Adopting Physician-Rating Websites: Assessing the Influence of Practitioners' Motivations and System Perceptions

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Abstract

Physician-rating websites (PRWs) are internet-based platforms that allow users to read or contribute to reviews of service performance about healthcare practitioners (HCPs). Healthcare consumers use PRWs to rate healthcare services; however, PRWs are not commonly embraced by HCPs, nor by professional associations. Nonetheless, in a competitive environment, HCPs could benefit their practice by attending to what clients publicly communicate about their services to align with the patient centred care (PCC) movement. The systematic literature review (SLR) revealed a paucity of research in the area. This research sought to understand what influences a HCP's intention to adopt a PRW. In doing so, this research explored the relationship between HCPs' motivation to adopt such websites and the role of their perceptions of a PRW's characteristics. The motivation and system elements were assessed in terms of their relative influence on HCPs' PRW adoption. This research conducted a narrative and SLR to inform a conceptual model to theoretically explain the relationship between motivation, system characteristics, and intention to adopt a PRW that was tested in a cross-sectional study. The research method and methodology included participants, 249 Australian allied healthcare professionals, who were surveyed using validated scales. Structural equation modelling estimated the model and the relative contribution of motivation and system characteristics on the adoption of PRWs. The Results chapter showed that HCPs' motivation type external regulation—social had a direct negative effect on their intention to adopt a PRW ($r = -.21$, $p < 0.01$). In discussing the findings, they contrasted with the perceived system characteristics of relative advantage and ease of use, which were found to have a direct positive effect on intention to adopt a PRW ($r = .88$, $p < .00$) and ($r = .24$, $p < .00$), respectively. In conclusion, the results from this study, first, increase current understanding of HCP behavioural intention to adopt a PRW. Second, theoretical contributions are made through the integration of self-determination theory and diffusion of innovation applied to this unique context. Third, this study is the first to apply the Multidimensional Work Motivation Scale in Australia. The findings have implications for healthcare businesses and HCPs' strategic development of PCC measures. Furthermore, translation of the findings could assist in the design of HCPs' professional development to use online feedback, to manage patient onboarding, and to identify pathways to innovation adoption by HCPs.

Declaration

I, Renato Ulpiano, declare that the DBA thesis entitled "Adopting Physician-Rating Websites: Assessing the Influence of Practitioners' Motivations and System Perceptions" is no more than 65,000 words including quotes and exclusive of tables, figures, appendices, bibliography, references, and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

I have conducted my research in alignment with the Australian Code for the Responsible Conduct of Research and Victoria University's Higher Degree by Research Policy and Procedures. All research procedures reported in the thesis were approved by the Human Research Ethics Committee HDRE17-125.

Renato Ulpiano 8 December 2021

Dedication

I dedicate my dissertation work to my family.

First, to my soulmate Maria, best friend, wife, and the most patient person in the world, without your unwavering support, one word would not have become over 55,000. You understood what was required and stood by me all the way and did not doubt me for one second. Our connectedness will last through eternity.

Alessia and Claudia, you both have a special place in my heart, and I hope when time passes, this will be a keepsake that your children may read one day.

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To Claudia, as I would say to you on many occasions, if you think you will, you will. I did, and I did, and you have too. I’m proud of your achievement!

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List of Abbreviations

AHPRA	Australian Health Practitioner Regulation Agency
AHRQ	Agency for Healthcare Research and Quality
APA	Australian Physiotherapy Association
AVE	Average variance extracted
BI	Behavioural intention
CMS	Center for Medicare & Medicaid Services
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CR	Construct reliability
EFA	Exploratory factor analysis
ERM	External regulation—material
ERS	External regulation—social
FIML	Full information maximum likelihood
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems
HCP	Healthcare practitioner
HPA	Healthcare professional association
ICT	Information and communications technology
IOM	Institute of Medicine
IP	Internet protocol
KMO	Kaiser-Meyer-Olkin
MAR	Missing at random
MCAR	Missing completely at random
ML	Maximum likelihood
MWMS	Multidimensional Work Motivation Scale
NDIA	National Disability Insurance Agency
NDIS	National Disability Insurance Scheme
NCAR	Non-ignorable missing at random
OECD	Organisation for Economic Co-Operation and Development

