integration* has more activities compared to the first combination, which is within the scope of Core Integration category and Internally Complementary Integration category. This combination represents medium number of activities and the dyadic interaction between the firm and the customer. The last combination or *high Level of Resource Integration* is a widest variety of activities within scope of Core Integration category, Internally Complementary Integration category and Externally Complementary Integration category (i.e., all three types of Integration Categories), which represents high number of activities and beyond the firm-customer interaction including also customer-customer interaction.

5.5 IVF intensity and loyalty conditions

The findings here reveal previously unreported aspects of IVF intensity and a link between four loyalty conditions and IVF outcomes.

5.5.1 IVF intensity

As discussed in the following section, IVF intensity, defined as customers' subjective perception of the extent of effort and time invested in the IVF process, emerged as a core category in the study's final theoretical framework – that is, it affects the resource

integration activities consequently IVF outcomes and level of loyalty (i.e., which is represented by four loyalty conditions in this study here). The term “IVF intensity” is similar to the work of Haumann et al. (2015), who examine co-production intensity defined as “customers’ subjective perception of the extent of effort and time invested within a specific process of co-producing a product or service”. However, this similarity in the definition does not mean that the previous work is used as data per se, the conceptualisation and its effects instead derived from the fieldwork. Importantly, they are distinct and consequently have different contributions. In a similar vein, the author also examined prior research to find other examples of conceptualising effort in the relevant literature (e.g., IVF). For instance, Sweeney et al. (2015) investigate effort through objective measures (e.g., how long it takes to input the data), subjective measure/direction (e.g., how involved other customer at their usage), intensity (e.g., how hard they work on the apps) and persistence. Two things are important to remember. The first is that these examples were necessary for stimulating the author’s thinking about the properties and dimensions of the emergent concept. The second is down to the researcher to state that IVF intensity did emerge from the participants’ own story and their contextualised behaviours mentioned in the interviews (i.e., from the data).

5.5.2 Four loyalty conditions and IVF outcomes

While the four loyalty conditions representing level of loyalty are not new concepts, what the author discovers here is the link between four loyalty conditions and IVF outcomes. The latter is discussed in the following sections, while the former means that the properties and dimensions of these concepts can be derived from the literature. Recall, loyalty conditions can be classified according to two dimensions of relative attitude (low vs. high) and repeat patronage/purchase (low vs. high), which yields a 2 x

2 matrix (four loyalty conditions). That is, the true loyalty condition (high relative attitude and high repeat purchase), the latent loyalty condition (high relative attitude and low repeat purchase), the spurious loyalty condition (low relative attitude and high repeat purchase), and the no loyalty condition (low relative attitude and low repeat purchase). Within this conceptualisation, the customer's relative attitude can be classified according to attitude strength (week vs. strong depending on the individual's assessment) and attitude differentiation (no vs. yes depending on the individual's perception of differences among brands). Therefore, the relative attitude can be lowest (weak attitude strength and no attitudinal differentiation), low (strong attitude strength and no attitudinal differentiation), high (weak attitude strength and having attitudinal differentiation), and highest (strong attitude strength and having attitudinal differentiation). However, to be simple and suitable for four loyalty conditions which include only low vs. high relative attitude, low and lowest relative attitude are considered as low relative attitude, while high and highest are considered as high relative attitude (Dick & Basu, 1994).

As discussed in Section 5.1 and Section 5.2, the subsequent section presents the emerging six IVF practices in a nested manner of the first- and the second- order analyses. That is, the theoretical framework is provided with direct support from the participant voice and vice versa (i.e., the participants' narratives are objectively illustrated by the emergent framework).

Table 5.4. IVF practices

Level of resource integration	IVF intensity		
	Low	Medium	High
High	**External Complementary – Effortlessness**[2] • Value co-destruction: no • Value co-creation: high • Overall: value co-creation • Loyalty condition: True loyalty • Cases: 9,15,16,20, 3,7	N/A	**Addiction – Effort**[3] • Value co-destruction: high • Value co-creation: high • Overall: value co-destruction • Loyalty condition: Latent loyalty • Cases: 4,5
Medium	**Internal Complementary – Effortlessness**[2] • Value co-destruction: no • Value co-creation: high • Overall: value co-creation • Loyalty condition: True loyalty • Cases: 4,11,12,19, 21,17	**Adequacy – moderation**[2] • Value co-destruction: no • Value co-creation: high • Overall: value co-creation • Loyalty condition: True loyalty • Cases: 2,6,8,14	**Tedium – effort**[3] Value co-destruction: medium • Value co-creation: medium • Overall: medium or both value co-creation and value co-destruction perceived • Loyalty condition: Latent loyalty • Cases: 18,16,21
Low	**Deficiency – effortlessness**[1] • Value co-destruction: low • Value co-creation: low • Overall: medium or not much value co-creation and value co-destruction perceived • Loyalty condition: No loyalty, latent loyalty • Cases: 1,10,13 20	N/A	N/A

Notes:

N/A: not applicable

Some cases/informants emerge in more than one practice because they use more than one app and have different perspectives/practices on each app.

In light of **Table 5.4** and **Table 5.5**, three aggregate emerged:

1) Initiation: Deficiency – effortlessness;

2) Success: External Complementary – Effortlessness, Internal Complementary – Effortlessness, Adequacy – moderation;

3) Vulnerability: Addiction – Effort, Tedium – Effort.

Table 5.5. IVF aggregates

		Level of loyalty		
		Low	Medium	high
IVF outcomes	Low/ value co-destruction	N/A	Addiction – Effort	N/A
	Medium	[1]Deficiency – effortlessness	Tedium – Effort	N/A
	High/ value co-creation	N/A	N/A	• External Complementary – Effortlessness • Internal Complementary – Effortlessness • Adequacy – moderation

Notes:

N/A: not applicable

Low level of loyalty: no loyalty

Medium level of loyalty: latent loyalty or superior loyalty

High level of loyalty: true loyalty

[1]Deficiency – effortlessness represents both no loyalty or latent loyalty hence considering low level of loyalty

In light of **Table 5.4** and **Table 5.5**, three aggregate emerged:

1) Initiation: Deficiency – effortlessness;

2) Success: External Complementary – Effortlessness, Internal Complementary – Effortlessness, Adequacy – moderation;

3) Vulnerability: Addiction – Effort, Tedium – Effort.

5.6 IVF practices

5.6.1 An overview

Considering two properties and their corresponding dimensions: (1) Level of Resource Integration (low, medium and high) and (2) IVF intensity (low, medium and high), there are six IVF practices emerged, namely *Tedium – Effort , Addiction – Effort, Deficiency – Effortlessness, Adequacy – Moderation, Internal Complement – Effortlessness, and External Complement – Effortlessness* (see Table 5.4).

Then, in the light of the six practices and according to two properties and their corresponding dimensions of IVF outcomes (from low/value co-destruction to high/value co-creation) and level of loyalty (low, medium and high) (see Table 5.5), the

author identified three aggregates (i.e., *Vulnerability, Initiation and Success*). These practices and aggregates are also shown in Figure 5.1 which represents this thesis's theoretical framework.

5.6.2 Deficiency – Effortlessness

This practice is characterised by low Level of Resource Integration, with low IVF intensity. Some but not all resource integration activities in Core Integration category are performed, though participants in this group could have one or two more activities (e.g., supporting other customers) in other Integration Categories.

Value co-creation

Users who represent this practice tend to perceive neither difficulty nor dislike of using health apps. For example, when asked about the difficulty of health apps, an interviewee who is using a workout app replied:

> No, it's really really good … the reason I downloaded it, it tells you what to do, it shows you. It is not writing, it's video so video is quite important, it's visual. (Jackson)

As such, perceived ease of use is the main motivation for continued use. He however engaged in low level of activities (i.e., only watching and following the instructions from videos given by the app):

> I'll just copy, I'll just watch and then I do it so it tells you what to do. (Jackson)

Moreover, another participant and her son using the same fitness app focused on a competition to see who got more steps with the aim of earning rewards from the app. Steps were automatically counted by the app (i.e., low effort spent in inputting data) while she sometimes watched her phone's screen to see how many steps they were, how many digital money she earned. Subsequently, she supported her son by giving her earned rewards (i.e., digital money) to exchange small offers from the app, which represents value co-creation:

> The free thing that he gets was incentive to use it more. As I collected the stars, I could transfer the stars to my son's phone. So I won't be a gamer but he was so that was good incentive to carry on using it you know. (Emma)

Similarly, utilising a nutrition app to interact and support his clients (giving support – a resource integration activity) was an integral part of usage for Thomas who is a personal trainer:

> If you were a client of mine … you want to lose four stones, you eating a lot of food but you didn't know what was good and what was bad. What I would then do is I ask you to scan everything and input everything for a couple of days in a week that you are eating then we would look at it together and I would able to say well you are eating 4000 calories a day. If you want to lose weight, you need to cut that down to 2000 calories per day. What I can then do, I can show them exactly everything that they [are] eating, I can show them how many calories and everything that they [are] eating, I can show them what they need to stop eating, how much they need … you wouldn't know how many you eat in unless you add it up and Myfitnesspal [a nutrition app] adds it up for you. (Thomas)

In addition to this argument, elsewhere in the same interview, this interviewee reported the continuance intention of a nutrition app was not for monitoring (tracking) what he was going to eat, but for the purpose of interacting with his clients. Note that tracking is considered as a main feature in Myfitnesspal:

> Just use it more often with other people so the people that need education, other people that I work with that do as much as what I do so to help them understand in more detail about what they're eating so that's what I'll be using for in the future. (Thomas)

Diminished value

However, the value created seems to be diminished after some time despite positive attitude towards usage. For instance, on the one hand, when asked what he (Thomas) does not like with the health app, he said: "There isn't anything I don't like, I like it all, yeah nothing I can say I don't like about it. (Thomas)." On the other hand, he had a tendency to use the app less after a period of time of usage: "I used it every day for 2 or 3 months and then stop using as often, I won't use it more often. You know maybe a couple of months I do a few days." The current study finds self-efficacy for his own

knowledge of tracking (i.e., one's belief in one's ability to succeed in tracking activities without health app support) is considered as the reason for discontinuity:

> I didn't need to use it as much because I trained the way I was approaching what I eat in so it got make to the point where I didn't need to use it because I learnt. (Thomas)

This finding is reinforced by previous work (Peng et al., 2016), which finds tracking is a very positively favoured characteristic of health apps, but also indicates the usefulness of the apps might be temporary. This is because users would learn about their own routines after tracking for a short period of time, thereby having no need for using the apps. Thus, notwithstanding positive attitude towards the health app, not much value co-creation is stated, even diminished over time.

Similarly, Emma perceived fun and interesting, but she gave up the app after two months of usage because her son stopped using it. Meanwhile, another user considered health app fun, but superficial things:

> Samsung Health is good because you can record different exercises. It doesn't need to record you're doing the exercises like before I cycle, I put cycling on and then I cycle, and it'll tell you how many distance you cycle, average speed. Mostly I just like to do it quickly so I get speed up … I can look at the speed, it's pretty cool I like it the most about it … I just like to look at speed on it … Not much, just superficial things. (David)

This practice appears to be associated with relatively low level of loyalty. Specifically, two participants (Jackson and David) who irregularly used health apps at the time of the interviews have low relative attitude, as such they had *no loyalty*. Conversely, Emma who stopped using a step app while Thomas who irregularly used a nutrition app both declared high relative attitude forward the app. Hence, they expressed *latent loyalty*. Apart from the above comments and arguments, another quote is illustrated to demonstrate the low level of loyalty:

> My son stopped using it so we did not have the competition any more so I stopped using it, but I would like to get it back on. (Emma)

Taken together, these participants are considered to be in the initial phase of adopting health app, not much value co-creation and value co-destruction are identified. Hence, this practice is termed *Deficiency – Effortlessness* which represents deficiency in resource integration activities, but effortlessness in IVF process, and consequently low extent of IVF outcome and low level of loyalty.

5.6.3 Tedium – Effort

This practice describes medium Level of Resource Integration and high IVF intensity. Specifically, *Tedium – Effort* including four over five activities in Core Integration category (i.e., (1) Adhering to goal, instruction, and reminder; (2) Inputting Data/Recording; (3) Analysing Activities and Related Statistics, (4) Goal Setting) and those in Internally Complementary Integration category (i.e., Adapting to Changes), which is more resource integration activities performed compared to the aforementioned practice.

Value co-creation

Although goals direct consumer behaviour, people might be uncertain about how to approach the goals (Huang et al., 2015). Moreover, pursuing a wellness goal (e.g., weight loss) necessitates repeatedly engaging in goal-consistent behaviours (e.g., doing regular exercise) and minimising goal-inconsistent behaviours (e.g., eating unhealthy food) (Campbell & Warren, 2015), as such reaching the desired outcome requires long-term effort. This study finds the contribution of health apps to addressing the above challenges of goals. Particularly, many health app providers offer a goal-setting feature that translates an abstract goal (e.g., weight loss) into specific goals (e.g., 10,000 steps or calorie restriction like maximum 2500 calories per day) for a set of actions. Then, this process is contextually regulated in the customer sphere in which ‘‘the customer creates

value as value-in-use independently of the provider'' (Grönroos & Voima, 2013:138) or the service is adapted to customers' own preferences and circumstances to create value (Temerak et al., 2018). For instance:

> [a nutrition app] It's personal, you do it yourself, you have to set goal yourself, so you do a little bit of knowledge there … although I think you can ask it to set you a goal, and you can say like I weight this, I want to weight this amount, that's how you have to figure out which your goal weight is, you have to figure out right what do I think, what do I want to achieve. (Jonathan)

Many participants in this practice and in other practices, who adhered to the app's instructions to establish a goal(s) perceived that those closed-ended goals gave direction, more accessible and easier to self-monitor and *comply with*. As such, this translation of an abstract goal(s) into a closed-ended or specific goal(s) shapes motivation for goal pursuit (e.g., eating healthy) on the basis of operand resources, that is, that products (i.e., health apps). Following comments illustrate the role of a goal co-established by the firm and the customer and then the benefit of adhering to it:

> it sets you how many calories you should have during the day so that's 2500 calories as well and what it does, it tells you, you know, when you coming up close that limit … it can help me to physically better so the next time I work out my recovery will be good, and then I'll train better next time and if I don't eat properly then I haven't got much energy, I'm not gonna train the next time. (Lucas)

> setting the goal and just the fact again on a daily base you can regulate what you suppose to eat in without have to think about the bigger picture too much, so you can break it down … it'll tell you if you are eating too much so again it's kind of just stop you. So I think the benefits there just kind of keep you on track, it reminds you (Jonathan)

In contrast to those who represent Deficiency – Effortlessness, all participants in this practice appreciate and try to use tracking feature (i.e., Inputting Data/Recording; Analysing Activities and Related Statistics), though these activities might be inconsistent. Moreover, conducting simultaneously several resource integration activities in Core Integration category ("tracking", "goal setting" and "adhering") contributes to raising

awareness, complying with the established goal(s) and the reminders hence value co-created. Below are some illustrations.

One interviewee who uses a nutrition app for weight loss emphasises the importance of tracking and the need for adhering to the goal/the calories restricted:

> Every time I have a meal, I track it straightaway on the app … Myfitnesspal just tell you the calories restricted, you can see that, if you eat in too many, the topic goes red like you know you're eating too much, kind of like your mum telling you like you eating too much kind of thing and it's very like black and white you can't really lie to it, you can't put it in, you can't be like oh actually I don't think I've done all of that, it's just simply this is how much facts in it, this is how many calories in it and stuff like that. (Madison)

In a similar vein, another interviewee who also use the nutrition app but for exercise performance:

> you put your food into the app and you put exercise into the app as well so if I exercise in the morning I burn like 500 calories which mean throughout the day I've got try consume 3000 calories, get to my target goal as well so it's good for that to help you to guide you to eat more what you want. A lot of time you eat food and you don't understand what you eating. With this one it does tell you what you eat in. (Lucas)

Effortless or easy to integrate resources plays a vital role in customer preference as many participants in this research's sample mentioned ease of use and simplicity when they were asked "what do you like most about the app?" or "what is the motivation of using health app?". One example of those answers is a case of Madison:

> Just ease of using it, the things like if you can't find it [e.g., food or drinks] on search, you can like scan the barcode or things like that. (Madison)

In a similar vein, this also occurs in other practices such as Sophia in another practice reported that:

> I really like it because it is just easy to keep track. What I really like is when I adding food, you can search them and then also you can do like a barcode scanner so that's so great, that's so easy to add things. I like the barcode. (Sophia)

Value co-destruction

Despite perception of ease of use, having to manually and repeatedly input data into the apps in a long period of time is likely to diminish or even destroy the value due to perception of considerable effort and time (i.e., high IVF intensity) accumulated. For example, an interviewee stated ease of use was the main motivation of using a nutrition app:

> I don't have to write everything down manually, all on my phone, it's relatively easy, easier than doing it not on my phone and then obviously that I wanted to lose weight for some holiday, that was motivation of using, I use Myfitnesspal because it looks professional, it's easy to use in comparison to other apps. (Jonathan)

However, he also perceived that regularly and manually inputting the data took considerable effort. Elsewhere in the same interview, he elaborated on this: "Myfitnesspal is a lot of work. Every time you eat something you have to type it in or scan, even if you scan a barcode, it's often not right so it takes a lot of time in a day … it just so much work to use it consistently, so it's just right I'm gonna use it for 6 weeks or 8 weeks and then I'll drop out for few months, and then I come back to when I want to use it again." Consequently, despite perception of relative ease of use compared to other apps, it is still effortful to use (i.e., taking a lot of work/effort, taking time to use) in prolonged service.

Similarly, Lucas perceived ease of use, but effort and consequently irregularity of usage:

> Again simple to use, it has all food, all set out there, it's got nice, clear numbers as well. it's just easy to use, and easy to see the results as well … Just a bit boring, it does get a bit tedious and it'll a lot easier if you just take a picture of food and it did it for you then rather than having to type it in and find the right food and things like that … you have to sort really get habit doing it as well, it's quite easy to forget, sometimes I get bored of it because, it doesn't, the features don't change it all, you have to really into it to get it goes, maybe I have a specific goal, I will use it more. If I'm not training for some time, I just drop it off until I use it. (Lucas)

This practice also exhibits inconsistency and irregularity in performing resource integration activities, namely "Planning i.e., Goal Setting", "tracking" and "Adhering"

which are in Core Integration category. In other words, the participants representing this practice tries to conduct those activities as discussed earlier but inconsistency and irregularity. Below are some examples.