OTA	Occupational Therapy Australia
PCC	Patient-centred care
PCI	Perceived characteristics of innovation
PGMPS	Press Ganey Medical Practice Survey
PREM	Patient-reported experience measure
PROM	Patient-reported outcome measure
PRW	Physician-rating website
RMSEA	Root mean square error of approximation
SDT	Self-determination theory
SEM	Structural equation modelling
TAM	Technology acceptance model
TOE	Technology–organisation–environment
TBP	Theory of planned behaviour
TLI	Tucker-Lewis Index
TPB	Theory of planned behaviour
UTAUT	Unified theory of acceptance and use of technology
WHO	World Health Organization

Chapter 1. Introduction

This chapter first introduces the study of healthcare practitioners' (HCPs') adoption of physician-rating websites (PRWs) and discusses the health service context in which the research is situated. Second, an overview of the relevant theories relating to technology innovation and adoption in health care is presented. Next, the research questions are described and how the findings contribute to new knowledge outlined. The chapter concludes with a description of chapter content and thesis structure.

1.1 Background

In health care, the practitioner–patient relationship has transitioned from a service-controlled model, where the HCP decides on the patient's health care, to patient-centred care (PCC), where the patient is empowered to make decisions (Calnan, 2010; Fischer & Emmert, 2015; Gabe et al., 2015; Kekewich, 2014; Kupfer & Bond, 2012; Li et al., 2018). Patient feedback is a requisite for PCC, and patients are increasingly using PRWs to provide online feedback of their healthcare service encounters (Atherton et al., 2019; Powell et al., 2019; Turk et al., 2020). PCC was conceptualised through research conducted by the Picker Institute in conjunction with the Harvard Medical School in 1993 (Australian Commission on Safety and Quality in Health Care, 2011). Other contributions to this shift have included

- increased individualism in Western societies and governments or payers embracing free-market principles to deliver more effective outcomes (Fischer & Emmert, 2015),
- a patient empowerment campaign launched in 2015 by the European Patients' Forum that sought to educate and explain patient rights in Europe (Bedlington, 2015),
- an inaugural European conference on patient empowerment held by the World Health Organization Europe (WHO Europe) in 2012, where Robert Johnstone of the International Alliance of Patients' Organizations said, "What needs to happen is for doctors to come down off their pedestal and for patients to get up off their knees" (WHO Europe, 2012, para. 1).

Significantly, the U.S.-based Institute of Medicine (IOM) reoriented the profession by making PCC one of its six goals to improve health care (Kupfer & Bond, 2012). At the start of the last decade, there was a concerted push by healthcare institutions across the world to recognise the rights of patients and implement PCC.

PCC has made health care safer and of higher quality (Australian Commission on Safety and Quality in Health Care, 2011). The approach delivers higher than average overall patient satisfaction scores, shorter average lengths of stay, and a reduction in cost per (patient) case over 5 years (S. Stone, 2006). The IOM used the term *patient-centred care* to bridge two extreme views: radical consumerism, where the consumer is always right, and classic professionalism, where the professionals hold authority (Berwick, 2009). Kupfer and Bond (2012) made the distinction between PCC and patient satisfaction (a proxy for consumerism). From the consumerism perspective, the quality of the service encounter is measured against the customer's expectation; however, under PCC, HCPs are not obligated to satisfy all demands made by patients.

Modern healthcare design models view patients as more than passive recipients of healthcare services and instead expect patients to manage their care and be accomplished in assessing service quality (S. A. Adams, 2011; Li et al., 2018). Under a consumer model of health care, HCPs are suppliers of a service and can be selected and evaluated based on consumer needs just like any other product or service. Sturgeon (2014) identified Dennis Lees, an economist in the 1960s, as the first to argue there is no fundamental difference between medical services and any other consumer service. PRWs enable patients to be proactive participants in their health care.