Madison who uses a nutrition app only tracks nutrition and does not follow or adhere to the app's instruction of tracking exercise. Actually, she tracks it mentally:

> literally just I think like diary or stuff that you track it every day, you can put in exercise, your water, things like food, weight, to do quite a lot, you can track your progress, stuff like that … Only mentally because they're so much variation, it depends on calories you've burn, depends on how much you weight and stuff and then because I do, I like to focus on things like weights and stuff … I can put it (i.e., exercise data), but I just choose not to … I don't because it tells you how many calories you just left for the day, and if you put more exercise in, so you have more calories than you do, I want kind of like lose weight, I want to create more like a deficit. (Madison)

Another interviewee seems flexible about adhering the goal established:

> this is ideal goal, this where I'm, I'm going to try to get close to the goal possible. And I don't meet it, it's not end of the world, but as long as I'm close to this (the ideal goal) than I was before then I'm happy. That's how I use it for, because I said it's hard, it's hard to know what is your ideal … it's like a goal, you don't have to get to, you just try to get close as close possible. (Jonathan)

Eating habits also contribute to accounting for this phenomenon. For instance, somewhere in the same interview, Jonathan recounted his eating habits which reveal the rationale behind the irregularity of using the nutrition app:

> I eat pretty much all the time, I have breakfast I come to work. I'll be starving by 11 o'clock so I have a snack and then I have full-long lunch at twelve which I always bring from home. Very rarely buy from canvas and then by 5 o'clock I'm starving I get home, I have something to eat as soon as I'm home and I have dinner about 7:30 – 8 o'clock and I might have snack before I sleep as well. so I eat quite a lot, quite frequently throughout the day. It's not like a breakfast, lunch and dinner, I'm kind of topping up throughout the day. (Jonathan)

When he used the nutrition app, he had to eat less:

> sometimes you'd love to eat in what you suppose to eat, but actually if you are hungry, you think you eat more food and then you look at it [the app], you go actually I eat what I suppose to eat … diet is annoyed. (Jonathan)

Therefore, the findings reveal that the participant had to give up an enjoyable habit (e.g., eating a lot of food) when using the app whereby attaining the goal might not lead to satisfaction. The unhealthful habits provide instant gratification, whereas the healthful behaviour taking considerable effort might not always bring about good emotions. Thus, there is not a feeling of satisfaction when the user achieves the goal due to the perceived sacrifice.

In a similar vein, Madison even had uncontrolled eating habits and irregularity of usage:

> I feel very bad about them [eating habits] so uncontrolled … That's why [I] start using Myfitnesspal again because I kind of use that for many years on and off … I haven't seen any improvement [of weight loss] … I will probably try it [the app] for about three or four weeks and if I don't see any improvement to like measurement, my weight, I just stop using it again. (Madison)

In short, this practice exhibits more resource integration activities in Core Integration category (i.e., four out of five activities) and in Internally Complementary Integration category (i.e., Goal Setting and Adapting to Changes) compared to the previous practice, thereby emerging additional value. However, tedious task of manually inputting data in the context of prolonged, complex and technology-based self-services (i.e., wellness apps) as well as inconsistency and irregularity in performing the integrated activities partly leads to perception of high IVF intensity, which results in value co-destruction and discontinuity in usage. Therefore, this practice is termed Tedium – Effort which is characterized by tedium of repeatedly performing resource integration activities, especially those in Core Integration category, and high IVF intensity. This practice is typified by those who have latent loyalty as being low repeat patronage/irregular use and high relative attitude, which is mentioned earlier and also clarified by the following example:

> I think it's the most popular one that I know of, I don't think I know any other food tracking apps that of that popular … you leave it because you know there is a lot of work so when you want to diet again or anything like that or tracking food again, you just automatically go back to the one you used it before, you didn't dislike it, you just know that to track your food, it's difficult, it takes a lot of time. (Jonathan)

5.6.4 Adequacy – Moderation

Medium Level of Resource Integration, with medium IVF intensity, reflects this practice. The resource integration activities (i.e., Adhering; Inputting Data/Recording; Analysing Activities and Related Statistics; Goal Setting; and Adapting to Changes) and the corresponding value co-created from these activities described in the previous practice also emerge in this practice. In addition, there are some more activities added and consequently additional positive outcomes (i.e., value co-creation, higher level of loyalty) emerge. First, the users typifying this practice use two or more health apps to achieve a desired outcome(s) whereby another activity (i.e., Connecting Devices and Combining Different Means) in the Core Integration category is displayed. The value co-created by actively and simultaneously employing and combining several apps is demonstrated by the following illustration:

> I mean use Aflete app [a workout app] and Myfitenesspal together like obviously you have to eat well and exercise well. So I like use them together because the Myfitnesspal track you stuff so I chose how many calories I've just burn, do I walking and then on the Aflete one it shows you like average amount of calories spent for each exercise as well so it works well together and then the other two just like sort of like if I'm bored of doing some exercises then I can use one from them. (Sophia)

Second, somewhere in the same interview, she also narrates the usefulness and motivation of two integrated activities, namely "Learning", which is not present in the previous practice, and "Adhering" to video guides from a workout app:

> it [a workout app] shows me like how long I spend how many stuff I've done and like it gives me break down for what I can do for each day … she uploads like transformation for us like people use their guides, obviously usage like inspiration so I really like that … seeing people that like look like me and then seeing the transformation into like in how many months she is in the guides, that was good. (Sophia)

Another difference to the previous practice is that this practice is displayed by the users who maintain greater continuity and have a routine even addiction to usage. Therefore, it is indicative of frequently conducting the resource integration activities. Specifically, all interviewees (Olivia, Sophia, Amelia, Scarlett) in this practice declare goal attainment and benefits of using the apps from a long-term and regular use. For example:

> everyday I'm also addicted to putting it up … It makes me healthier, I won't say necessarily made me happier, but it made me healthier and made me think about things quite a lot … it helps me stay quite healthy, so I don't want to get relying on it, but it's helpful. (Scarlett)

> actually normally I don't log my food, doesn't mean like at the end of the day, or sometimes in my notes, or my phone I put what I eat in at the end of the day I go I do it … it's really useful, I have this app for really long time [one and a half years] and I've lost five stone using this app. (Amelia)

Therefore, despite the similarities in resource integration activities to the Tedium – Effort practice, especially having to manually input the data, value co-destruction is not stated. Instead, the augmentation as well as consistency and regularity in performing integrated activities lead to higher value created and increasing frequency with health app usage. Moreover, no considerable effort or difficulty of usage and integrating resources invoked, but only perceived ease of use. Consequently, those aforementioned advantages seem to compensate for the effort in usage whereby this practice is associated with medium IVF intensity. Illustrations of this are:

> Continued use is because of its effectiveness and ease when trying to monitor my calorie intake … Ease of monitoring calorie intake is main use for me. (Olivia)

> I really like them, it's an easy way to help yourself. (Sophia)

> it's just convenient for me. It's on my phone just take some minutes to log in some food. (Amelia)

> Very easy to use, very user-friendly, very easy to navigate, quite visual as well, and I can find a lot of different food in search bar so you can literally just find whatever you want really as it connects to the internet, so if there is something I'm not sure

> on the calories or even it might be really bad for me, I can just find out, it helps me monitor things. (Scarlett)

These individuals demonstrate high intention to continued use and high relative attitude, which represents true loyalty. Some more examples are:

> I think because it just helps me lose so much weight I thinks it's the best app, I have in my life. (Amelia)

> I just want to carry on using them. Yeah I just want it. Like build muscle so I just want it. (Sophia)

Taken together, this practice includes more activities with higher frequency of occurrence, but less perception of effort and greater extent of IVF outcome and higher level of loyalty compared to Tedium – Effort. Therefore, Adequacy – Moderation is termed for this practice to describe the adequacy of resource integration activities and their combinations for goal pursuit, and medium IVF intensity.

5.6.5 Internal Complement – Effortlessness

Medium Level of Resource Integration with low IVF intensity signifies this practice. Similar to the previous practices, this practice also entails the value co-created by the aforementioned activities. For instance, the value co-creation arises out of goal setting or translating an abstract goal (e.g., to stay fit and healthy) into a specific goal (e.g., 10,000 steps per day). In other word, this process motivates users to strive for and adhere to the specific goal (e.g., "I set, yeah 13,000 steps I set every day … on a day I don't quite do that I push myself to maybe walk to the shop or do something. Lily."). The value is also co-created by adhering to the app's reminder to get motivation for performing desired activities (e.g., "it reminds you, you have to move for ever long, it's because it tell you to move, just get up from the desk, get some steps in. Isabella.").

In addition, this practice exhibits another resource integration activity (i.e., Earning Internal Rewards/Incentives) in the category of Internally Complementary

Integration, which plays an important role in encouraging users to perform desired activities (e.g., walking, running). It could be a positive message or a prize, which might occur regularly (i.e., daily):

> today I run to work this morning so I had very high step counts. You know earlier on so it's congratulating me if I achieve my goal and I'm now achieving about my goal. That's a nice message to get. I think it's motivating. (Emily)

> It nudges me through the day, I'm not moving enough because my job is basically like that. And you can choose what you see it goes yeah you've done three sessions out of three and it's a prize, it's nice to get your screen when you've done steps, it is an award thing I suppose. When you first start with this app, it gives you badges and things … it's quite nice to say oh my steps to the moon, congratulation. (Elizabeth)

Another difference to the previous practice is automation of tracking (automatically inputting and analysing the data). Specifically, in aforementioned practices value is likely diminished among users who have to regularly and manually input their data into the apps due to forgetting to use or investing considerable time and effort in the prolonged context. For example: "I wouldn't really say anything deters my use. It is very simple to use, however sometimes I genuinely do forget to log progress and fall out of the habit. (Olivia)." In contrast, all users in this practice utilise health apps that automatically track their activities, tending to perceive ease of use and effortlessness in value co-creation process (low IVF intensity). Thus, they maintain or even increase regularity in usage and enhance motivation for performing desired activities. Demonstrations for this are:

> I wear Garmin [a health watch] 24 hours a day, I never take it off and it's got the heart rate monitor on there as well, it's so easy so it takes data from here. (Isabella)

> I always look at in the morning to see my sleep was, I always look after an exercise session … I give an example, when I run I do a loop and I come back to sort of my house and I do maybe another half loop and when you come back to your house you could easily say ok I just go home now, but maybe because I know it is recorded [automatically], and just only me that see it, but as I say, I'm not completely exhausted. You know, let do that extra a bit, it's an improvement on last week. And

> I think if I didn't monitor it that I wouldn't know it's necessarily improvement on last week because it's not just easy to see those things. (Emily)

Also, repeated behaviour and automaticity triggered by environmental cues, and reliance on the apps represent this practice. For instance, Elizabeth who had been continuously using the fitness watch for more than three years reported her habit and reliance on the numbers/data given by the app:

> The first thing I do in the morning is to go into my Fitbit app to see how I was slept when I should know how I was slept. You get used to seeing the number, get used to relying on it, maybe a sense of understanding your own body, should I know if I have enough calories or stop eating, go for walk at lunch time … I think I'm obsessed with this, I think numbers appeal to me".

Similarly, Lily reports her reliance on the app:

> we all a little bit of the opinion that it's addicted because if you do a run, you forgot to take a Fitbit [a health watch] you feel the run doesn't count, it's silly. I know it's silly but actually we feel it has to be log. So you do become a bit reliant on it. Because it's almost like you haven't done the exercise, but of course you have, but it is not on the app, it doesn't show. (Lily)

This practice is associated with high level of loyalty (i.e., true loyalty) due to high intention to continued use accompanied by high relative attitude. More demonstrations of this are:

> It becomes part of my life now. It's part of my daily things I need to get those steps in each day. I wouldn't not wearing now. A bit obsessed with this. (Isabella)

> Luckily, I was under warranty and I've got replace it very quickly, but I don't like to be without it so it's something that's certainly become a big part of me. (Emily)

Taken together, two more valuable additions are made compared to the Adequacy – Moderation practice. First, a resource integration activity (Earning Internal Rewards/Incentives) in the category of Internally Complementary Integration added results in greater motivation for performing desired activities (e.g., regularly doing exercise) and increased reliance on the usage. Second, mitigating IVF intensity by improvement of technology (e.g., automatic tracking) plays a crucial role in enhancing

value co-creation (e.g., greater motivation for tracking, performing desired activities). Therefore, this practice is termed *Internal Complement* – E*ffortlessness* to represent effortlessness in IVF process and the importance of Internally Complementary Integration activities, especially Earning Internal Rewards/Incentives.

5.6.6 External Complement – Effortlessness

This practice is characterised by high Level of Resource Integration with low IVF intensity. In addition to the resource integration activities, their combinations and the value co-creation described in the Internal Complement – Effortlessness, the current practice (External Complement – Effortlessness) adds more resource integration activities in Externally Complementary Integration category (i.e., Earning External Rewards, Comparing and Challenging, and Connecting Other Users). In line with Kwon et al. (2016), it should be noted that although some participants in this practice did not mind even proactively shared their data, the majority participants in previous practices considers health app as personal or private, which justifies the limitation of performing the resource integration activities in Externally Complementary Integration category in the prior practices:

> No, I'm very solitary in fitness so no I don't really talk about it or discuss it with anybody, I don't really want anyone to know. (Scarlett)

> You don't often hear people talk about fitness app, within the fitness app, they not really talk about the app … I'm not gonna expect them to ask me about my fitness apps so I don't ask them. It's a bit intrusive. I think it's just personal things. (Amelia)

> No, I don't share a lot of my data. I'm not really active on a lot of social media so I guess maybe I'm quite private so I'm not really interested in sharing my data. (Emily)

In line with Earning Internal Rewards/Incentives, *Earning External Rewards* also motivate users to perform desired activities (e.g., walking, running), but the difference resides in the presence of other stakeholder (i.e., other customers). This resource

integration activity is contextualised regarding the number of people attended, type of rewards received. For example, on the one hand, an interviewee preferred personal challenges, but let her peers know her personal achievements:

> I do personal challenges so like this one it's a five-day challenge, so you can start it now and it'll tell you what you need to do every day so one day say you need to walk 10,000 steps or something like that, and when you've done that it will give you a badge then all you friend can see your badge, and know you've done that. (Charlotte)

On the other hand, another informant focused on challenges with others for the purpose of prizes or getting something, but not on badges or a virtual certificate:

> Running Heroes [app] is a little bit different. Again that takes information from Garmin and it's kind of like challenges, you can enter challenges and for example this one I can win ticket to running festival, I just need to run 6 miles in a week … Strava has challenges, but I don't often enter those, because you don't get anything in return apart from a virtual certificate. (Mia)

Those two examples also describe another resource integration activity (i.e., Comparing and Challenging) which is utilitarian, but Comparing and Challenging can also be done for hedonic purpose, especially in a small group of users:

> I have a couple of friends on my Fitbit app, and I can see who is winning in terms of steps overall … I've got about three or four people on that and you can see what they have done, what they are doing … I properly just keep it between us because I work all the time, so we only do it for little bit of, a little bit of laugh really. I wouldn't do it seriously with somebody. I have to work all day. (Andrew)

Therefore, the users can individually or collectively conduct these two activities (Earning External Rewards, Comparing and Challenging) to co-create value but necessitating the presence of other stakeholders i.e., other customers. Also, both direct and indirect interactions among customers contribute to value co-creation. The motivation for performing desired activities (e.g., walking, running) and resource integration activities (e.g., tracking, adhering) can also stem from Connecting Other Users (e.g., making like-minded friends, sharing data & comments, receiving feedback & emotion from the app). Some participants are motivated to regularly write comments,

give a thumbs-up and so on like Facebook. In other words, health apps create an environment for their users to share data/information or even to show off their achievements, and to follow and interact with others that are similar to them. Below are some examples:

> it's like Facebook for people that exercise so I do an exercise it goes on everyone else should follow me on Strava can say I've done it and I can like it or write comments about it so I use that every day … Strava uses probably the most because of side of social networking. (Benjamin)

> it shows me that sixteen of my friends give me a thumbs-up or well-done and doing that and can give me comments as well if they want to. I can see what other people are doing, so I see my friend Tim who went out for running this morning, he run quite fast, that's a good pace, he did nearly 5 miles, so I can give him a thumbs up and say well-done Tim … So it's nice for all other people can see that I've done something. (Mia)

These users in this practice also declare perception of effortlessness in IVF, though more resource integration activities are conducted compared to other practices. One illustration of this is:

> No, maybe take a couple of minutes, so everything links to Garmin, so once I finish exercise and then uploads, it shares it for about three or four different things immediately so you don't have to, the only that takes time if you go in each app and writing about it up and stuff on there, maybe take 5 minutes, but it is quite good when you finish your exercise because it automatically uploads it you can just sit down get a little bit of breath, and just update everything before you go have shower or something, just got a bit of time stop and relax. (Benjamin)

This practice appears to be associated with high level of loyalty (i.e., true loyalty) owing to high intention to continued use accompanied by high relative attitude. One example is:

> I can't switch from different app … because I would need to buy a different brand of watch if I did that. As I said Garmin is the best one … I think I'll be silly to get a different type which I know it isn't going to be that good. (Mia)

Taken together, a distinction from Internal Complement – Effortlessness is that the users in this practice seems to get motivation from interactions with other customers. Thus, this practice is termed *External Complement* – E*ffortlessness* to

indicate the importance of performing activities in Externally Complementary Integration and to represent effortlessness in the IVF process.

5.6.7 Addiction – Effort

High Level of Resource Integration, with high IVF intensity signifies this practice. Addiction – Effort is similar to the External Complement – Effortlessness in displaying a variety of activities except "Earning Internal Rewards" and "Earning External Rewards" whereby similar benefits are displayed. There is, however, the significant difference between the two practices, that is, the lack of additional motivation created from these two resource integration activities. Apart from the positive effects of Externally Complementary Integration displayed in the previous practice, this practice reveals its negative effects, that is, addiction to perform resource integration activities in Externally Complementary Integration which is main focus on this sub-section. Specifically, the earlier sub-section discussed the positive effects of the resource integration activities in Externally Complementary Integration (i.e., Earning External Rewards, Comparing and Challenging, and Connecting Other Users), this practice reveals the negative effects from those who are addicted/obsessive with these resource integration activities (e.g., Comparing and Challenging) or the negative effect of customer-to-customer (C-2-C) interactions leading to perception of high IVF intensity and consequently value co-destruction.