PRWs are internet-based platforms that allow users to read or post reviews of service performance about HCPs and contribute to PCC (Boylan et al., 2020; Syed et al., 2019; Waxer et al., 2019; Zaki et al., 2020b). Patients are aided by PRWs as they have the power to publicly review and assess the health care received (Rothenfluh & Schulz, 2017). PRWs are internet-based platforms that allow patients to read and provide evaluations based on personal experiences with HCPs (Fischer & Emmert, 2015). They are similar in content to online rating sites that exist for other industries and services such as those found in tourism—for example, Tripadvisor, where the traveller provides experiential feedback (i.e., star ratings and comments) to the host and other potential customers (Bidmon et al., 2014; Emmert et al., 2017; Reinhardt et al., 2018; Strech, 2011; Terlutter et al., 2014; Velasco et al., 2019) and are designed with similar features and functions (Rothenfluh et al., 2016).

An example of a PRW is Healthgrades.com. It has been identified as the most widely used PRW in the United States with 254,600 daily unique visits (Kadry et al., 2019; Pike et al., 2019). Healthgrades enables users to rate HCP's on a scale from 1 star to 5 stars on the overall satisfaction level of the service provided. Users can also leave free text comments that appear adjacent to the star reviews. Healthgrades provides additional information about the HCP including insurance details, location, a short biography, and whether they are affiliated with hospitals. HCPs' profiles are aggregated by Healthgrades.com through publicly available sources, and their profile cannot be removed by the HCP, but they can add additional information. HCPs are unable to remove reviews, but they can respond to reviews or report fraudulent reviews to the Healthgrades support desk via email. Other information relating to PRWs, including ownership, content, advantages, and disadvantages, are detailed in Sections 3.3.3, 3.3.4, 3.3.11, and 3.3.12, respectively.

The fusion of PCC and the capability afforded by the internet has enabled the PRW to rebalance the power in the practitioner–patient relationship towards the patient as it provides patients with a means to damage HCP reputation (Lopez et al., 2012; Menon, 2017). This shifting landscape has been especially challenging for HCPs who typically claim health care as complex and difficult to evaluate, and the consumer model as less applicable to health care (McDonald et al., 2007). HCPs are also concerned about unjustified negative reviews (S. Patel et al., 2015, Rothenfluh & Schulz, 2017, Turk et al., 2020), although the concerns may be unfounded as empirical research studies have found online reviews for HCPs, across many disciplines, tend to be positive overall (Bakshy et al., 2012; Gao et al., 2012; Lagu et al., 2010; Lopez et al., 2012; Marrero et al., 2020, Segal et al., 2012; Sobin & Goyal, 2014). Variability in healthcare funding models and differences in patient user adoption, which are discussed in Sections 3.1, 3.3.9, and 3.3.10, has been reported to influence HCP perception of online reviews.

HCPs question patients' capacity to evaluate health care through online reviews due to several assumptions, notably, that patients do not have the technical skills for accurate evaluations of healthcare outcomes (S. Patel et al., 2015). Although patients may not have the clinical skill to evaluate a healthcare service, they can review nonclinical aspects such as the waiting rooms' cleanliness and staff friendliness (Donnally et al., 2020; Khan et al., 2017; Lopez et al., 2012; Obele et al., 2020).

Nonetheless, in the last decade, patients are increasingly consulting PRWs to select their HCPs (Deng et al., 2019; Emmert et al., 2016; Galizzi et al., 2012; Gao et al., 2012; Greaves & Millett, 2012; S. Patel et al., 2015; Wickner et al., 2019). Both clinical and nonclinical (such as wait times) ratings are considered equally when PRW reviews are used to select a primary care physician (Yaraghi et al., 2018). Bidmon et al. (2020) supported the latter research, reporting that when HCPs had a good bedside manner, the willingness to rate their services more favourably increased significantly (b = 1.26). A lack of modern medical equipment and extended wait times have the largest impact on negative evaluations (Bidmon et al., 2020; Doshi et al., 2016). Consequently, HCPs are less likely to engage with online service evaluations than other service providers as the online review emphasis relates to factors other than clinical efficacy (McLennan, Strech, Meyer, and Kahrass, 2017).