Note that usage addiction is also exhibited in the three previous practices (i.e., Adequacy – Moderation, Internal Complement – Effortlessness, and External Complement – Effortlessness). As such, the participants in those practices have addiction to performing resource integration activities in Core Integration. Addiction and other synonymous words (addicted, obsessed, obsessive) are "in vivo codes", specifically are the words used by the participants (i.e., Isabella, Samuel, Charlotte,

Emily, Elizabeth, Scarlett, Benjamin, Victoria, Madison, Lily) in the interviews (Glaser, 1967; Strauss, 1998) to mean the state of dependence on the usage. The users in those practices with the exception of Isabella and Samuel in the current practice express ambivalence about this state, but they stick to the apps and receive the benefits from the resource integration activities. For instance:

> I don't think that there's anything that I don't like about it. I really quite like it. That's why I depend on it, you know I'm addicted to it … I suppose you can become a bit addicted really, just checking your steps over time. Like any social media I suppose people can become addicted at checking it frequently. (Emily)

> I think they all seem to very like it and feel it useful. And think we all a little bit of the opinion that it's addicted because if you do a run, you forgot to take a Fitbit you feel the run doesn't count, it's silly. I know it's silly but actually we feel it has to be log. So you do become a bit reliant on it. Because it's almost like you haven't done the exercise, but of course you have, but it is not on the app, it doesn't show … they could get obsessed with how many calories they will expend, how many they will take in and another realistic deficit in the calories and, I think that could be the downside, for me I don't think there's any downside really. No I don't realise any downside personally but I can see that maybe that other users maybe. (Lily)

In contrast to the benefits of addiction to performing the resource integration activities in Core Integration, the following two examples illustrate the drawbacks of addiction to the resource integration activities in another category (i.e., Externally Complementary Integration):

First, a previous study (Cutright & Samper, 2014) suggests that people are motivated to reduce a discrepancy between ones' desired state and their current state when they perceive the existence of this discrepancy. Wallace and Etkin (2018) reinforce this argument by demonstrating that specific goals (vs. nonspecific goals) are more motivating at higher levels of goal progress. In addition, Koo and Fishbach (2012) who examine "a small-area hypothesis" propose that people focusing on smaller area would show greater adherence to goal completion. For example, at the beginning of goal pursuit, individuals strengthen motivation if they focus on the completed process than

remaining one (e.g., 20% completed vs. 80% remaining). Reversely, at the later progress of goal pursuit people increase motivation when remaining process rather than accumulated process (e.g., 20% remaining vs. 80 completed) was monitored. The current research reinforces these arguments since it finds that the closer the outcome to the desired goal is, the greater motivation behind striving for completing the goal is generated. Moreover, this research discovers the negative effect of striving for goal complement, especially in complex, prolonged and TBSSs. For instance, an interviewee who used a fitness app for cycling was motivated to go ride on holiday and very bad weather when he nearly achieved the goal to share. Consequently, he stops usage due to high IVF intensity accumulated over time, though the goal was attained:

> at the end of last year, particularly run by Christmas, I've done about 2976 miles something like that of the year, and right I'm gonna go out, I go ride and go on my bike to my parents' house. I'm gonna be right there to get 3000 miles and it was most a miserable, windy really day … right I'm gonna get 3000, I got that, well I was really pleased I've done it, but you know, it was a horrible ride, I not enjoy it at all. And made me think about why I was riding … I think of myself why, what's the point in making myself ride, just to get someone on the screen so that was the point I decided that actually it doesn't suit me anymore. Part of it was that I know I'm not really, I near of mile to share. You know, I was doing 60 miles a week cycling to work, and that's gone … I would cycling for the app and it wasn't a problem with the app, I think it's my personality, it's quite competitive and I get quite obsessed about things quite easily and I decided to take away that tempted. (Samuel)

Second, Peng et al. (2016) consider social competition could be motivating but also demotivating due to fear of too far behind compared to others. This study reinforces this argument by exploring that the value destroyed by recognition/perception of great effort from social competition. For instance, a female user stopped using a fitness app due to perception of being too obsessed with the competition and expending constant and considerable efforts, though she was happy at first. As such, "too much competition" could transform motivation into demotivation and value co-creation into value co-destruction:

> everybody follows each other on Strava [a fitness app] and I would come away for my session, I worked really hard of that, I was really pleased with this but then I see what somebody else has done that session I think ohh and it started to get things down, if you like, that constant comparing yourself to other people … constantly comparing my efforts to other people thinking I'm not doing enough, I'm not working hard enough, I wasn't working hard enough. I'll be able to do like it, I'll be able to run much faster but I know that I push myself as far as I physically can, so you know comparing yourself to other people it can really worth to down the effort that you made yourself … so I just thought like no more. So my running and my activity that I do it's just for me nobody else. That's why I stopped using those apps. Too much competition. (Isabella)

These two scenarios evidenced the negative effect of Externally Complementary Integration (high IVF intensity accumulated over time) regardless of goal attainment. It should be noted that the value co-destruction and the discontinuity of those two informants derive from C-2-C interactions, which is understudied. This finding is meaningful since prior value co-destruction research, such as Echeverri and Skålén (2011) and M. Smith (2013), focuses more on direct firm-customer interactions, but pays less attention to the effects of C-2-C interactions. Other studies investigate C-2-C interactions such as on (online) brand communities (Schau et al., 2009; Pace et al., 2015), but spotlights value co-creation.

Moreover, despite the value co-destruction and the attritions, these interviewees still have a positive attitude, and consequently latent loyalty to the app. For example:

> I guess such a bit part of it is community [that deters him to switch to other apps], if I switch to another app, it will lose that. It also probably the best features I found on app cycling. (Samuel)

Taken together, this section has discussed how being too obsessive with performing resource integration activities in Externally Complementary Integration, especially without support (additional motivation) of Earning Internal Rewards or Earning External Rewards in complex, prolonged and TBSSs leads to effortful perception and value co-destruction. Together with discussions in the previous practice, it demonstrates the two side effects of doing the resource integration activities in

Externally Complementary Integration. Thus, this practice is termed Addiction – Effort to indicate the addiction to performing resource integration activities, especially in Externally Complementary Integration and to represent high IVF intensity.

5.7 IVF Aggregates and characteristics

5.7.1 IVF Aggregates

As shown in **Table 5.4** and **Table 5.5** and aforementioned discussion, three IVF aggregates (i.e., *Vulnerability, Initiation and Success*) emerge regarding four dimensions of (1) IVF intensity (low, medium and high); (2) Level of Resource Integration (low, medium and high); (3) IVF outcomes (from low/value co-destruction to high/value co-creation) and (4) level of loyalty (low, medium and high). First, *Vulnerability* is characterised by high IVF intensity; medium/high Level of Resource Integration; low/medium extent of IVF outcome (i.e., value co-destruction in the case of the Addiction – Effort and both value co-creation and value co-destruction stated in the case of the Tedium – Effort were identified); and medium level of loyalty. Tedium – Effort and Addiction – Effort describe this aggregate. Second, *Initiation* reflects low IVF intensity; low Level of Resource Integration; medium extent of IVF outcome (i.e., no vale co-destruction and not much value co-creation stated) and low level of loyalty hence Deficiency – Effortlessness is the best practice to represent this aggregate. The last aggregate (i.e., *Success)* describes low/medium IVF intensity; medium/high Level of Resource Integration; high extent of IVF outcome; and high level of loyalty. Consequently, this aggregate includes following practices: Adequacy – Moderation, Internal Complement – Effortlessness, External Complement – Effortlessness. The following sub-sections discuss in detail these aggregates with respect to their properties and dimensions.

5.7.2 The interplay among properties and dimensions

In order to gain better understandings of characteristics of each aggregate and their corresponding practices, the interplay among IVF intensity, Level of Resource Integration, IVF outcomes, and level of loyalty warrant further investigation (see **Figure 5.1**).

5.7.2.1 Level of Resource Integration and IVF intensity

Low Level of Resource Integration or deficiency in resource integration activities, especially in Core Integration category has a tendency to produce less benefits (low extent of IVF outcome) and expressing low level of loyalty, though individuals perceive effortlessness (low IVF intensity). This scenario is exemplified by Initiation aggregate (i.e., Deficiency – Effortlessness practice). Engaging a variety of resource integration activities (medium/high level of resource integration), however, can have a double-edged sword. That is, medium/high Level of Resource Integration can lead to low IVF intensity, and consequently high extent of IVF outcome and high level of loyalty. Success aggregate including Adequacy – Moderation, Internal Complement–Effortlessness, External Complement – Effortlessness practices is an exemplar in this circumstance. Alternatively, the medium/high Level of Resource Integration can also cause the unexpected results of high IVF intensity, and consequently low/medium extent of IVF outcome and low/medium level of loyalty, which is exemplified by Vulnerable aggregate including "Tedium – Effort" and "Addiction – Effort" practices. In short, Level of Resource Integration (low, medium and high) is vital but insufficient to obtain deep insights into IVF intensity. The next sub-section will discuss this further, specifically the role of contextualisation and factors that influence IVF intensity.

5.7.2.2 Influencers of IVF intensity

Considering only Level of Resource Integration (low, medium and high) is unfeasible to determine whether IVF intensity is low or high, IVF outcome is value co-creation or co-

destruction, customer is loyal or disloyal. As such, it is important to investigate Level of Resource Integration and the specific context of an IVF practice or aggregate. For example, if we only know Level of Resource Integration is medium or high, then we cannot determine the extent of IVF intensity or IVF outcome and level of loyalty. However, medium/high Level of Resource Integration in a specific context of an IVF practice or aggregate such as External Complement–Effortlessness in Success aggregate help to exactly determine other factors, that is, that low IVF intensity, high extent of IVF outcome; and high level of loyalty.

As a result, examining Level of Resource Integration in the context-specificity of the emergent practices or aggregates leads to the emergence of intensity–reducing factors which reduce IVF intensity and intensity–increasing factors which increase IVF intensity, thereby contributing to clarify IVF intensity. The following delves into the emergent IVF practices and aggregates to elucidate those two factors.

(1) Intensity–increasing factors

Users who represent Vulnerable aggregate including “Tedium – Effort” and “Addiction – Effort” involve in medium/high Level of Resource Integration. Specifically, requirement of performing regular activities in prolonged services, as such in the context of complex, prolonged and technology-based self-services in the customer sphere representing indirect interactions, which are normally without direct help of service provider, leads to the feeling of constant effort accumulated over time. In addition, when desired outcomes are not achieved yet, it might end up perception of considerable time and effort (i.e., high IVF intensity). In Tedium – Effort practice, tedious task of manually inputting data in the context of prolonged, complex and TBSSs (i.e., wellness apps) as well as inconsistency and irregularity in performing the resource integration activities, especially in Core Integration category partly lead to perception of high IVF intensity,

which results in value co-destruction and discontinuity in usage. Moreover, in Addiction – Effort practice, the lack of additional motivation created from two resource integration activities (i.e., Earning Internal Rewards and Earning External Rewards) and the negative effect of C-2-C interactions (e.g., addiction to Comparing and Challenging in a long period of time) create perception of high IVF intensity.

In short, intensity–increasing factors (increasing IVF intensity) identified in the thesis's sample include tedious task of manually inputting data; inconsistency and irregularity in performing resource integration activities, especially in Core Integration; the lack of additional motivation from Earning Internal Rewards and Earning External Rewards; and the negative effect of Externally Complementary Integration (e.g., addiction to Comparing and Challenging).

(2) Intensity–reducing factors

Success aggregate including IVF practices, namely Adequacy – Moderation, Internal Complement – Effortlessness and External Complement – Effortlessness also entails medium/high Level of Resource Integration but the opposite scenario and outcomes are achieved compared to Vulnerable aggregate. In this situation, consistency and regularity in performing a variety of resource integration activities in Core Integration and making use of the positive effects of *Internally Complementary Integration* and *Externally Complementary Integration* (e.g., Earning Internal or External Rewards and interactions with other customers) enhance motivation for goal suit and mitigate effort. In other words, users focus more on the positive aspects and engage in value co-creation while perceiving low effort. Thus, users become loyal especially in prolonged service.

In short, intensity–reducing factors (reducing IVF intensity) include consistency and regularity in performing resource integration activities and the positive aspects of Internally Complementary Integration and Externally Complementary Integration.

Deriving from the improved understandings of IVF intensity, IVF outcome and level of loyalty, the next sub-section reveals further insights into the relationship among them.

5.7.2.3 IVF outcomes and level of loyalty

As discussed earlier, low IVF intensity is necessary but insufficient for value co-creation. In other words, low IVF intensity does not necessarily result in value co-creation (see 5.6.2). Recall, there are two scenarios: (1) alongside low Level of Resource Integration, low IVF intensity in Initiation aggregate leads to medium extent of IVF outcome (i.e., no vale co-destruction and not much value co-creation stated) and low level of loyalty, whereas (2) low/medium IVF intensity in Success aggregate displaying more resource integration activities (medium/high Level of Resource Integration) brings about high extent of IVF outcome and high level of loyalty. However, high IVF intensity predispose to bring about value co-destruction and low level of loyalty. Therefore, IVF intensity plays a central role in identifying a linear relationship between the IVF outcomes and level of loyalty. That is, that individuals tend to have high level of loyalty (true loyalty) if they perceive the high value co-created and vice versa (e.g., low/medium extent of IVF outcome only leads to low/medium level of loyalty) (also see Table 5.5).

Taken together, the dynamic and contextualised nature of each resource integration activity or Integration Category appears paradoxical situations, specifically both intensity–increasing factors and intensity–reducing factors were identified from the IVF practices. These factors contribute to clarifying the effects of Level of Resource Integration on IVF intensity. This approach of examining Level of Resource Integration (low, medium and high) in the specific context of the IVF practices or aggregates clarifies the interplay among IVF intensity, Level of Resource Integration, IVF outcomes, and level of loyalty. These insights are instrumental in emerging a theoretical framework which is discussed in the subsequent sub-section.

5.7.3 Theoretical framework

The phenomena of interest are elaborated via the six emergent IVF practices and their corresponding aggregates as well as their properties and dimensions which constitute two groups, namely (1) those related to input of the IVF process including different Level of Resource Integration (low, medium, high), IVF intensity (low, medium, high); and (2) those related to outcomes of the IVF process including IVF outcomes (e.g., value co-creation, value co-destruction) and level of loyalty (low, medium, high). Specifically, Level of Resource Integration arises out of combining three Integration Categories (i.e., Core Integration, Internally Complementary Integration and Externally Complementary Integration). The three Integration Categories were identified or defined by integrating resources (i.e., the twelve resource integration activities) (see **Error! Reference source not found.** for further information). Contextually, Level of Resource Integration affects the customers' subjective perception of the extent of effort and time invested in the IVF process (i.e., IVF intensity) and consequently affecting IVF outcomes and level of loyalty. In the light of those properties and dimensions, the six IVF practices and three aggregates emerge. In turn, they contribute to recognising intensity–reducing and intensity–increasing factors that affect IVF intensity. At this stage (selective coding), a core or central category (i.e., IVF intensity) clearly emerges due to its power of pulling together all the major concepts (i.e., level of resource integration, IVF outcomes and level of loyalty), as such relating IVF intensity to other major categories and validating those relationships. Consequently, the formation of IVF practices and aggregates are clearly clarified. The emergent theoretical framework is illustrated in **Figure 5.1**

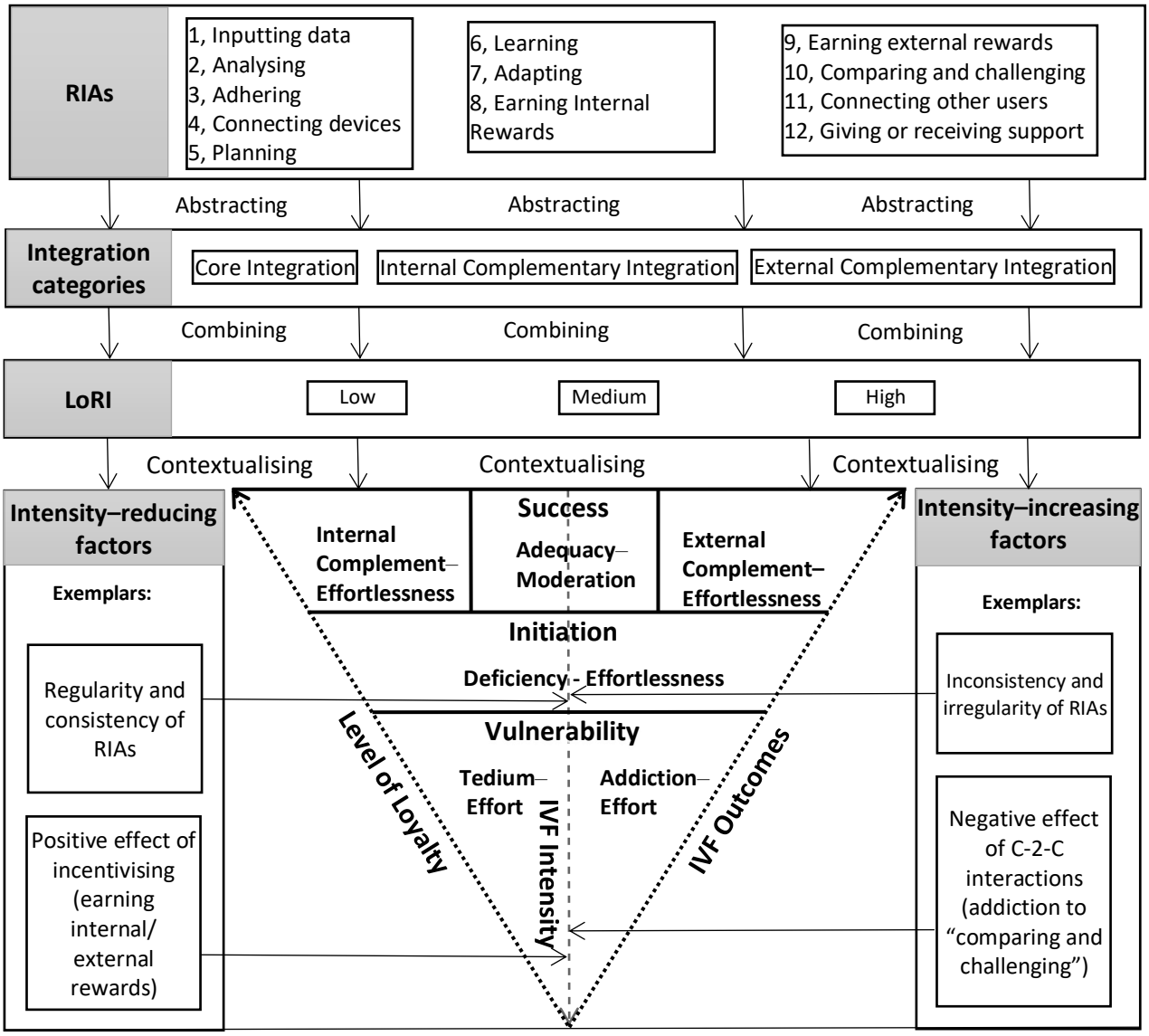


Figure 5.1. IVF practices and their characteristics

Note:

- - - -> represents the effects IVF intensity on IVF

·····> represents output of IVF process

5.8 Conclusion

In conclusion, this chapter commenced by introducing the methods and structure of presenting this thesis' findings, that is, that first-, second- and third- order analyses. Following this, the first-order analysis reporting participant voice (i.e., using terms, codes) delineated twelve broad themes of resource integration activities. In particular, a list of these activities is tabulated with the names, the descriptions, the corresponding quotations of value co-creation, value co-destruction and value no-creation. Then,

Section **Error! Reference source not found.** presented the second-order analysis which represented the researcher voice (i.e., using concepts, themes, and dimensions). Specifically, more abstracted categories (i.e., Integration Category, Level of Resource Integration, IVF intensity and level of loyalty), their dimensions were introduced. Subsequently, this chapter reported a third-order analysis which presents the theoretical framework with direct support from the participant voice and vice versa (i.e., the participants' narratives are objectively illustrated by the emerging framework). The third-order analysis presented the emerging six IVF practices and three corresponding aggregates in a nested manner of the first- and the second- order analyses. Moreover, the interplay among emergent concepts, themes, and dimensions (Level of Resource Integration, IVF intensity, IVF outcomes and level of loyalty) was discussed, which played an important role in obtaining insights into the emergent IVF practices and aggregates. Importantly, the emerging IVF practices and aggregates, in turn, contributed back to clarify those concepts, themes and dimensions, that is, that recognising the intensity–increasing factors and intensity–reducing factors. Last, a theoretical framework emerged in the light of those categories and their relationships. Deriving from these findings, Chapter 6 is involved in discussions pertaining to the research objectives, then presents managerial and theoretical implications as well as limitations and future research.