Although some HCPs agree that PRWs may be important, with benefits such as real-time feedback (Kilaru et al., 2016), ratings are not a means to an end. Rather, HCPs' priority is delivering the correct treatment, even if it means a poor rating. A mixed-methods study of HCPs and healthcare consumers in Switzerland reported that HCPs did not agree on the measure of patient satisfaction and argued that measurement could not be an end goal. In other words, satisfaction was important but not at the cost of correct treatment (Rothenfluh & Schulz, 2017). The dichotomy inherent in healthcare service provision (i.e., the perceived tension between patient satisfaction and patient health outcomes) is core to the debate on PRWs' relevance and adoption.

Healthcare quality is difficult to evaluate because it is normative. Specifically, the concept of healthcare quality is shaped by a variety of factors, including values and goals in the health system and the larger society in which it is embedded (Berwick & Fox, 2016; Donabedian, 2005). Whether PRWs are a valid measure of quality of care has been examined in the literature. In one study, HCPs and patients concurred that HCP's clinical skills and clinical outcomes could not be accurately evaluated by healthcare consumers (Holliday et al., 2017; Rothenfluh & Schulz, 2017). By contrast, Okike et al. (2016) reported no correlation between surgeon online ratings and risk-adjusted mortality rates. However, a weak but significant association was found between higher online HCP satisfaction ratings of cardiac surgeons and lower patient mortality rates ($r = -.09$, $p < .03$; J. J Liu et al., 2016), and a study by Gao (2015) reported a positive correlation ($r = .466$, $p < 0.00$) between online ratings of HCPs and HCP quality. Emerging from this literature is limited evidence to present a robust case

that PRWs, a proxy for patient satisfaction measures, offer quality of service measures advocated by professional medical institutions (Bidmon et al., 2020; Haskins et al., 2017). These debates are important to understand in terms of HCP motivation to adopt PRWs, as distinct from the characteristics of a PRW such as content and patient variables.

An antecedent to patient satisfaction in medical treatment is trust (Birkhäuer et al., 2017; Krot & Rudawska, 2017). In an evaluation of 250 spine surgeons in the United States, trust was the strongest predictor variable of PRW ratings ($r = .749$, $p < .01$; Kalagara et al., 2019). Holliday et al. (2017) suggested that patients trust commercial rating sites more than institutional health systems' performance rating systems. In the United States, trust in the medical profession's leaders has been declining since the second half of the 20th century from a high of 73% in 1966 to 34% in 2012 (Blendon et al., 2014). Timmermans and Oh (2010) argued that the decline in trust was a result of high-profile medical errors and the medical profession's corporatisation, which has increased public cynicism. In the context of declining trust in the healthcare system, Huang et al. (2018) explained commodification, first, as taking the form of consumerism, whereby the practitioner–patient relationship is based on self-interest and market dynamics and, second, financial conflict of interest, whereby the patient doubts the HCP is acting in their best interests. In a study with 34,968 respondents, comparing 23 countries that had either a commodified (commercialised), a decommodified (public), or medium-commodified healthcare system, results showed respondents in the commodified healthcare system were approximately half as likely to trust physicians compared to those in a medium-commodified healthcare system (Huang et al., 2018). PRWs provide a public platform to both rate and review HCPs, enabling other patients access to independent information about the HCP, thereby increasing information symmetry (Holliday et al., 2017; S Patel et al.,2015; Zaki et al.,2020a). Accordingly, PRWs have the potential to influence patients' healthcare decision-making and behaviour by creating a mechanism to counter potential trust issues.

PRWs are a part of a wider movement towards transparency around the quality of health care and patient satisfaction, and HCPs can potentially use PRWs to improve their practices (Han et al., 2019; Smith & Lipoff, 2016; Webster, 2018). Research supports HCPs' ability to use PRWs to gain insights to facilitate improvements in their encounters with patients (Merrell et al., 2013; Orhurhu et al., 2019; Shah et al., 2021). Of note, Rozenblum and Bates (2013) stated, "Customer ratings have the potential to

become important differentiators among healthcare organisations and providers and may have major future effects on customer behaviour and decisions" (p. 2). While PRWs are primarily of interest to patients, the valuable information posted on such sites should also be of interest to HCPs (Bidmon et al., 2020).