Chapter 6 Discussion and Conclusion

6.1 Introduction

Whilst the previous chapter (Chapter 5) presented the findings including the twelve resource integration activities and the more abstracted categories (i.e., Integration Category, Level of Resource Integration, IVF intensity and level of loyalty) which featured in the IVF practices, their corresponding aggregates. The interplay among those categories were also displayed, especially a grounded theoretical framework emerged.

As a final work of this thesis, this current chapter plays an important role in recognising this research's contributions in relation to the research objectives proposed in previous chapters as well as its limitations and recommendations for future research. This chapter, first, outlines how these findings address the research questions/research objectives of this thesis. Second, it presents the theoretical and practical implications of this research as well as the limitations and future research. Specifically, the following Section 6.2 provides a brief, abridged summary of the research objectives and design. Following this, a discussion of the findings that address the three research objectives is provided in Section 6.3. Subsequently, the theoretical and practical implications of the research are discussed in Section 6.4, followed by the research limitations and future research in Section 6.5. Last, a conclusion of this thesis is delineated in Section 6.7.

6.2 Revisiting the Research Objectives and Design

In the opening of this thesis in Chapter 2, several research voids have been unaddressed from literature. First, Consistent with Echeverri and Skålén's (2011) contention suggesting that value co-creation is inseparable from co-destruction over time and space rather than a simple assumption that the two processes are bipolar in nature, this study addresses this knowledge gap by examining interactive value formation (IVF) or the "interplay between resource integration and a service system" (Makkonen and

Olkkonen, 2017:518). IVF is a neutral and integrative term which can describe both value co-creation and co-destruction simultaneously (Echeverri and Skålén, 2011). The IVF process is ideal in capturing the nexus between value co-creation (the actors are better off), value co-destruction (worse off), or value no-creation (indifferent) (Makkonen and Olkkonen, 2017). Critically, existing IVF applications remains within business-to-consumer and inter-organisational contexts (e.g., Echeverri and Skålén, 2011; Makkonen and Olkkonen's, 2017), this study here extends its conceptualisation to examine customer-to-customer (C-2-C) interactions. Second, despite the importance of indirect interactions or "when the customer consumes resources that are outputs of the firm's processes", the extant value (co)creation body of literature still retains a focus largely on direct interactions or joint and dialogical processes between firms and their customers (Grönroos and Voima, 2013:142; Spanjol et al., 2015). Moreover, there is, surprisingly, a paucity of research on resource integration which is a key element in the value co-creation process, especially within the wider process of IVF (Pfisterer and Roth, 2015; Caridà et al., 2018). Chief among the issues and lastly, while the positive aspects of operant resources, especially those associated with human (e.g., competence, motivation and effort) have attracted significant attention, their negative effects remain largely unexplored.

Accordingly, this study seeks to derive a better understanding of the IVF process including resource integration from the identified research gaps in the literature (see Chapter 2), thereby selecting the context of complex, prolonged and technology-based self-services (i.e., wellness apps), which is an excellent setting for this research topic (see Chapter 3). Particularly, the purpose of this research is threefold:

- First, to develop our understanding of how customers integrate resources and further (2) to build a better understanding of the IVF process in a complex, prolonged and TBSS experience;
- Second, to explore whether both the negative and positive effects of subjective perception of operant resources within resource integration and therefore the IVF process exist, if yes, to discover what the effects are;
- Last, to build a theoretical framework(s) illustrating the emergent phenomena.

In the light of those research objectives, the author dedicated Chapter 3 to select and provide the justification of the research context of complex, prolonged and TBSSs (i.e., wellness apps) to address these research objectives. Subsequently, Chapter 4 carried out a critical review of available methodological choices to address the above research problems and to achieve research objectives. Specifically, Chapter 4 discussed philosophical assumptions (i.e., ontological, epistemological and axiological assumptions) and methodological choices in general and consequently came up with the philosophical position of the research. Especially, this thesis adopted an appropriate paradigm involving an inductive approach and a purely qualitative study as a part of the interpretivist paradigm. In the light of the chosen paradigm, the research objectives and the selected context, a grounded theory methodology and depth-interview data were adopted. Consequently, the author conducted the simultaneous process of the data collection and data analysis, which is consistent with theoretical sampling. A special emphasis is on systematic, but creative procedures of building grounded theory, that is, that following the suggested procedures (e.g., constant comparison spiral throughout the research, developing and relating categories to subcategories in axial coding, etc.), but being flexible such as breaking through traditional assumptions, creating a new

order out of old (Strauss, 1990). The subsequent section draws on these research objectives and design in order to discuss the findings in Chapter 5.

6.3 Discussion

6.3.1 Overall

An increasingly relevant but unexplored context (i.e., complex, prolong and TBSSs or wellness apps) was carefully examined in the customer sphere representing indirect interactions to address the unresolved issues and the research objectives by adopting a grounded theory standpoint. In other words, this thesis is guided by the recommendations of leading scholars in grounded theory (Glaser, 1967; Strauss, 1990; 1998; Goulding, 2002; Gioia et al., 2012; Charmaz, 2014; Goulding, 2017). In so doing, this research displays the art of presenting a grounded theory study, which is not presented as it was conducted (e.g., research questions, a discussion of data collection and codes, findings, theory, and recontextualisation in the literature). This thesis, however, builds on the work of Gioia et al. (2012) and Goulding (2017), presenting its work in a structure of a conventional manner with some revisions, that is, (1) the illustration of weaving the extant literature and the emergent categories (i.e., IVF intensity and the link between IVF outcomes and level of loyalty) in the "theoretical background" section; (see Chapter 2); (2) the illustration of a first-order analysis to report participant voice (i.e., using terms, codes), a second-order analysis to report researcher voice (i.e., using concepts, themes, and dimensions), and a third-order analysis in a nested manner to present the theoretical framework with direct support from the participant voice in the "findings" chapter (see Chapter 5).

Particularly, explicating the IVF process (see **Figure 5.1**) in the ideal context of complex, prolonged and TBSSs (wellness apps), this study fills the knowledge gaps in the literature. It specifically clarifies the process of resource integration through identifying

the twelve resource integration activities, namely (1) Inputting Data/Recording, (2) Analysing Activities and Related Statistics, (3) Adhering (goal, instruction, reminder), (4) Connecting Devices and Combining Different Means, (5) Planning (Goal Setting, Making Schedule), (6) Learning, (7) Adapting to Changes, (8) Earning Internal Rewards/Incentives, (9) Earning External Rewards, (10) Connecting Other Users, (11) Comparing and Challenging, and (12) Giving or Receiving Support. In line with prior work (McColl-Kennedy et al., 2012; Sweeney et al., 2015) which considers self-generated activities as a potential source of value co-creation, this study only includes activities that represent a combination of more than one resource, that is why they are termed resource integration activities. Then, according to their properties and dimensions - that is, that the number of interactions (low .vs high) with different individuals and frequency of occurring resource integration activities (regular .vs irregular), these twelve resource integration activities are classified into the three integration categories. (1) Core Integration includes activities that occur regularly, but less involvement in interactions with others (i.e., other customers). This category is prerequisite for co-creating value in prolonged services. (2) Internally Complementary Integration also entails activities having less interactions with others, but having tendency to increase motivation for performing desired activities and resource integration activities. (3) Externally Complementary Integration also contributes to increasing motivation, but from interacting with others (i.e., other customers). This transition from resource integration activities to the Integration Categories, in turn, contributes to recognising different Level of Resource Integration (low, medium, high). These levels and IVF intensity are instrumental in identifying the six IVF practices (Deficiency – Effortlessness, Tedium – Effort, Addiction – Effort, Adequacy – Moderation, Internal Complement – Effortless, and External Complement – Effortless) and the three corresponding aggregates

(Vulnerability, Initiation, and Success). Importantly, these IVF practices and aggregates contribute to identifying the factors that reduce or increase IVF intensity which is a central category in the emergent framework. Moreover, the thesis identifies and/or corroborates both the positive (e.g., motivation, IVF intensity) and importantly negative aspects (e.g., self-efficacy, IVF intensity) of operant resources on the IVF process. Consequently, this study provides a better understanding of the nexus between value co-creation, value co-destruction, or value no-creation (Makkonen and Olkkonen, 2017) and further identifies the linear relationship between the IVF outcomes and level of loyalty.

In addition, the context of complex, prolonged and TBSSs represents indirect interactions whereby this is among the first empirically corroborating the contribution of indirect interactions to value co-creation and co-destruction. Finally, in the specific context of wellness apps, this study obtains further insights into post usage experience, in particular, the phenomenon of user attrition despite the increasing importance of wellness apps. The author, for example, identifies that self-efficacy (one's belief in one's ability to succeed in tracking activities without health app support) and addiction to performing resource integration activities in Externally Complementary Integration bring about value co-destruction and discontinuity. This study therefore adds to previous findings (Peng et al. 2016) revealing that lack of time and effort, motivation, and discipline are barriers to continued use.

Taken together, the emergence of twelve resource integration activities, Level of Resource Integration, IFV intensity, IVF outcomes, level of loyalty and the relationships among those categories (e.g., a linear relationship between IFV outcomes and customer loyalty though four loyalty conditions) in the context-specificity of complex, prolonged

and TBSSs (i.e., wellness apps) contributes to elucidate the IVF practice and consequently the IFV process.

6.3.2 Addressing research objective 1

Research objective 1: to develop our understanding of how customers integrate resources and further (2) to build a better understanding of the IVF process in a complex, prolonged and TBSS experience;

Chapter 3 examined different services to justify the selection of complex, prolonged and technology-based self-services as the broad context while wellness apps were chosen as the specific context for this thesis. The selected context was demonstrated to be highly relevant to investigating indirect interaction and capturing the nexus between value co-creation (the actors are better off), value co-destruction (worse off), or value no-creation (indifferent) (Makkonen and Olkkonen, 2017). The author further specified the increasing importance but lack of understanding on post usage experience and user attrition. Therefore, the specific context of wellness apps provides opportunities to achieve the research objectives and additional insights into user attrition. In addition, given the paucity of existing knowledge on the IVF process, this study employed grounded theory (Glaser 1967; Strauss 1990; 1998) which can help to explain interactions between the customer and the phenomenon under examination. Given that grounded theory can capture the complexities in relationships and interactions, it is also ideal in uncovering the complexity of the interactive nature in the IVF process and adds to the flexibility required to navigate between divergent views on value co- and de-construction.

In the light of those work, the author found twelve resource integration activities emerged from the data, which can bring about a wide range of IVF outcomes including value creation, value no-creation, or even value co-destruction (see Section 5.3 in

Chapter 5). Specifically, chapter 5 detailed the resource integration activities which listed the names, the descriptions, quotations of value co-creation, value co-destruction and value no-creation. Therefore, this study differentiates its work from a list of customer value co-creation activities (McColl-Kennedy et al. 2012; Sweeney et al. 2015), identifying resource integration activities which directly examine what customers actually do when they integrate resources in the IVF process. In other words, the research objective of obtaining deeper insights into how customers integrate resources has achieved.

Emerging the resource integration activities in the indirect interactions among integrators led to the emergence of (1) those related to input of the IVF process including Integration Categories (Core Integration, Internally Complementary Integration and Externally Complementary Integration) (see Subsection 5.4.1), different Level of Resource Integration (low, medium, high), IVF intensity (low, medium, high) (see Subsection 5.4.2); and (2) those related to outcomes of IVF process including IVF outcomes and level of loyalty (low, medium, high) and consequently led to the emergence of the six IVF practices and their corresponding aggregates (see Section 5.5, 5.6 and 5.7). First, Vulnerability represents low/medium extent of IVF outcome (i.e., value co-destruction in the case of the Addiction – Effort practice and both value co-creation and value co-destruction stated in the case of the Tedium – Effort practice); and medium level of loyalty due to high IVF intensity and medium/high Level of Resource Integration; Tedium – Effort and Addition – Effort describe this aggregate. Second, Initiation reflects medium extent of IVF outcome (i.e., no vale co-destruction and not much value co-creation stated) and low level of loyalty because of low IVF intensity and low Level of Resource Integration; Deficiency–effortlessness is the best practice to represent this aggregate. Last, Success describes high extent of IVF outcome (i.e., value

co-creation); and high level of loyalty due to low/medium IVF intensity and medium/high Level of Resource Integration; Consequently, this aggregate includes following practices: Adequacy – Moderation, Internal Complement – Effortlessness, External Complement – Effortlessness. consequently, this study has arrived at a better understanding of both value co-creation and value co-destruction regarding indirect interactions among integrators

6.3.3 Addressing research objective 2

Research objective 2: to explore whether both the negative and positive effects of subjective perception of operant resources within resource integration and therefore the IVF process exist, if yes, to discover what the effects are;

The second objective of this thesis seeks to fill another knowledge gap in the literature, that is, the different aspects of operant resources, especially those associated with human (e.g., competence, motivation and effort) in the IVF process. Under the guidance of leading scholars in grounded theory (Glaser, 1967; Strauss, 1990; Gioia & Chittipeddi, 1991; Strauss, 1998; Goulding, 2002; Gioia et al., 2012; Charmaz, 2014; Goulding, 2017), the theory and major emergent categories were derived from the data, rather than *a priori* theorisation. In particular, this research objective was considered as general (open and broad) at first while this study's findings identified a narrower and more focused themes or concepts such as IVF intensity defined as customers' subjective perception of the extent of effort and time invested in the IVF process. That is, low/medium IVF intensity in Success aggregate brings about high extent of IVF outcome and high level of loyalty whilst Level of Resource Integration is medium/high. In contrast, alongside low Level of Resource Integration, low IVF intensity in Initiation aggregate leads to medium extent of IVF outcome (i.e., no vale co-destruction and not much value co-creation stated) and low level of loyalty. However, high IVF intensity predispose to

bring about value co-destruction and low level of loyalty. As such, IVF intensity varying dimensionally (from low to high) cause both negative and positive effects on the process of IVF. In addition, this study finds the paradoxical effects of Externally Complementary Integration representing high number of interactions (beyond the firm and customer dyad to include other customers), as such identifying the double-edge sword of C-2-C interactions in the IVF process (e.g., positive effects of Earning External Rewards and negative effects of addiction to Comparing and Challenging). In short, the thesis identifies multidimensional aspects of the operant resources.

6.3.4 Addressing research objective 3

Research objective 3: to build a theoretical framework(s) illustrating the phenomena of interest.

In line with grounded theory approach (Glaser, 1967; Strauss, 1990; 1991; Strauss, 1998), this thesis goal is to build theory whereby the findings are presented not just the descriptive details or a listing of themes, but in a set of interrelated concepts including a core/ central abstract category. These concepts are constructed out of data by the researcher. By "constructed", the researcher means that "an analyst reduces data from many cases into concepts and sets of relational statements that can be used to explain, in a general sense, what is going on" (Strauss, 1998:145). Following this, a theoretical framework (see 5.7.3 in Chapter 5) emerge as a result of integrating and refining the theory. Specifically, the grounded theoretical framework represents the six IVF practices and their corresponding aggregates as well as their properties and dimensions including those related to input of the IVF process, namely different Level of Resource Integration (low, medium, high), IVF intensity (low, medium, high); and those related to outcomes of the IVF process, namely IVF outcomes and level of loyalty (low, medium, high). Within this conceptualisation, three Integration Categories (i.e., Core Integration, Internally

Complementary Integration and Externally Complementary Integration) are abstracted concepts arising from the twelve resource integration activities (i.e., abstracting process), while Level of Resource Integration emerges from combining these three Integration Categories (i.e., integrating process). Contextually, Level of Resource Integration, in turn, affects the customers' subjective perception of the extent of effort and time invested in the IVF process (i.e., IVF intensity) and consequently affecting IVF outcomes and level of loyalty. The six IVF practices and three aggregates, dynamically, contribute to recognising intensity-reducing and intensity-increasing factors that reduce and increase IVF intensity respectively.

In short, the grounded theoretical framework illustrates a fresh approach to explicating the IVF process from the twelve resource integration activities or how individual integrate resources to IVF outcomes and level of loyalty.

6.4 Implications

6.4.1 Managerial Implications

This research yields deep insights into the IVF process, which sheds light on what activities contribute to co-creating and co-destroying value in the increasingly relevant, but under-researched context of complex, prolonged and TBSSs. Particularly, the twelve resource integration activities were identified, which provide a basis for building a measurement scale of the IVF process in the context of complex, prolonged and TBSSs, especially wellness apps.

Moreover, customers engage in the IVF process differently, showing a variety of combination among resource integration activities and consequently different Level of Resource Integration and outcomes. Therefore, firms need to understand that although these resource integration activities are imperative to co-create value, they might also transform value co-creation into value no-creation or even value co-destruction. These

understandings are useful, especially for health app providers in the process of forming potential value (value propositions). With the advance of technology and social media, for example, we have witnessed the development of online and offline platforms with the aim of connecting consumers such as RunKeeper's had 50 million users in 2016 (Stragier et al., 2018) and more than 2.5 million users joined a Fitbit group to connect with others in 2017 (Huang, 2018). These firms, therefore, can make use of the positive effects of "Externally Complementary Integration" to increase users' motivation from interacting with others (i.e., other customers) to enhance value for consumers (see Subsection 5.5.6 for more information of how the resource integration activities including Earning External Rewards, Connecting Other Users, Comparing and Challenging, and Giving or Receiving Support strengthen motivation for value co-creation). However, the negative effects learnt from "Addiction – Effort" practice also deserve careful consideration for the firms to avoid value co-destruction and low level of loyalty or discontinuity in usage.

More specifically, this study suggests that consumers interactively form value as a process in flux, depending on the number, type, frequency and intensity of resource integration. By limiting or extending the number, type and frequency of resource integration activities customers can influence the level of IVF intensity, resulting in different IVF outcomes and levels of loyalty, which is important for service managers to understand. Whilst resource integration activities of social comparisons in, for instance, wellness apps is common and can ensue true loyalty as in External Complement–Effortlessness, too much of a good thing – in this case over-regularity with activities within External Complementary Integration – can reverse the direction of IVF from value co-creation to co-destruction. This process however may be offset by emphasizing greater choice of use in Core and Internal Complementary activities. The shifting from

External to Internal and Core practice types may alleviate the degree of IVF intensity and thus re-direct individual goals to adaptive outcomes. Given the malleability of IVF intensity, both intensity–increasing and intensity–reducing effects should be managed in the design of services.