Evaluations made on PRWs are at odds with how HCPs prefer their services to be appraised (Gross et al., 2021; Menon, 2017; S. Patel et al., 2015). The measures inherent in PRWs potentially deter HCPs from embracing PRWs as part of their business model. Arguably, while patients are motivated to use PRWs, HCPs are not motivated to believe they are a valid rating of their service. The current study examined influences and attitudes towards PRWs among HCPs, as well as whether this affected their behavioural intention (BI) to adopt PRWs.

1.2 Healthcare Context

Research on PRWs has centred on patient use and the influence on HCP selection (Burkle & Keegan, 2015; Hanauer et al., 2014; Terlutter et al., 2014). A second stream of research has explored how online patient feedback could improve healthcare service delivery (Emmert et al., 2016; Powell et al., 2015), and recently, a systematic review identified data quality issues associated with PRWs (Mulgund et al., 2020). Importantly, online feedback has been put forward as a means to drive transformative change in a sector where HCP perspectives shape the uptake of innovation (Turk et al., 2020). Understanding how motivation differentially influences the adoption of PRWs may enable healthcare stakeholders to generalise the findings to other healthcare innovations that have the potential to improve efficiencies and quality.

The findings of this research could help explain the reluctance of HCPs to recognise the value of feedback provided by patients through PRWs and therefore help understand the relative disinterest in the medium by health professional bodies. Healthcare professional bodies argue against PRWs, both in England and Germany (Strech, 2011) and recently in Australia. The Australian Medical Association president, Michael Gannon, elected May 2016, vocalised opposition to PRWs by implying HCPs may not treat patients who use PRWs: "Posting the clinical outcomes of treatment online could result in reduced access to care" (as cited in Rollins, 2016, p. 8). Such a statement reflects the strong opinions held by a health professional associations (HPAs). Similarly, articles published in HPA journals report evidence that PRWs may cause burnout and stress (Holliday et al., 2017; Zaki et al., 2020a) or are not a suitable

measure of quality (Bakhsh & Mesfin, 2014; J. Chen et al., 2018; Gao et al., 2015; Haskins et al., 2017). The current research on PRWs is diverse, and there is potential for PRWs to facilitate healthcare service delivery improvement; however, additional insight into HCP's apprehension to adopt PRWs is needed before any benefits can be realised.

1.3 Problem Statement

Business use of consumer rating sites for most industries is increasing, in contrast to the experience in health care. For example, Sensis (2016) surveyed Australian small businesses engaged with people who provided ratings on their businesses and found that 53% of those businesses responded to comments and feedback, up from 44% the year prior. The evidence for HCPs' adoption of online consumer ratings sites indicates low adoption. For instance, research in Germany reported HCPs responded to only 1.58% of all reviews (Emmert et al., 2017), and in the United States, 74% of surgeons who were members of the American Shoulder and Elbow Society indicated that they did not regularly check their online profiles on PRWs (Syed et al., 2019). HCPs provide a consumer service like other businesses; however, the difference in adopting rating sites compared to other businesses warrants empirical investigation.

In healthcare settings, the speed and success of adoption of new technology initiatives are influenced by the attitudes held by HCPs (Greenhalgh et al., 2004). Although PRWs may provide benefits for HCPs, such as improving the quality of care (Emmert et al., 2016) and helping to mitigate the reputational effects of negative reviews, HCPs appear reluctant to adopt PRWs (Emmert et al., 2017; Strech, 2011; Syed et al., 2019). In countries such as the United Kingdom, health policy actively encourages the use of online feedback channels for patients, but there is limited support for HCPs on how to optimise identification and response to such feedback (Atherton et al., 2019). This lack of institutional support may help explain the uncertainty HCPs experience in terms of responding to comments and being fearful that such sites encourage negative reviews (Antheunis et al., 2013; Terlutter et al., 2014). Therefore, research that sheds light on the adoption antecedents of PRWs will allow professionals and other stakeholders to develop and implement strategies that take advantage of and welcome the free feedback for positive good in terms of health service improvement. The move to use and value the feedback provided by patients on PRWs needs individual provider and institutional support; a first step is to explore practitioner attitudes to

PRWs, which is the aim of this thesis. There is limited research on the perspectives of health professionals who are rated (Emmert et al., 2017). Very few studies have examined HCPs' adoption of PRWs and whether PRW system or individual factors are at play (S. Patel et al., 2015; Syed et al., 2019). The potential for PRWs to drive transformative change relies on understanding the attitudes that HCPs hold towards them (Turk et al., 2020). Emmert et al. (2017) specifically called for future research to examine health professionals' motivations to respond to PRWs.