A key task for service managers, therefore, to ensure an adequate or basic number of resource integration activities is to be encouraged and enacted upon. A basic number of resource integration activities in Core Integration and options augmenting Internal and External Complementary Integration activities should also be offered. Therefore, whilst the tediousness of manually inputting data should be minimized by for instance automating Core Integration activities, providing options for resource integration activities in Internal and External Complementary Integration may also help to offset accumulated IVF intensity. It is essential here that when consumers enter engagement levels with socialised activities such as Comparing and Challenging, alternative routes to usage can be provided to prevent addiction in such External Complementary Integration activities. McColl-Kennedy et al. (2012, p. 385) similarly advocate offering a range of co-creating activities since individuals are "likely to have differing views of their role, partially in response to their abilities and interests in these roles". Given the more indirect nature of complex, prolonged and TBSSs, this study proposes a greater emphasis on service design aspects enabling an optimal level of options. Moreover, a monitoring scheme assessing an adequate level of Resource Integration across Core, Internal and External Complementary Integration may further assist managers to segment users based on outcomes. This usage monitoring should also encapsulate frequency in usage which may help managers to offset early indicators of IVF intensity accumulation.

Given the insights that customers take part in IVF process differently, showing a variety of combination between level of resource integration (low, medium and high)

and consequently IVF intensity (low, medium and high), this helps managers clearly distinguish value propositions and other related concepts such as value and value co-creation (see Section 2.3). Despite offering the same value propositions, for example, customers are contextually related to various resource integration activities and have different outcomes. As such, different actors might potentially evaluate the same value proposition(s) in not the same ways hence value propositions can create, but also can destroy value.

This thesis also identifies the central role of IVF intensity, defined as customers' subjective perception of the extent of effort and time invested in the IVF process. That is, that high level of IVF intensity results in value co-destruction and low level of loyalty, but low level of IVF intensity only brings about value co-creation and high level of loyalty when resource integration activities are adequate. Therefore, the key lesson is that the firms need to offer propositions facilitating the adequacy of the resource integration activities to achieve medium/high Level of Resource Integration and low IVF intensity, though this is a challenging task.

Relating to the importance of IVF intensity in the IVF process, different approaches/strategies of mitigating the negative aspect of IVF intensity are proposed from the emergent IVF practices or aggregates. Deriving from the findings (see Chapter 5), customers, on the one hand, should be encouraged to adopt the practices in Success aggregate (i.e., Adequacy – Moderation, Internal Complement – Effortlessness, External Complement – Effortlessness) which describes high extent of IVF outcome (e.g., value co-creation) and high level of loyalty. On the other hand, the individuals should avoid the negative aspects of Initiation aggregate, especially Vulnerability aggregate which describes medium/low extent of IVF outcome (e.g., value co-destruction) and medium/low level of loyalty. In other words, without an understanding of the dynamics

and contextualised nature of resource integration activities or Level of Resource Integration, firms are likely to be limited in their means of supporting customer in reducing IVF intensity. The author argues that high IVF intensity which relates to Tedium – Effort and Addiction – Effort practices can be reduced in the light of other practices in Success aggregate (i.e., Internal Complement – Effortlessness, External Complement – Effortlessness, Adequacy - Moderation). In particular, taking into account intensity–increasing and intensity–reducing factors, there are two approaches arising out of this thesis' results that practitioners can employ. First, utilitarian strategies are based on (1) consistency and regularity in performing resource integration activities, especially in Core Integration; (2) making use of the positive effects of Internally Complementary Integration and Externally Complementary Integration (e.g., earning internal or external rewards and interactions with other customers), (3) improvement of technology (e.g., automatic tracking) to enhance motivation for goal suit and mitigate time and effort. Second, value co-destruction arises out of addiction to "Comparing and Challenging", whereas lower frequency of this activity and higher frequency of "Connecting Other Users" such as making like-minded friends, sharing data & comments, receiving feedback predispose to bring about value co-creation. Therefore, hedonic strategy is designed to maintain a balance between these two activities, and as a consequence motivating users to engage in the resource integration activities and reducing perception of great effort.

Finally, previous studies (e.g., Chi Kin et al., 2012) indicate the positive effects of customers' self-efficacy on customer participation, whereas this study finds that self-efficacy causes discontinuity. Therefore, managers who offer complex, prolonged and TBSSs, especially wellness apps should, for instance, not only position services with low IVF intensity which can end up self-efficacy, but also encourage users to involve in more

resource integration activities to achieve medium/high Level of Resource Integration, hence higher value co-created and consequently increasing level of loyalty.

6.4.2 Theoretical implications

This study adds to a key service research priority of understanding value formation (Ostrom et al., 2015; Guo et al., 2013; Temerak et al., 2018) by investigating the nature of IVF within complex and prolonged TBSS contexts. The current study contributes a fresh framework of how this study progressed from raw data to the different IVF practices and the aggregates regarding four properties and dimensions of level of resource integration (low, medium, and high), IVF intensity (low, medium, and high), IVF outcomes (from low/value co-destruction to high/value co-creation) and level of loyalty (low, medium, and high) as well as their relationship, thereby a better understanding of the IVF process.

In particular, deriving from the wide range of experience in using wellness apps, this study contributes to the service literature by identifying the approaches (e.g., successful IVF practices) in which consumers create value or even become better off (e.g., lose weight) after managing to consume complex, prolonged and TBSSs. Moreover, extant research on PEOU has ignored the attribute of *accumulation* which leads to the confusion. For instance, PEOU is considered as one of the most important factor of continued use of health apps (Peng et al., 2016), whereas the effect of PEOU might be insignificant when users feel accustomed to the new technology (Cho et al., 2015). In this study, some participants also consider wellness apps as PEOU at first or PEOU with one-time/short-term experiences, but accumulated experience causes “tedium” (Lucas) or “a lot of work” (Jonathan), thereby identifying the dynamics of amassing time and effort in consumption (IVF intensity). Many other themes (e.g., consistency and regularity, and addiction to performing resources integration activities) also emerge in

light of the attribute of accumulation. As a result, this study's findings are unique to consumption of complex, prolonged and TBSSs (vs. other services such as those with one-time outcomes) and differentiate this' study work from others that disregard the impact of the embedded attribute of accumulation in consumption.

The thesis also adds to Vargo and Lusch's (2004, 2008a) conceptualization by extrapolating the role of resource integration in providing a dynamic space from which value can emerge. The author builds on earlier studies (e.g. McColl-Kennedy et al. 2012; Sweeney et al. 2015; Cabbidu et al. 2019) to develop a framework to illustrate how resource integration activities can operate in tandem across both value co-creation and co-destruction. Whilst other studies (Echeverri and Skålén, 2011; Skålén et al., 2015; Camilleri and Neuhofer, 2017) have also explored the both sides of IVF, our framework adds to existing knowledge by demonstrating the ambivalent effects of operant resources. Specifically, responding to previous findings revealing either the one-sided (positive) effects of operant resources or the causes of co-destruction but restricting to collaborative and dialogical process, the study here identifies multidimensional aspects of the operant resources. First, extant research focusing on a unidimensional aspect of effort (considerable effort) finds its positive (Sweeney et al., 2015; Sugathan et al., 2017), negative (Haumann et al., 2015), or both negative and positive effects (Buechel and Janiszewski, 2013) in the value co-creation process, this thesis identifies IVF intensity varying dimensionally (from low to high) cause both negative and positive effects on the wider process of IVF. Second, in lieu of deriving corporate communication strategies from a priori theory (equity theory; Haumann et al., 2015), this study here contributes to the nascent research on consumer-based strategy (Hamilton, 2016). Specifically, the author finds (intensity–reducing and intensity–increasing) factors that reduce and increase IVF intensity respectively from the data and consequently

suggesting strategies or extending the scope or sources of approaches to mitigating the negative effects of effort or operant resources in the IVF process. Accordingly, to the wellness app literature, the study's findings here not only uncover the reasons for user attrition (e.g., self-efficacy, high IVF intensity), but also identify the mitigating strategies to reduce attrition rate. Third, extant research focuses on positive aspects of C-2-C interactions such as on (online) brand communities on value co-creation process (Schau et al. 2009; Pace et al., 2015), this study finds the paradoxical effects of Externally Complementary Integration representing high number of interactions (beyond the firm and customer dyad to include other customers), as such identifying the double-edge sword of C-2-C interactions in the IVF process (e.g., positive effects of Earning External Rewards and negative effects of addiction to Comparing and Challenging).

To the best of the author's knowledge, no empirical research explores whether there is a link between inseparable existence of the creation and destruction of value and level of loyalty through the four loyalty conditions classified by (Dick and Basu, 1994). This is where this study's key contribution lies, that is, identifying a linear relationship between the IVF outcomes and level of loyalty.

To the literature on goal pursuit, this thesis confirms that the closer the outcome to the desired goal is, the greater motivation behind striving for completing the goal is generated (Koo and Fishbach, 2012; Cutright and Samper, 2014; Wallace and Etkin, 2017). More importantly, the study here discover the negative effect of striving for goal complement, especially in complex, prolonged and TBSSs, that is, despite goal attainment, value co-destruction and/or dissatisfaction might occur(s) due to accumulated subjective perception of time and effort.

Finally, this study differentiates its work from a list of customer value co-creation activities (McColl-Kennedy et al., 2012; Sweeney et al., 2015), identifying resource

integration activities which directly examine what customers actually do when they integrate resources in the IVF process.

6.5 Limitations

While the findings gave useful and rich insights into the effects of IVF intensity and other major categories (e.g., IVF outcomes and customer loyalty) in the context of complex, prolonged and TBSSs (i.e., wellness apps) on the IVF practices and aggregates and consequently the IVF process, there were some limitations. Therefore, this section outlines the key limitations of the current research, which contributes to suggesting potential future research in the next section.

First, the research here sought to investigate wellness apps including nutrition, exercise and lifestyle change apps, none of participants used lifestyle change apps though. Furthermore, the study focuses on one service interaction type, customer to customer interactions within wellness apps as an exemplar of a complex, prolonged and TBSS.

In addition to the research context, this study's results evidence the unique characteristics of complex, prolonged and TBSSs (e.g., customers are required to contribute a considerable range of resources within their own spheres during the service consumption) and their suitability for investigating the identified research gaps (see Chapter 3 for further information).

Third and last, the study employed a qualitative dataset and therefore the emergent inter-relationships with loyalty (the dynamic relationship among value co-creation and co-destruction, and levels of loyalty) could not be empirically validated.

6.6 Future research

Resting on the aforementioned limitations, the thesis here provides the following potential further research.

Regarding the first specified limitation, future research might consider the presence of lifestyle change apps to cover all types of wellness apps. More importantly, apart from the unique context of wellness apps, further research is needed to achieve richer understanding of the IVF process across other complex, prolonged and TBSSs (e.g., online education). Scholars might further increase the robustness of the identified framework by generalising or testing relationship among components of the emergent framework (e.g., IVF intensity and level of loyalty). Moreover, other service contexts which may be subject to the IVF process, for instance online education, provide a promising avenue for further corroborating or adding to our IVF framework.

The second limitation brings us to another direction for future research, that is, the identified research gaps might be revisited by investigating other services (vs. complex, prolonged and TBSSs), thereby enriching the literature on the IVF process (e.g., further insights into both value co-creation and value co-destruction; or addressing the question of whether the paradoxical effects of operant resources on the IVF process in such contexts exist and to what extent).

The third limitation presents a promising area for empirically validating the interactions (i.e., a dynamic relationship between the inseparable existence of value co-creation and co-destruction, and levels of loyalty) demonstrated within our framework.

Whilst this study utilised a culturally uniform sub-sample, it is possible that cross-cultural differences may emerge in the manner in which operant resources are utilised in particular during prolonged and complex services. Moreover, whilst our study has demonstrated the complexity of the IVF process, we feel it still represents an initial foray into an exciting and highly relevant services concept. Further applications of the IVF processes which are able to longitudinally evaluate the salience of individual components are likely to add to our knowledge of user retention versus attrition.

Finally, data was gathered through in-depth interviews, which were proved as an appropriate method for this research. Having said this, under the guidance of Strauss (1990) and Charmaz (2014), all sources (e.g., interviews, observations, documents, books) can be used for grounded theory. Therefore, the research design would include other sources of data such as natural data from health app online communities, documents, books to extend the understanding of the IVF process across a variety of sources.

6.7 Conclusion

In conclusion, this thesis began to work on the extant literature of value co-creation and value co-destruction whereby the research problems and specifically the four unexplored research gaps emerged. Consequently, the author came up with the corresponding research objectives to address those research gaps. In other words, given the paucity of existing knowledge on the interactive value formation (IVF) process, this study sought to understand how this process is enacted during the service consumption process in the increasingly relevant but unexplored context of complex, prolonged and TBSSs (i.e., wellness apps). Specifically, how wellness apps were embedded into users' daily lives hence a better insight into the phenomenon of user attrition despite the increasing importance of wellness apps. In order to achieve those research objectives, a purely qualitative study as a part of the interpretivist paradigm, specifically a grounded theory and in-depth interviews were adopted, with the simultaneous process of the data collection and data analysis.

Under the guidance of grounded theory methodology, the presentation, especially in Chapter 2 and Chapter 5, was not organised in traditional manner. That is, it provided (1) the illustration of weaving the extant literature and the emergent categories (see Chapter 2); (2) the illustration of first-order analysis to report participant voice, second-

order analysis to report researcher voice, and third-order analysis in a nested manner to present the theoretical framework with direct support from the participant voice in the "findings" chapter (see Chapter 5). The findings reveal twelve resource integration activities and more abstracted terms of Integration Categories which are then integrated into Level of Resource Integration (low, medium, high). In turn, Level of Resource Integration affects IVF intensity and consequently contributing to the emergence of the IVF practices and aggregates. Importantly, the emergence of IVF intensity as a core category contributes to relating other categories and validating those relationships and clarifying the phenomena of interest. Therefore, the formation of the IVF practices, aggregates and their properties and dimensions were systematically described, yielding deep insights into the IVF process.

Last, Chapter 6 demonstrated how this study's findings address the research questions/research objectives proposed from the beginning of this thesis. In other words, this study fills the knowledge gaps in the literature. This last chapter also presented the theoretical and practical implications as well as the limitations and future research. Especially, to remedy the negative effect of IVF intensity, utilitarian and hedonic strategies arose from data to enhance motivation for goal pursuit and mitigate IVF intensity. This is meaningful since high IVF intensity results in value co-destruction and low levels of loyalty, but low IVF intensity only produces value co-creation and high levels of loyalty when resource integration activities are adequate. This is among the first to find a linear relationship between inseparable existence of the creation and destruction of value and level of loyalty.

To sum up, firms attempt to co-create superior perceived value and/or avoid value co-destruction. There is no guarantee of success especially within the consumption of complex, prolonged and technology-based self-services. In such services, the process of

value co-creation and co-destruction may operate simultaneously to generate a multitude of tensions in each direction. As such, a multitude of interacting factors may be at play during this IVF process. Adopting a grounded theory approach and in-depth interviews of users of such services, the authors investigate for the first time the IVF process during an indirect service interaction process and introduce the role of operant resources as mediators during the inter-play between value co-creation and co-destruction process, during the IVF process. We also identify factors that reduce and increase IVF intensity, suggesting strategies to mitigate IVF intensity. This is meaningful since high IVF intensity results in value co-destruction and low level of loyalty while low IVF intensity might bring about value co-creation and high level of loyalty. Therefore, managers who offer complex, prolonged and TBSSs, especially wellness apps should, for instance, not only position services with low IVF intensity which can generate self-efficacy, but also encourage users to involve in more resource integration activities to achieve medium/high level of resource integration, hence higher value co-created and consequently increasing level of loyalty. This study represents an initial foray into the complexity between co-creation and co-destructive factors during prolonged and complex services.

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Appendix 1. Examples of interview questions

General discussion

1. Personal information (e.g., age, marital status, occupation)
2. Lifestyle
3. Eating, drinking, exercising habit
4. Personality
5. What do you think of technology?
6. How did you discover/ the app(s)?
7. Did you think of the app before that?
8. How did you come to decision to download?
9. Can you tell me about the cost of the app?
10. Tell me anything that affected your decision to download/use the app
11. Why did you get (what motivated you get) the app(s)?

Deeper probing

12. What did you feel at the beginning of usage?
13. Please show me how you use your health app.
14. How do you use wellness apps in a normal day
15. Does your usage change over time
16. What are the main benefits of using your app
17. How difficult is to use your app?
18. What has been the cost in terms of both effort and time in using your app?
19. Do you involve other people in your usage?
20. Can you tell me about the future/your intention with the app?
21. Is there anything that deter you from stopping switching the app?
22. Tell me about other users, what do you think about them

Appendix 2. Examples of filed notes

FUN AND INTERESTING COMPETITION

Interview 1

Adoption

A middle-aged woman (50) used a kind of free app [sweatcoin] counting steps, the motivation of adoption derived from her son. He was using it, recommended, and downloaded it for her. Furthermore, the app adoption of her son also came from his friend recommendation and Perceived incentive – digital currency.

Continued use

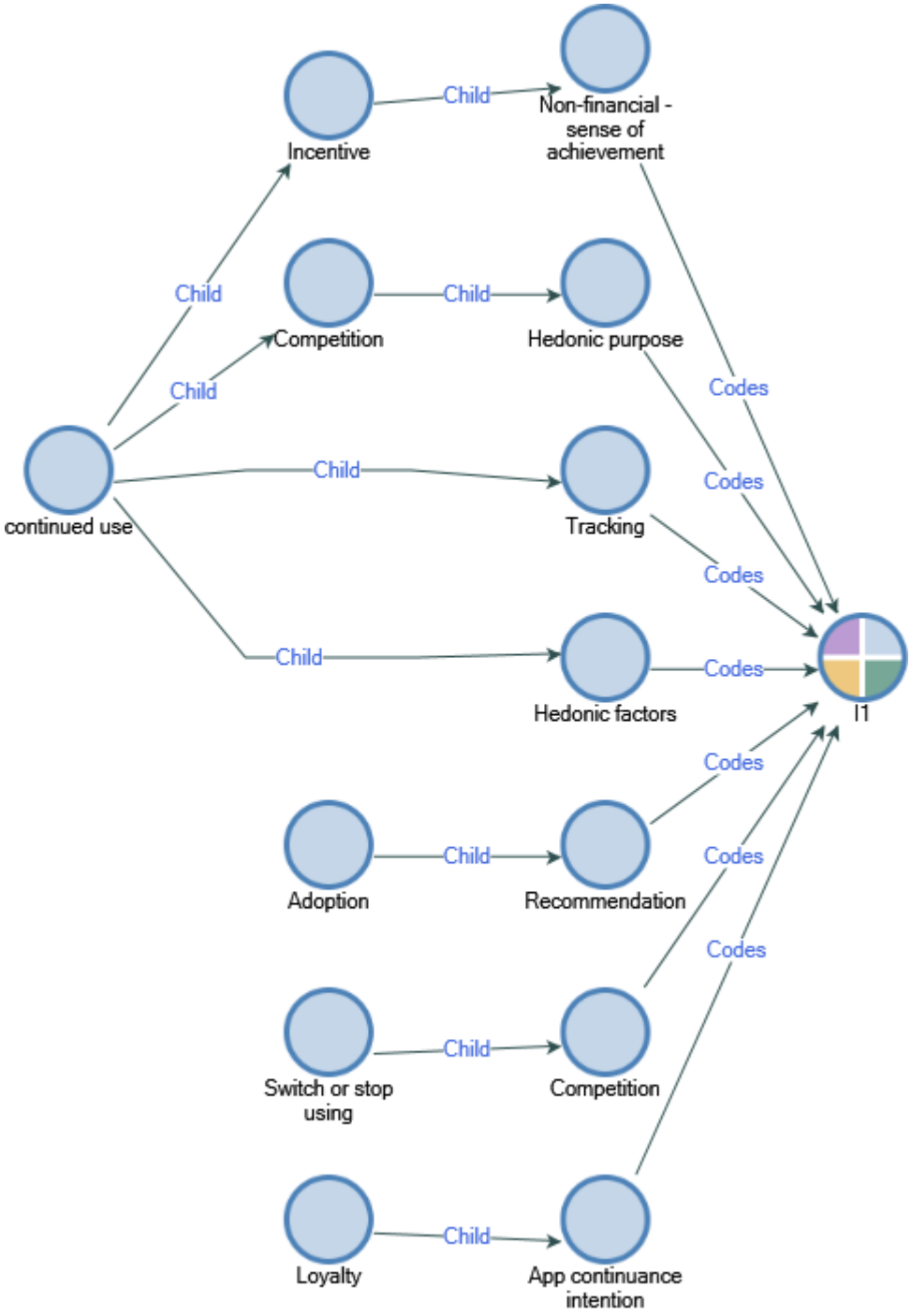
Now she does not use health app, but the reasons made her continuously use the app for 2 months were fun [hedonic factor/benefit], incentive [the feeling of getting something] and goals. First, she and her son had made a competition to see who step more. The app would count how many steps they gained and turned them into virtual money. Users could use the earned virtual money to exchange things offered by the app, a few items are available though. She wanted to get more virtual money by stepping more, then giving it for her son, hence it was incentive from the app. Moreover, she repeatedly mentioned that it was a good competition and made her usage fun and interesting. The 'fun' competition was considered as the main motivation for her continued use. Lastly, making a goal also keep her interested in usage.

Drop out/ attrition

The reason for stop using the app also comes from her son. He stopped using the app causing an end of the competition hence her motivation of continuance was gone. It means that the stop arose out of the influence of other person.

The future intention

She mentions the high ability of reuse, if she involved another competition.



Interview 2

Adoption

A female student (25 years old) who has a 3-year-old child has been using [free] health apps for about 2 years. She wants to lose weight and be healthy hence she went to a gym where she received recommendation of using myfitnesspal, a nutrition app, from her coach. In other words, she adopted a nutrition app [Myfitnesspal] due to her coach's recommendation.

> He [her coach] knew I wanted to lose weight and I was explaining how I'm good at doing the exercise but often fall of track when it comes to eating well and tracking calories.

Continued use

For the purpose of losing weight and being healthy [goals], she continues to use Myfitnesspal because of effectiveness [perceive usefulness] and ease [perceived ease of use] to monitor her calorie intake. Moreover, a conscious effort and commitment to make healthier lifestyle keep her loyal or come back [sometimes she stopped using the apps, maximum of this period is 1 month] to the health app.

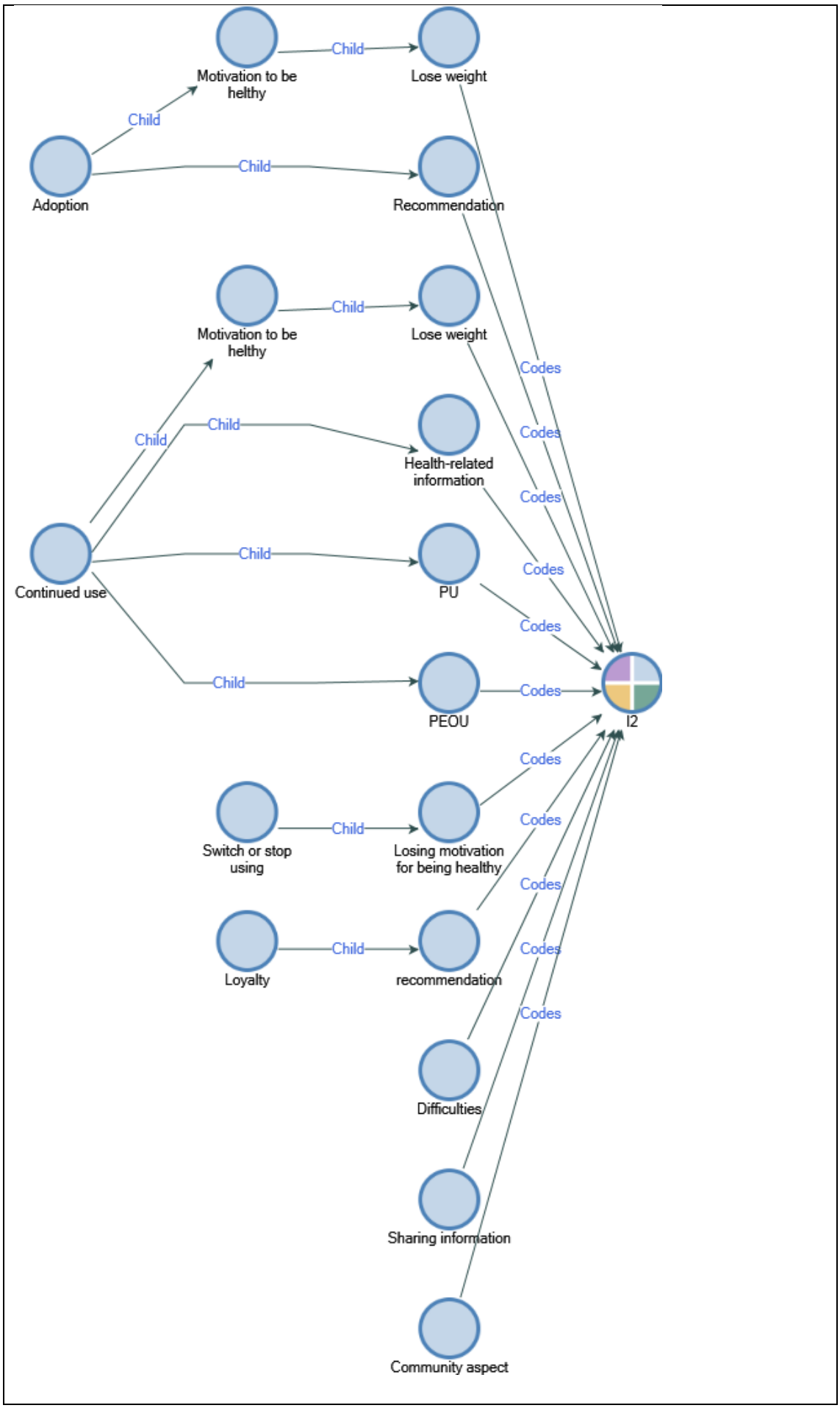
She likes the apps because they are easy to use and have convenient features like scanning barcode. Also, she and her friend stopped using health apps due to not easy to use.

The future intention

Although she not thinks of stop using health apps, but she might switch because of recommendation or the cost.

Drop out/ attrition

Giving up a health app [sleep cycle] since it was not easy to use, but she said, the apps that she is using are straightforward. She is using the free apps, and she doesn't want to pay for health apps when there are a lot free ones that are available. Therefore, she said she would not use if she had to pay for them. Furthermore, she does not want to share the data and considers health app usage is private


Motivation to be helthy
Child
Lose weight
Child
Adoption
Child
Recommendation
Motivation to be helthy
Child
Lose weight
Child
Child
Health-related information
Continued use
Child
PU
Child
PEOU
Codes
I2
Switch or stop using
Child
Losing motivation for being healthy
Loyalty
Child
recommendation
Difficulties
Sharing information
Community aspect

Interview 3

Adoption

A 44-year-lod man has been using a Fitbit watch for about 3 years with the aim of losing weight and keep fit. The usage was originated by motivation to lose weight and keep healthy. Furthermore, his sister's recommendation, and then good reviews - subjective norms in the Theory of Planned Behaviour (TPB) (Ajzen, 1991; Ajzen, 2005) also are motivators. He also considered another watch, a Garmin watch, due to his friend's recommendation but did not use because it was complicated.

Continued use

The watch and its app track what he is doing and consequently make him more conscious and aware of being healthy. In other words, it motivates him to do exercise. He, his wife and a couple of his friends (three or four) on his Fitbit app are in competition to see who can do the most steps. He wants to keep the competition between them because he thinks it's just for fun and would not do it seriously.

In addition, He does not think of others to keep fit because he believes all the data from his fibit, believes that it gives him healthy. Overall, It's reliable.

He also mentioned that the app is good, and it takes a while to realize a feature that he does not like [the database is not up to date in the UK when users do scan barcode]. Importantly, he said the Fitbit works [support him to achieve goals – weight loss], as such perceived of usefulness.

Stop using/ switch

He only stops using the app on holiday. He switched from old version of fitbit to new one because the old one lacked some features [e.g., it didn't do heart monitoring] –

perceived usefulness, the price difference between the two versions is insignificant [£80 and £130 respectively]

Competition – approach/avoidance motivation

Interview 4

A 44-year-old female who has had long experience in using health apps (more than 10 years) has been using a Garmin watch for about 4 months and stopped all other health apps [4 apps]. She is active person and uses the apps to set **goals** or challenge herself everyday. She seems very happy as talking about the app, the Garmin watch.

Adoption

She mentioned easy to use, but the main motivators for adoption are tracking for progress and awareness and asking for advice – opinions of others or subjective norms and **recommendation**.

Continued use

She repeatedly claimed that the Garmin connect is best app [very good quality], easy to use. By tracking, the app gives necessary information for the purpose of doing exercise like steps and running. Importantly, the app supports her set goals and challenge herself daily to get her target consequently reminders and makes her motivated to keep healthy lifestyle. After long period of usage (10 years), she might think of switching among health apps, but not get rid of. She considers health apps as part of her life.

Stop using/ switch

She used to share and compare her data to other, but it forced her to work harder, try more to get better achievement. This worked at the beginning, but she avoids it now because it takes her enjoyment away as someone else might get far faster than her. Now she considers her data private. **Serious competition** is like a two-edged sword. On the one hand, the competition **encouraged** her to work harder and was pleased and **committed** to **adopt** as well as **continue** to use the app called **Strava**. On the other hand, constant comparison between yourself and others or intensive and serious competition lasted long time **taking her enjoyment** and even it ended up **stopping** usage.

She **switched** from Nike Training Club app, a workout and fitness app, that she had been used for 10 years to a Garmin watch because of the quality [accuracy of measuring distance] of the old app, perception of pre-eminence attributes and easy to use of the Garmin watch and recommendation.

A horrible ride – riding/cycling for the app – an unpleasant event

Interview 5

A 37-year-old male stopped using a cycling app [Strava] several months ago after using for about 3 years, he still likes the app though. After several-month stop, he has recently bought a Mi Fit watch for steps and monitoring heat rate.

Adoption

Strava app:

A lot previous remarks or online word of mouth which came up on Facebook made him notice the Strava app. Then, he gives it a try because the app is free, convenient [do not need to use a computer, just need mobile phone] and has interesting features.

Mi fit watch [applied recently]

Recently his wife's got a fitbit [descriptive norms], meanwhile he did get rid of Strava and did try to use another health app available in his phone without a watch but it was inconvenient since he often not brings his phone. He walks to work and his heart rate is a bit high whereby he wanted to track steps and remind him about heart rate. Moreover, he thinks the price of the watch is cheap [£40].

Approach and avoidance motivation: this app not link to a community, not link to his friends. As such this app is less competitive. It is clear that he avoids apps that he feels competitive.

Continued use

Strava app:

He repeatedly claims that he really enjoyed the competitive element [avoidance now] and the community aspect of the app that facilitate data comparison among users.

This features made him obsessive about tracking on mileage and get a bit addicted. Hedonic feeling also exists as he felt happy within cycling and finding good trails.

Mi Fit

At the time of the interview, he has just used the app for several days, but he said se like the app because it's convenient, tracking gives him "enough information, but not too much."

Stop using/ switch

To get the target of 3000 miles, he went ride that around Christmas day, though the weather was horrible [a miserable, windy day]. He was pleased at first, but he did not enjoy then, goal achievement though. He called it was "a horrible ride". Therefore, he realised he was too competitive and obsessive about number that "didn't really mean anything". That's why he stopped using it.

Interview 6

A 18-year-old female student are using 3 health apps. Myfitnespal, a free nutrition app, has been used daily for 2 years, after using this app for more than one year, she decided to adopt another paid app as a compliment to support her doing exercise. In other words, she simultaneously uses several apps to effectively and efficiently lose weight and keep healthy.

1, Adoption

Being healthier, like weight loss is main motivation leads her to use health app [Motivation to keep healthy]

Recommendation from her friend who is effectively using a health app

Influence of other people used to be like her by seeing them using health app or watching online videos/fitness guide – online descriptive norms.

Being more aware or conscious of what she has done [eating and exercising] – tracking for awareness and progress.

Convenience and easy to follow: I never know whether I am doing it right so I am seeing the videos it helps me to like visualise what I should be doing. Can it be perceived usefulness?

She has adopted all of the apps (three) partly because she knows that "it is free workout I not lose out I download it and don't like it". Free trial version.

2, Continued use

She really like features that are *convenient*:

> Even though I am listening to musical I feel I don't have to bit on the app, it will speak to you and tell you when to stop, running and walking and stuff.

Keep going [tracking for awareness]: the apps motivate her to eat well [Myfitnesspall app] and exercise well [Aflete app] or they help me more conscious what she has done.

Descriptive norms: if I can see that my friend is healthier than me, I feel a bit bad and make me want to do it.

Easy to use:

> What I really like is when I adding food, you can search them and then also you can do like a barcode scan so that's so easy to add.

Reminder:

I know if I didn't have any of them like I wouldn't be committed, and like they sort of hold me comfortable, like that I own my phone I know every time I log my phone I see them, so I need to do it

3, Stop using/ switch

if people say bad things it doesn't affect me because I'd paid money for it so I'm gonna use it but Myfitnesspal [free app] like sometimes I forgot to log in like a week or whatever if you go and talk about it remind me to start using it again.

4, Give Recommendation

Definitely Myfitnesspal because it's mainly free and it's easy to use

5, Cost

She likes using free app, but she does not mind if they ask.

Interview 7

A 23-year-old female student has been using a Fitbit watch for 1 year, before that she used an older version of Fitbit and Myfitnesspal app for 3 years. She really like the new watch.

1, Adoption

Tracking

I wanted to know what I was doing everyday

I just wanted to know how active I was everyday

it's tracking my progress really

Descriptive norms

My friends, everyone had it

Probably I saw result from my friends, my friend, Sam, she was just like me, she was really big as well and she just did her diet in Myfitnesspal that was it.

Motivation to lose weight, be healthy

I guess I felt if I bought this healthy watch that would make me healthy

Perceived usefulness, effectiveness

I just like the clock on it, you can touch it as well, you can touch screen. You can pay music for it. You've got you coach. There that thing that tell how many steps. Everything there and I like it because it's pretty [the reasons made her buy the new watch].

if I had this new one I could do this. You know that was motivated me to get that

Easy to use and convenient

I downloaded it and I like yes so easy

Because I used to write everything in my diary, but because I do nursing, it's difficult to come out and write things in so when I just got my phone I can just search banana,… boom … it was just so easy

2, Continued use

Motivation to keep healthy/keep going

It motivates me more so if I don't feel like I don't want to go to the gym today I can go on here and say I want to go to this place

It keeps me going

You can't cheat on it ever

I need stop doing that then I weigh my on but I don't know what I eat until I weigh on, so I still need, because when I put in my Fitbit, it told me out if I eat too much that's why I do it that's why you can't lie now I can't lie. [So it makes her keep going if she wants a good data/results]

Awards

It [about challenges] will give you a badge then all you friend can see your badge. And know you've done that as well.

Perceived usefulness, effectiveness:

I've lost about 3 stone at this stage and I fall

Community aspect

The community part, that where you can joy the community and you can post your own picture you see and people just like it

Reminder

It reminds me as well because people get busy everyday and you forget, sometimes I forget to eat.

3, Stop using/ switch

Perceived usefulness

She tried to use another app before Myfitnesspal but:

it doesn't give you any feedback, it doesn't say stopping that or didn't tell how many calories were in everything, you don't know … you eat in so I used to try one really.

Switching

She does not intend to change to another one now, partly because she perceive the usefulness and effectiveness of the current app/watch and the cost [£250] is also a barrier.

4, Give Recommendation

She and her friends often give recommendation

5, Competition

She loves challenges or takes part in competition because it gives her motivation to keep fit. Also, it might give her a badge that her friends can see that. However, she also does not like it.

It makes me angry finish something, it makes me really competitive and obsessive

Interview 8

A 18-year-old female student is using four health apps, Myfitnesspal is the first and most frequently used.

1, Adoption

Recommendation

Her friend uses both Myfitnesspal and NHS, so she introduced NHS app for her:

> When people mentioned them to me then I just downloaded it and tried them

Good reviews

Perceived effectiveness/usefulness

2, Continued use

Convenience

> Now I figure out how to like scanning things, I don't have to manually put information on, it's got all data for me, wasn't on my old account when I had to manually put it in I didn't put in like the average or things ... how long I did it

Usefulness and effectiveness

Goal to work to and can see the progress

3, Give Recommendation

> Yes, because she thinks the app is useful, it's the best to recommend.

4, Competition

No

Interview 9

Shelly is 37 years old, a language [French, Spanish and Germany] lecturer. She uses some apps, but mainly Garmin and Strava.

She does not think of switch Garmin and Strava, she is also willing to buy the newest version of Garmin watch, though she thinks it is not cheap and it is more expensive compared to others. Moreover, she uses the apps continuously for quite a long time (the longest one is 4 years) and will continue to use consistently. It can be say that she is a loyal user.

1, Adoption

Descriptive norms (seeing other are using health apps)

From her point of view, Garmin (physical evidence) is commonly used by others and is a big brand. Specifically, she thinks most people in her cohort (runner club) are using Garmin.

Recommendation is the other reason that motivate her to use health app.

2, Continued use

Utility – tracking: the watch (personal) and the apps provide useful information for user → know what she is doing, how good/bad she is → motivation [Garmin, the app itself has sharing feature, but she not use this feature and think this app is personal and private]

Convenience: link with other apps

Strava creates and provides a community, a place that users can share their information, interact together (e.g., to give a thumb up to what others are doing). It gives motivation to do exercise, to go to share good results and to get/follow information from other users. It might cause demotivation as well.

3, Stop using/ switch

She did try to use Myfitnesspal and an app about yoga, but she stopped quickly (in several weeks). She does not do exercise because of calories, and weight loss, hence Myfitnesspal is not her interest, and she wants to do yoga with other people instead of using it alone with a yoga app. She needs a community and competition.

4, Give Recommendation

The reason is perceived usefulness

5, Competition and community aspect

She thinks Garmin is more personal (private) than Strava. A Garmin watch tracks her heart rate, steps, sleep, and so on then send the data to health apps like Garmin app and Strava. She feels Strava more competition, a place users want to share good results. That's why she thinks Strava sometimes can cause demotivation. For example, users might not do exercise if they think they might get bad or not good results as they expect.