The body of literature on innovation adoption more generally is extensive and, in the main, technology related. However, among these, few interdisciplinary studies have drawn on an integration of the knowledge domains of motivation and the predisposition to adopt new innovations (Greenhalgh et al., 2004) to explain readiness for new technology such as PRWs. Lee and Hwang (2015) were some of the first researchers to relate a specific motivation theory to investigate technology adoption after identifying previous information and communications technology (ICT) studies used performance expectancy as a surrogate form of extrinsic motivation and perceived enjoyment as a surrogate for intrinsic motivation. This deficiency in integrative studies on motivation and innovation adoption, on the whole and specifically in health care and PRWs, makes this investigation into the influences of PRW adoption by HCPs important. The systematic literature review (SLR), discussed in Chapter 4, found only 16 research articles that examined HCPs' adoption of PRWs, and only one of those used a theoretical lens to examine the phenomenon.

1.4 Study Aims and Rationale

The aims of this study were to explore the role of HCPs' motivations that influenced their BI to adopt PRWs and to evaluate whether individual differences in motivations or perceived characteristics of PRWs contributed more to HCP adoption intentions.

PRWs are potentially poised to impact healthcare businesses to the same or even greater extent that rating websites have affected other industries. Research in the United States found that a "half-star" rating increase on a scale of 0 to 5 for a restaurant on Yelp.com led to a 19% increase in the sell-out rate of that restaurant (Rozenblum & Bates, 2013). Wu and Lu (2016) cited numerous studies that showed online reviews affected product and service receivers' selection of suppliers. In a choice-based conjoint experiment, researchers found that the difference in choosing a HCP increased by 1.12

units when comparing HCPs with a two-star rating versus one with a four-star rating (Yaraghi et al., 2018). PRWs were also found to shift the balance of power in the practitioner–patient relationship (Hawn, 2009; S. Patel et al., 2015; Terlutter et al., 2014). Emmert, Sander, and Pisch (2013) warned policymakers and HCPs that they should not underestimate the influence of PRWs as they already play an important role in helping patients choose HCPs. Given the growing importance of PRWs, research into HCPs attitudes and behaviours is timely.

The purposes of this research were as follows:

1. Develop and test a conceptual model that explores the influence of health practitioners' work motivations and their perceptions of the characteristics of a physician-rating website on their behavioural intention to adopt a physician-rating website. The conceptual model is theoretically driven and empirically developed through exploration of the literature to hypothesise adoption intentions.

2. Compare the relative contributions of motivation and system-related factors to elicit predictors of behavioural intention to adopt a physician-rating website. A quantitative study tests the hypothesis formulated from the literature review.

The key research question developed from the literature and discussed in subsequent sections of this thesis concerns the relationship between the type of motivation, the perceived characteristics of the PRW innovation, and the subsequent adoption decision was as follows:

1. What influences health practitioners' intention to adopt a physician-rating website?

    a. What is the effect of different motivation types (intrinsic or extrinsic) on adopting physician-rating websites?

    b. How do the system characteristics influence the intention to adopt physician-rating websites?

    c. How does motivation type influence system characteristics individually and in combination affect the intention to adopt a physician-rating website?

1.5 Study Details

This research adopted a positivist approach, positing that observation and reason are the best means for understanding human behaviour (Antwi & Hamza, 2015). In doing so, this research surveyed 249 HCPs from psychology, speech pathology, occupational therapy, and physiotherapy to understand their motivation and system perceptions and how these antecedents influenced their BI to adopt a PRW. The study used self-determination theory (SDT) to conceptualise motivation and diffusion of innovation (DOI) to understand innovation processes, from which conceptual model and study hypotheses were developed. The methods and measures aligned with positivism and the integrated theoretical framework. Data were analysed using structural equation modelling (SEM) and results reported as support, or not, for the proposed hypotheses. The research examined allied health professionals' adoption of PRWs in Australia, which paves the way for future research on both the use of public feedback and HCPs' technology adoption in pursuit of service improvement.