She uses Strava to satisfy her social life, hope to get compliments [cue dots], and to give her opinion to other (e.g., give a thumb up). However, she sometimes does not want to use the app to avoid get negative comments or even do not want to do exercise …

In short, Garmin and Strava meet her different needs namely private and social life respectively.

Interview 11

A 40-year-old female who is working as an academic. She has been using 'map my run' and a second Fitbit watch for about three years and two and a half years respectively.

1, Adoption

Motivation to be healthy (e.g., a heart rate monitoring feature hence think of Fitbit)

Keep track health or tracking activities

Perceived convenience (do not often bring the phone, Fitbit is a wearable device) and usefulness (have added features for tracking like heart rate monitoring)

Recommendation from magazines

2, Continued use

Tracking for progress and awareness

Convenience (wearable technology)

Motivation to move (to be healthy)

Goal setting

3, Stop using/ switch

She does not think of stop using, but adopting another app (Fibit) as still using the old one (Mapmyrun) due to need for other supplementary features (heart rate and sleep monitoring)

4, Give Recommendation

She just mentioned receiving recommendation from magazines only, and just gave recommendation to her mother.

5, Competition

Avoidance of community or competition with others

Approach to competing herself.

Interview 12

A 47-year-old female who is working as an analyst at the university. She has been using a nutrition app, Nutracheck, since 2011 and several versions of Fitbit and Garmin watches for several years. It can be say that health apps and health watches are part of her life, she is a loyal user.

1, Adoption

Free trial version

Motivation to lose weight

Avoidance of sharing health-related information

Tracking

Recommendation

Advertising

Perceived convenience

Physical evidence [size, colour and material of watch band]

2, Continued use

Perceived convenience

Product attributes

> the database's very good. When I try this one [Myfitnesspal] the database I think it isn't very good and I went back to this one [Nutracheck]
>
> It's convenient, it's got anything in there, it's very rare if I can't find something in there if I eat something or bought a sandwich or if something, you know, if something isn't packaged there is a list of ways investigating the calories in there, things like eating out.

Tracking

It appeals to my sense of tracking, I work here as a planning and business analyst, it's my job my plan and I look at the numbers I think the **Nutracheck** regardless of whether I'm losing any weight or not because often I have … calories then I think **I will stuck with that.**

I track calories in and out in nutracheck (I only use the app on my phone. I use the webpage on my tablet.). I think my use of the Fitbit and Garmin apps are wholy linked to the device. I didn't buy them for the app. Nutracheck is so easy to use. It has a good database of food and drinks, you can create your own meals, have favourite foods and there are no adverts like the free calorie tracking apps.

Brand

I think my Garmin is more accurate because **the watch designs for workouts** so I think that's **more accurate**. I think Fitbit has **estimated steps** and thing like that.

Physical aspects

The old one was a Fitbit flex, tiny really one, **it's a plastic band**, it's like charity band if I'm at work, it looks a bit gabby, **a bit child**. I **need something a bit more grown** up and this is a more grown up version. And I said why don't I try the Garmin one which is smaller because I have the Garmin and then link to the Garmin connect but it's still plastic, it's a big on me and it's most comfortable one that I have and **looks like a normal watch**.

this's nice, this [her Fitbit watch] looks nice while the Garmin watch is huge.

It was cheap, it was too big on my wrist, so it's sort of got to look nice, the watch's got to look nice and I think the Fitbit watch look nicer than Garmin one. I don't want something black and plastic on my wrist all day, I want something a little bit more professional enough for work.

I think if they could make the devices smaller then I would have the Garmin track and heart rate.

If the Garmin look like this [she pointed in her Fitbit watch] I would probably choose Garmin

Routine

One of the first thing I do in the morning is I go on my Fitbit app on my main page on my phone this is by my bed and **I'm going to Fitbit before I get out to bed in the morning and I don't wake my husband with the light** because I like the sleep and this's new … I like to look at that, I have look at the for my woman my age … to get deep sleep **even though you know you have a good night sleep. I just like, I like the number**

Personal trainer told me to use it. He said me to try it. It was free so why wouldn't I try it. When I pay for this one. And also it has the pie chart and she wanted to know how much fat, protein and carbohydrate I was taking, because she was, two months to eat more protein and more fat … carbohydrate I tried it. In the end, I worked out Nutracheck can tell you. [--> Come back to paid app even tried a free app.]

Nutracheck I don't know what to do without it, I always like it and pay for it since 2011.[--> loyalty.]

I think, **I focus on the numbers**, I'm going on it, ten times a day and six times a day and then Garmin I mean some days I could be, I underestimate, I think that's why I use Nutracheck, you could **get over obsessed** with the numbers. **The first thing I do in the morning is to go into my Fitbit app** to see how I was slept **when I should know how I was slept**. You get used to seeing the number, get used to relying on it, maybe a sense of understanding your own body, should I know if I have enough calories or stop eating, go for walk at lunch time … make it running when you go out without Garmin on, but you don't have any number, you just go for a run. **I couldn't do that**. I like to see my numbers. I think I'm obsessed with this, I think numbers appeal to me.

Habit.

I think. Nutracheck I'm tracking it. **It really works.**

Different apps

I use two watches for different things and two apps for different things, both apps come with the watches.

Good assessment

PEOU

at the time Myfitnesspal did split by protein, carbohydrate, fat, you know, pie chart but Nutracheck didn't do that but I tried that I didn't like it because of the measurement it wasn't easy to use as Nutracheck, Nutracheck is so easy to use.

PU/benefits

I'm paying for it and I do know when I pay attention to calories I can see some differences, I lose some pounds and it depends on whether I'm running or not, training for marathon or not. The Garmin gives me that detail I want to see with my running, when I'm marathon training I download all that information from PC version of this and I put it in my running plan, and I work out how I am doing.

I think it's not instant, you can't see the way that Fitbit set out is that you can see information so quickly. I can see on here, I can see on Fitbit app. Nutracheck is such an easy thing to use. You don't struggle to find calories or stuff, it's already there, it's just convenient, it's there. You don't have think twice, I'm doing it, it's just there, I think it's huge, you have to sort of search on it or find to get the information out. I think it's the stuff I'm using it.

Goals

Fitbit - I have goals set for steps and for movement in the day. I usually ignore the movement in the day goal but find it is a useful reminder that I have sat still for an hour! The steps, while I don't try to hit the target specifically, give me a sense of achievement when I do. I hit the target 4 or 5 days in the week due to the running.

Garmin - I have a goal set for 1000 miles run in 2018. This is really useful as it shows a radar chart and number of miles/% achieved. I am following this goal.

Nutracheck - I'm not goal focused in this app. While it sets daily 'allowances' for calories, I know through the week that I will need to eat more on training days than others.

Incentive

The Fitbit, it's a nice app. It tells you, you can change it, you can take it office. It nudges me through the day I'm not moving enough because my job is basically like that. And you can choose what you see it goes yea you've done three sessions out of three and it's a prize, it's nice to get your screen when you've done steps, it is an award thing I suppose. When you first start with this app, it gives you badges and things, after one … it's quite nice to say oh my steps to the moon, congratulation and I like the sleep. It's information I think.

it tells me I'm not moving enough because doing a little bit of exercise obviously healthy enough for me tick the boxes … you need to be more active.

Purpose of using the apps: Weight loss

If the Garmin look like this [she pointed in her Fitbit watch] I would probably choose Garmin because … one stop, one app. Even I still probably have Nutracheck, two apps, I get two apps.

they're so much more around losing weight that compel me to keep tracking things, even though my weight goes up and down and down and I think that ties into weight more than just using an app. I think that's more than how do we get people to lose weight and keep it up.

3, Competition

She considers health apps as personal and is not interested in community aspect of the app.

Interview 15

A 33-year-old male Lecturer in sports and exercise nutrition is using a lot of nutrition and exercising apps including health watches (Garmin, Apple). Eating healthy and very active person.

1, Adoption

I did a bit of research to find out which is the best watch for what I want to do so swimming, running, cycling. The watch I've got can monitor all three.

Just because I like have a GPS function and the heart rate function so you can see how hard from your heart rate, how hard from training session is, what distance you've done from during that session

Yes, I just want to track.

Just to track what you do on the daily basis, just more interest than anything else really, just quantify what you do.

One of these lecturers here told me to start using it because it helps, assesses how recover you are often training before you start the next session. Start by recommended by a number of staff here.

That's came free, well it's just there when you have an apple watch. So it just syncs from that.

Just sort of from other friends that do enduring sports they've got it and they told me to download it, you can sort of connect with them on social platform.

Because the life insurance rewards you for being physically active so we both wanted to do that and then we get the rewards each week and each month, stuff.

2, Continued use

Product attributes

Free version

No, no pay, no charge.

Tracking for awareness

It's just keep me good awareness of the calories I need, specifically if I've been exercising you can sometimes be far too under analysis with the exercise so that's why I do that.

I didn't really see the value in it when I first started using it, I was quite new to enduring sports. But now I've done more research, and take it more seriously, now I see the value in recording the resting heart rate that's why I do that.

Just keep track of what you are doing and make sure you are doing thing properly and you're recovering properly and say how fast you're going, you're racing and stuff like that.

I don't know. It's just give you a broader awareness of what you're doing, what from my health, fitness point of view really. Because if you didn't do anything and you went out for running, you never know, if you're getting

quicker, how your heart rate is responding, what distance you've come, it just gives you sort a snapshot of what you're doing.

Just to keep tracking my exercise and my training to make sure I'm constantly improving or doing a course of training on it.

Routine

Health app maybe look at once a day, not really that interested where all the other I look at a good couple of times each day, I use Ithlete every morning, Myfitnesspal every time when I have some food, Garmin connect when I've done my exercise, same with Vitality I look at how many points I've got from my exercise, Strava uses probably the most because of side of social networking thing and training thing just link to my Garmin as well so maybe once or twice a day.

No, because I thought I already downloaded it and got everything I needed, so I just installed, just used that again.

To be as competitive as possible in my sport, keep improving it's probably motivation to me.

Good assessment

PEOU

most of the apps really easy and straightforward

PU/benefits

it is quite good when you finish your exercise because it automatically uploads it you can just sit down get a little bit of breath, and just update

everything before you go have shower or something, just got a bit of time stop and relax.

Goals

So Myfitnesspal you have it, it looks at daily thing, so today I can add what breakfast I have, I have three eggs, some bread, I can see for my breakfast I have had 3400 calories and it knows that each day for my activity level I need to 2700 so I have had 350 at the moment, I've done exercise already today. So still because of the exercise I've done, I still need to eat 3000 calories so and then when I have lunch, so I can put in what I have, when I have some snacks and dinner so give me a chance so to track.

I just make sure that I'm near the required calories, so I still get an enough energy and nutrient I need for health and training.

Incentive

She uses the apple health app so she's got an apple watch so she uses that just, she uses it for all her exercise as she goes to the gym, she'll set the setting and record sessions and she uses it to see how many steps she takes throughout a day, because her links to life insurance Vitality so if she keeps doing the steps and doing the exercise, she gets some of the rewards as well.

Cinema tickets, Starbucks drinks and providing you meet required level then you get money back each year when you renew premium as a cash incentive to say well-done you've done enough activities for, so it's good.

Yes, we have the same target, it's on the app so we both have to do the same thing, I normally get my exercise, she normally gets some through

the amount of step she takes in a day because she's at primary school teacher so she's always on her feet walking and walk around class

Because the life insurance rewards you for being physically active so we both wanted to do that and then we get the rewards each week and each month, stuff.

The benefit is specially link to the life insurance being able to get of the free drinks, free cinema tickets

Purpose of using the apps

Because when you do a lot of training sometimes you can get overtrain which is not good for your health and performances so I've got monitoring how your heart is, it tells you if you're ready to train or you need to be careful, because you got side that you might overtraining and then you can track what exercise you do.

Just taking the sport and performance a bit more seriously. I wanted to make sure recovering properly from my training.

Just keep track of what you are doing and make sure you are doing thing properly and you're recovering properly and say how fast you're going, you're racing and stuff like that.

C2C interaction

Interacting

Yes, pretty much every day, a couple of time a day or go on and see what people are doing, you get notifications that people like what you've done, you can go on and just see what other people are doing so.

social networking thing and training thing just link to my Garmin as well so maybe once or twice a day.

I like being able to interact with other people on Strava when you see what exercise they've done.

Interview 16

A 31-year-old male fitness manager is using a nutrition, an exercising apps and a health watch (Garmin). He is overweight and has been using health app for about 4 years.

1, Adoption

Friends are using it [Strava] so they were using it when they were going out running and then you can compare it with each other as well, so if I run for run. We can see each other in the map as well. So it gives you new running groups something like that. We can talk to other people on Strava. That's on facebook, just see an adult facebook, watching the adverts with facebook as well, yeah, that's why I got to know that one [Garmin]. That's the good tool.

From friends again, someone who I'm working with, using it [Myfitnesspal] and said it's good app so yeah I just decided to use it as well.

I read the reviews online as well, so has some good reviews. It's pretty much middle range price as well which is good. I could see a lot of people using it as well and no one complaint or send them back as they won't work, things like that. It works very well.

I think it was purely on the reviews, seeing what they did, and how is this, what to use.

Regarding reviews - I mean that I read what other people have to say about certain products before I buy anything.

If the review is good and suits my needs I gives me confidence that the product is right for me

The Reviews often describe what the product can do and any special features

2, Continued use

Product attributes

Free version

I wouldn't pay for it, I don't have to get pay for that. Not necessarily a good app.

I probably stick with those three, but if I heard good reviews or something else, I probably switch as well, if it's still free.

tracking

[the data in the apps] It's good, just simple to understand so it's good as you measure and see where you are as well.

I like how simple it is. It tracks your progress as well. I like compare it with friends, it will create new routes as well, just a handy bit of kit, a lot of people using it for running, for biking, that's sort of thing as well.

They show me the pace that I'm running, so if I want to hit certain time and I know I'm running wright speed. If I'm running too fast so I'm running a bit quicker. That's the main one.

Again it tells me the pacing thing, it's I can see how fast I go, the time I'm going and if I need to train harder or I can speed up the training.

[What make you come back to Myfitnesspal?] Again, if I feel, I need to track things a little bit closer, I feel I can put a little bit weight on, or I feel like that, got train for that so get back on the app.

I think people love to know what's going on, and how to get better, it's awareness as well.

Routine

it's lots more apps now, do better job than Myfitnesspal, but I use Myfitnesspal just because I know it, and then I have to use it, but I think people are start using lots of others as well.

I think there are a lot in the market, but for me just having good experience of this one. It hasn't broken, it's nice and simple so I won't change it I think.

Good assessment

PEOU

with technology for me it has to be easy to use, be simple. If it is too fancy then just give up of it really so that's so easy to use.

Again simple to use, it has all food, all set out there, it's got nice, clear numbers as well. it's just easy to use, and easy to see the results as well.

[Garmin] Good bit of kit, it doesn't let me down, it doesn't, it always works and it's very simple to use. It works inside, treadmill, do steps on the treadmill and my heart rate as well which is good. Again it's quite a cool bit of kit, it looks quite nice as well which is good. Yeah, it's good.

PU/benefits

so when I start using this app four years ago, probably I start running a bit more seriously, more to know how fast I'm going, what's the time, that's sort of thing.

Yep, just help you hit target, because it tells you where you are, tells you, you need to eat up or different as well

A lot of time you eat food and you don't understand what you eating. With this one it does tell you what you eat in and how to your body. It's just helpful.

I think it can help me to physically better so the next time I work out my recovery will be good and then I'll train better next time and if I don't eat properly then I haven't got much energy, I'm not gonna train the next time.

Yes, the benefit is very much, knowing where you are, seeing your numbers, just know where you are with the numbers. You know, again the exercise you doing what you need to do to get back, to get better as well, so the benefit is really I suppose.

[Garmin] Good bit of kit, it doesn't let me down, it doesn't, it always works and it's very simple to use. It works inside, treadmill, do steps on the treadmill and my heart rate as well which is good. Again it's quite a cool bit of kit, it looks quite nice as well which is good. Yeah, it's good.

Goals

I think it sets you how many calories you should have during the day so that's 2500 calories as well and what it does, it tells you, you know, when you coming up close that limit, it helps you sort of

Purpose of using the apps:

looking at how fast I'm running and then how it works again my heart rate, that's sort of stuff as well so that's the main thing that I use the app for. Myfitnesspal one I use that just for food really, just to see how much energy I've burnt off. Those the main apps that I use just to help me to get better I suppose.

I think it's just health. The chase game, from seeing anyone else just doing, just following the crowd of what was going on then the technology got better, and more and more things, the brands became a bit more popular as well, more and more people started doing it so it's just task on the long really.

Occupation

Yes, it's good, it's good tool. When I training other people in the gym, I just telling them to use it because I see their accounts, so I could see what they eat in, they would do, tracking a bit more as well. so it's good when I am a personal trainer and use

C2C interaction

Observational herding

Just because … got it so other people using it so yeah use it as well.

I think it's just health. The chase game, from seeing anyone else just doing, just following the crowd of what was going on then the technology got

better, and more and more things, the brands became a bit more popular as well, more and more people started doing it so it's just task on the long really.

Appendix 3. Examples of memos

The extent of competition and consumption

Part 1: Definition about competition

- **Definition**: The competition here is not necessarily to gain a tangible award, it just about the feeling of achievement/ high score.
- **Classification**

✓ *The number of competitors*

Competition myself does it make sense? (Isabella)

Competition with other: it can have two forms based on the definition of online and off-line (virtual) community. First, traditionally, a group of people compete together. Second, one compete with others in virtual community hence they do not need to know together, and they might not know who are taking part in the competition except some very good competitors with highest scores. One finds out target for oneself based on the results of others in the virtual communities

	Direct	Indirect
Off-line/real (I am not sure about the name) community	Traditional competition	???
Virtual community	???	???

✓ *Purpose of competition*

Challenge/competition for **fun** often involves several users who are quite close or at least know each other.

Competition for **swanky**/showing-off purpose: it is not necessarily knowing each other. This community often include a lot of users. Competitors do their best to get

as highest score as possible so that they can get incentives which can be tangible, intangible awards or just some nice comments from other users.

Part 2: The extent of competition and consumption

This stage discovers/ aims to understand (1) the role of competition to health app usage and (2) approach and avoidance motivation.

Competition makes users involve more in using health app, but in different manners and consequently causing different ways of usage. Some users (Isabella and Samuel) were enthusiastic at the outset, but they, then, felt pressure (might be not pressure, need to find other word) causing restriction or even stop of using health app → two sides of the issue. Users need something like competition to continue to use, but when the deep involvement makes them feel "a horrible ride" (Samuel) or drop out from using → consider the "fun" of competition as Emma and Andrew and serious competition of Samuel. However, in between another interviewee (Charlotte) still feel inspired by challenged as taking part in competition, but she also thinks that she is too obsessed and competitive. She thinks competition has both sides. In other words, she seems feel ambivalent about competition.

- ➔ These findings can be examined by the theory of approach and avoidance motivation.

Notice that hedonic consumption would seem to satisfy both approach and avoidance motivation. We believe this to be a primary contribution of this study.

Avoidance motivation – serious competition – active people – use long enough (long time) – not people who focus on lose weight, but those who want to show off.

Serious competition is like a two-edged sword. On the one hand, when users gain positive achievements in the competition, it encourages them to work harder hence

users are committed to adopt and continue to use the app(s) and become loyal. On the other hand, constant comparison between yourself and others/ intensive and serious competition lasts long time can take users enjoyment or even end up stopping usage.

Competing/challenging oneself also create motivation to use. In this aspect, users need supports/features to track progress or compare data themselves.

Approach and avoidance motivation

Competitive feelings would be analysed further with approach and avoidance motivation.

Some thoughts should be considered in the discussion part: Policy makers, social marketers and practitioners should consider which segment(s) they aim to, thereby providing users with appropriate features and services. It is not necessarily to create competitive aspect of health apps for those who consider sharing information as private/personal, but a community facilitating comparing data is a vital aspect to motivate users who are active and tend to show their good results. All users with the purpose of losing weight have tendency to keep their information, whereas those who are active and good at doing exercise tend to involve in sharing and comparing data. Having said that, there is a segment of users who avoid to involving in competitive element of health app, even though they used to and are still active. Tracking for progress and awareness, but not competitive side, is an important feature/factor to motivate those.

A practical issue of approach/avoidance motivation in competition context (should to expand to users who are using health apps to lose weight, they might not want to involve in competition with others, but challenge themselves or they might make more effort as seeing other healthy) causes a need for the corresponding **literature review** regarding previous studies/findings that **back up** this issue. Also find out whether or not these findings can contribute to the current literature.

But active person might be private (Emily)

(The literature is reviewed to get insight into the phenomenon, but the findings can fill the current gaps)

Competition can create loyalty to some users, but can be demotivating to other segment …

Think of literature review on recommendation and loyalty and the findings

Recommendation might derive from perceived usefulness. Loyal users might not give recommendation due to sensitive topic.

“Risk aversion reflects the individual's general tendency to avoid uncertainty. High risk-averse people endeavour to reduce uncertainty by choosing more certain alternatives” (Casaló et al., 2015:1830).

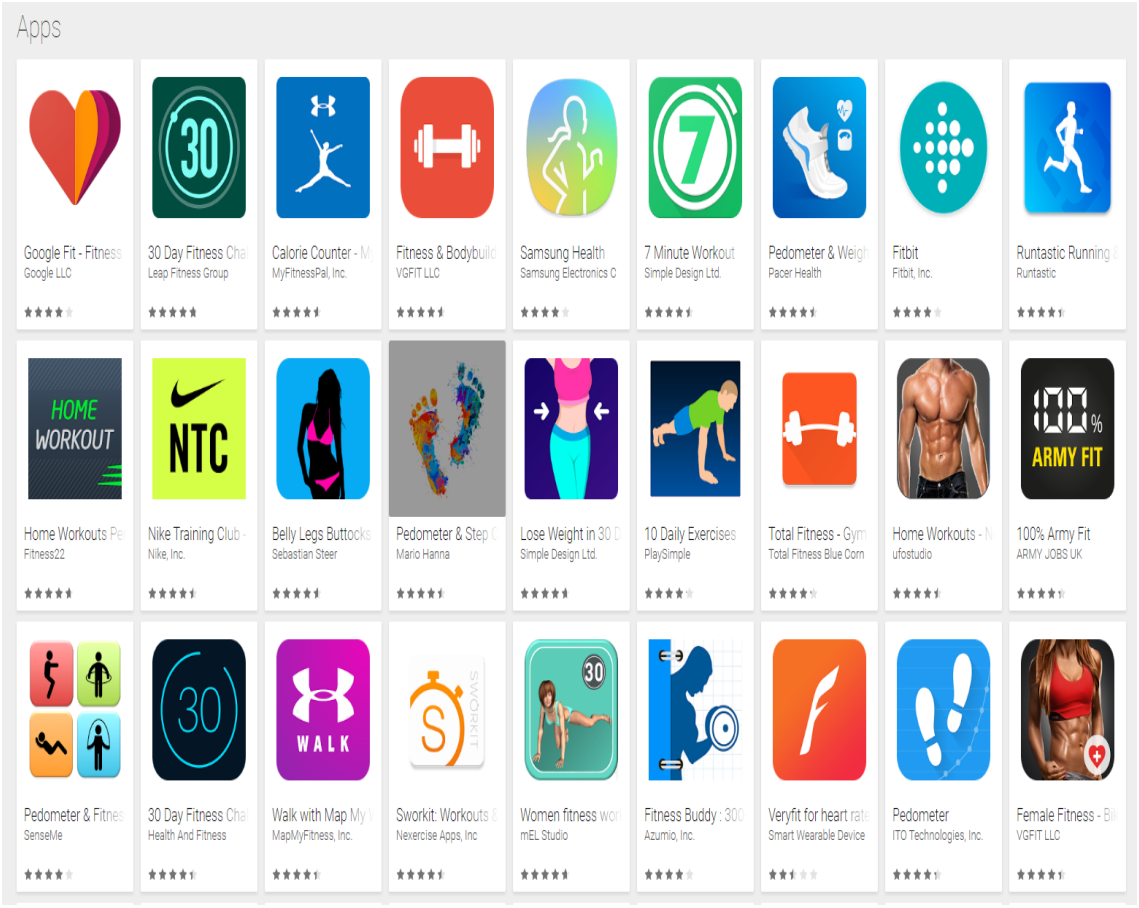
Switching cost

Fee or cost for using health app such as cost for wearable devices like watches prevent users from switch or stop. Some participants who involve in this cost do not have intention of switch or stop. They might even overcome difficulties to continue to use.

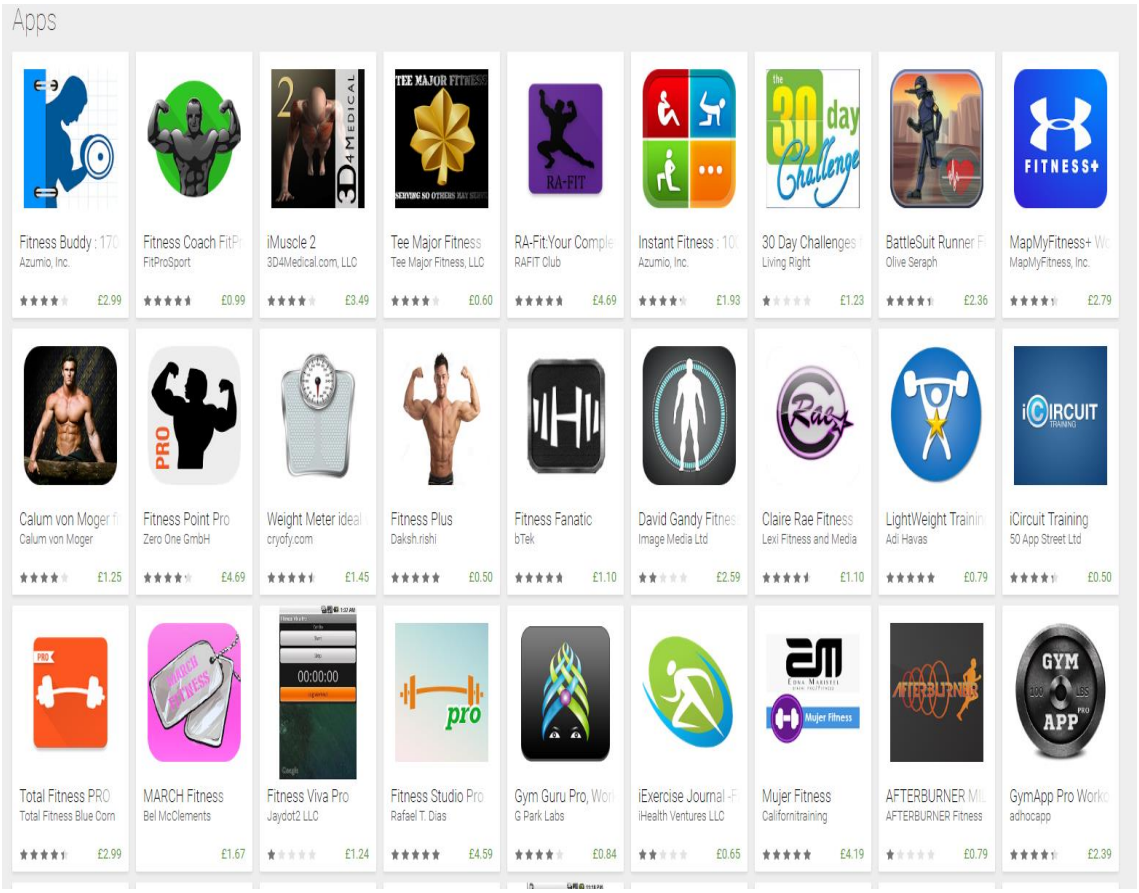
> The Aflete one that I've got it, if people say bad things it doesn't affect me because I'd paid money for it so I'm gonna use it but Myfitnesspal [she is using a free trial version] like sometimes I forgot to log in like a week or whatever if you go and talk about it remind me to start using it again. [Sophia].
>
> In some ways, actually it [the app and her goal of 10000 steps a day] is making her down about herself rather than … My wife has decided to continue using the FitBit, but to worry less about specific targets and more about maximising the steps that she is able to take. So instead of feeling like she *must* achieve 8,000 steps every single day she is trying to get as many as she is able; whether that is 4,000 on a day where she is stuck at her desk or 12,000 on a day when we go for a walk. [Samuel].

Furthermore, the costs give users commitment and motivation to usage or doing exercise consequently make them loyal to the app(s). Apart from Samuel and Isabella who have just used the watches for several days and moths respectively, other interviewees [Andrew, Charlotte, Mia] who own watches for quite a long time [3 years or more] have experienced at least two versions of the same brand. They attempted to get the newest and the most expensive ones hence feeling proud of them. This is in line with previous studies regrading luxury brands [reference some studies].

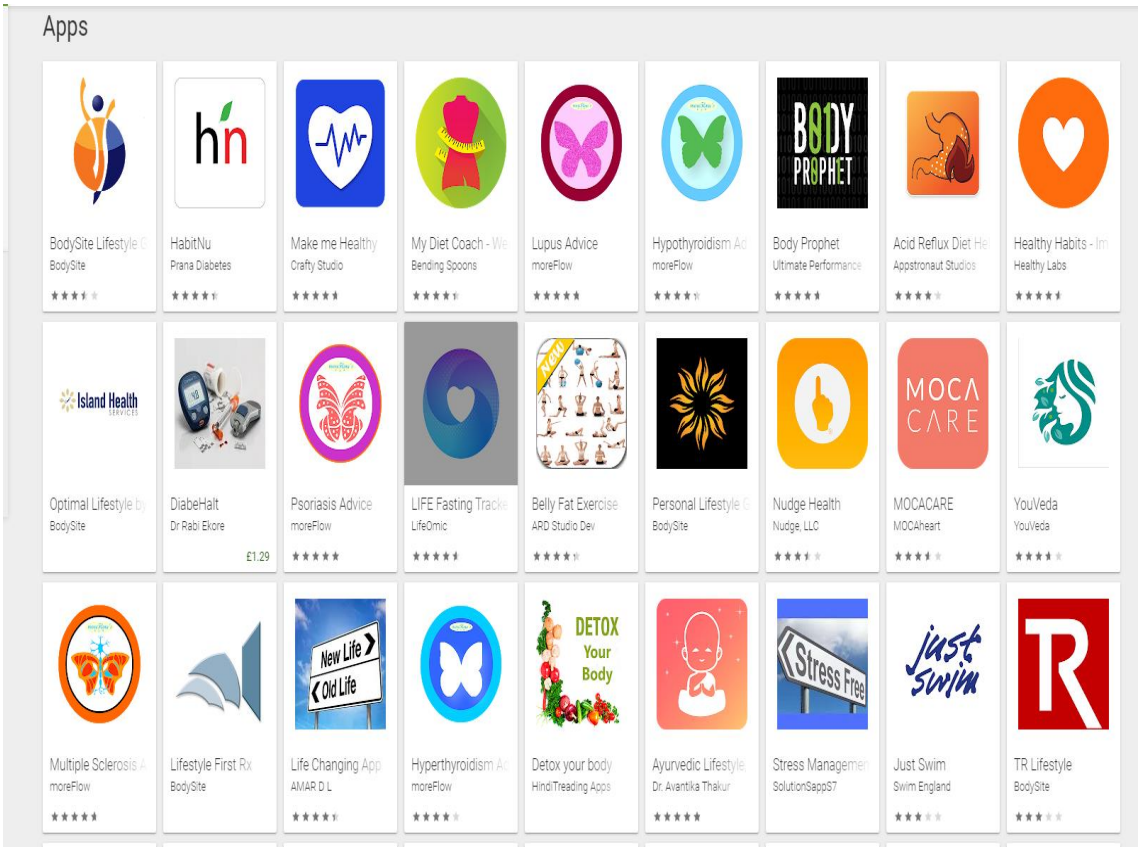
Appendix 4. Free fitness apps



Appendix 5. Paid fitness apps



Appendix 6. Lifestyle modification apps



Appendix 7. Advertisment for interview recruitment

Hello every one,

I am inviting you to participate in an interview of **approximately 60** minutes. The main aim of the project is to get insight into motivation behind health app adoption and health app loyalty as well as the rationale for defection. Specifically, I am looking for **Britons** who have **experience** in using **exercising or nutrition or lifestyle change apps (Fitbit, garmin or similar devices is acceptable)**.

All are welcome to participate. If you have any questions or ready for interview please feel free to contact me at (**t.luyen@2016.hull.ac.uk** or +**447599725116**). I am very pleased to give each participant **£10** for your time.

Thank you very much in advance for your assistance.

Regards,

Thuy Luyen

PhD Student, Faculty of Business, Law and Politics.

Appendix 8. Consent form

UNIVERSITY OF Hull

BUSINESS SCHOOL

RESEARCH ETHICS COMMITTEE

CONSENT FORM: SURVEYS, QUESTIONNAIRES

I, Name of participant of Company

Hereby agree to participate in this study to be undertaken by Mr. Van Thuy Luyen, a researcher of University of Hull. I understand that the purpose of the research is to answer the following research questions: What motivates users to adopt health apps? What keeps health app users loyal to usage? Why do health app users drop out from usage? In light of those questions, what can health apps do to reduce attrition?

By signing this consent form are agreeing to your participation in this research process and to the collation of the material. Participants have the right to withdraw from participation in the research process at any point and materials collated from them up to that point will be removed.

I understand that

1. Upon receipt, my interview will be coded and my name and address kept separately from it.
2. Any information that I provide will not be made public in any form that could reveal my identity to an outside party i.e. that I will remain fully anonymous.

3. Aggregated results will be used for research purposes and may be reported in scientific and academic journals (including online publications).
4. Individual results **will not** be released to any person except at my request and on my authorisation.
5. That I am free to withdraw my consent at any time during the study in which event my participation in the research study will immediately cease and any information obtained from me will not be used.

Signature: Date:

The contact details of the researcher are:

Mr. Van Thuy Luyen

Business School, University of Hull

Phone: (+44) (0)7599725116

Email: T.luyen@2016.hull.ac.uk

The contact details of the Module leader or Supervisor are:

Supervisor: Dr Haseeb A Shibbir

University of Hull, Hull, HU6 7RX, UK

www.hull.ac.uk

h.shabbir@hull.ac.uk

In some cases, consent will need to be witnessed e.g. where the subject is blind/ intellectually disabled. A witness must be independent of the project and may only sign a certification to the level of his/her involvement. A suggested format for witness certification is included with the sample consent forms. The form should also record

the witnesses' signature, printed name and occupation. For particularly sensitive or exceptional research, further information can be obtained from the HUBS Research Ethics Committee Secretary, e.g., absence of parental consent, use of pseudonyms, etc)

NOTE:

I**n the event of a minor's consent, or person under legal liability, please complete the Research Ethics Committee's "Form of Consent on Behalf of a Minor or Dependent Person".**

Appendix 9. Invitation form

UNIVERSITY OF Hull

BUSINESS SCHOOL

RESEARCH ETHICS COMMITTEE

INVITATION FORM: INTERVIEW

We would like you to consider participating in a study we are conducting at Hull University, Faculty of Business, Law and Politics. This invitation sheet provides further information about this project and your involvement in the research.

The aim of the project is to answer the following research questions: What motivates users to adopt health apps? What keeps health app users loyal to usage? Why do health app users drop out from usage? In light of those questions, what can health apps do to reduce attrition?

Participation in this study is voluntary. It will involve an interview of approximately 30 minutes in length. You may decline to answer any of the interview questions if you so wish. Furthermore, you may decide to withdraw from this study at any time without any negative consequences by advising the researcher(s). With your permission, the interview will be audio recorded to facilitate collection of information, and later transcribed for analysis. Shortly after the interview has been completed, we will send you a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or clarify any points that you wish.

All information you provide is considered strictly confidential. Your name and your organisation's name will not appear in any thesis or report resulting from this study,

however, with your permission anonymous quotations may be used. Data collected during this study will be retained for 1 year. Only researchers associated with this project will have access. There are no known or anticipated risks to you as a participant in this study.

Should you [the participant] have any concerns about the conduct of this research project, please contact the Secretary, Faculty of Business, Law and Politics Research Ethics Committee, University of Hull, Cottingham Road, Hull, HU6 7RX; Tel No (+44) (0)1482 463536.

We hope that the results of our study will be of benefit to the organisations directly involved in the study, as well as to the broader research community.

We very much look forward to speaking with you and thank you in advance for your assistance in this project.

Yours Sincerely,

Name of Researcher: Van Thuy Luyen

Email of Researcher: t.luyen@2016.hull.ac.uk

Name of Supervisor: Dr Haseeb A Shabbir

Email of Supervisor: h.shabbir@hull.ac.uk

Name of Supervisor: Dr Dianne Dean

Email of Supervisor: d.m.dean@icloud.com

Glossary

Value is defined as an improvement in system well-being and *value co-destruction* as an interactional process between service systems causing a decline in at least one of the systems' well-being (Quach and Thaichon, 2017)

value co-creation is defined as ‘‘benefit realised from integration of resources through activities and interactions with collaborators in the customer’s service network (Sweeney et al., 2015)

IVF outcomes includes value co-creation (i.e., the actors are better off), value co-destruction (i.e., the actors are worse off), or value no-creation (i.e., the actors are indifferent) (Makkonen and Olkkonen, 2017).

Indirect interactions entail one actor (e.g., a customer) interacting with a standardised system or product hence taking place in customer sphere (Grönroos & Gummerus, 2014). In other words, indirect interaction reflects situations where the customer consumes or interacts with resources that are outputs (e.g., a product) of the firm’s processes.

Co-production intensity is defined as “customers’ subjective perception of the extent of effort and time invested within a specific process of coproducing a product or service” (Haumann et al., 2015:17-18)

IVF intensity is defined as customers’ subjective perception of the extent of effort and time invested in the IVF process