1.6 Contribution to Knowledge

The research drew together the theories of SDT and DOI to address an identified gap in the research by examining the influence of individual adopter characteristics on technology adoption in a healthcare setting. DOI studies have largely been applied in information systems and behavioural research and have rarely used a multidisciplinary focus (Greenhalgh et al., 2004; S. Patel et al., 2015). Adopter characteristics have been studied mainly in the field of psychology, where findings suggest individual attributes, such as motivation, influence technology acceptance (K. Y. Lee & Yang, 2015; Wang, 2014). The combination of these two theories creates an enriched model of technology innovation with the addition of individual motivation type.

The study makes a significant contribution by unpacking the direct effect of motivation types and the direct and mediating role of system characteristics in the BI to adopt PRWs. By unravelling the complex linkages between antecedents to technology adoption, the research examined the influence of behavioural aspects in addition to system characteristics. Ferraro et al.'s (2020) study on work motivation burnout in physicians recommended more research into HCPs' intrinsic motivation using SDT, identifying most literature focuses on extrinsic motivation. SDT's and DOI's perceived characteristics of innovation (PCIs) are well suited to uncovering the differential effects as both contain validated measurement scales.

The research seeks to further develop and validate important measures relating to technology adoption (PCIs) and motivation (SDT). Theory and measures are interlinked, and testing of measurement scales aids in the further development of theory (Bagozzi, 1984). While both these instruments have been extensively validated (Gagné et al., 2015; G. C. Moore & Benbasat, 1991), such an application of the instrument has yet to occur extensively in a healthcare environment. In a study of the motivation of primary care physicians in the Netherlands using the Multidimensional Work Motivation Scale (MWMS), van der Burgt et al. (2018) identified that prior to their study, the MWMS had not been used for HCPs, and HCPs would benefit from this additional application.

Testing of the MWMS builds empirical evidence for the SDT proposition that different forms of motivation have differential effects on a range of outcomes (Gagné et al., 2015). Such evidence is important to support the theoretical claims. Van den Broeck et al.'s (2021) meta-analysis of SDT work motivation scales deemed the evidence scattered and relatively scarce. The outcomes of this research not only determine which types of motivations influence BI to adopt a PRW but also how motivation type influences such intention.

1.7 Statement of Significance

The significance of this research is that, first, it addresses the dearth of evidence about HCPs' attitudes to and adoption of PRWs (S. Patel et al., 2015). Second, the study reveals how such feedback can be used to improve patient satisfaction (Velasco et al., 2019). The earliest known research reporting HCP attitudes to PRWs is by S. Patel et al. (2015). The literature review found only 16 studies on HCPs' intentions to adopt PRWs. This research makes a practical contribution to the field of health care in a number of ways. First, understanding the continuum of motivation type of HCPs has implications for innovation adoption involving HCPs. Second, the research informs HCPs and regulators of the consequences of the growing PRW movement, locally and internationally. Third, the negative influence of patient ratings on HCPs (Holliday et al., 2017) requires HPAs to assist their members to become aware of the relevance of online feedback platforms and to develop HCPs' competencies in managing such feedback effectively.

The research benefits educators of HCPs by providing evidence of the possible use of PRWs in terms of their perceived value of feedback to the HCP, professionally

and for business development. It has been noted that medical training seldomly provides the opportunity to hear the voice of the patient and understand their views on what is essential for high-quality care (Jain 2010). Elevating the profile of patient satisfaction measures facilitates a better understanding of the current PCC movement transitioning from traditional medical paternalism (S. A. Adams, 2011; Baron-Epel et al., 2001; Kitson et al., 2013).

Innovation adoption is notoriously slow in health care and especially with certain technologies (Cresswell & Sheikh, 2013). This study casts light on contemporary reasons for such slow adoptions in terms of public online rating scales and reviews for patients. As with other nations, healthcare institutions are increasingly using patient experiences to contribute to their evaluation and reimbursement models (Belasen & Belasen, 2018; Chakraborty & Church, 2020). Australian healthcare institutions could conceivably adopt such sites to address the gaps in patient-experience data to reduce information asymmetry and improve healthcare efficiency (Dixit & Sambasivan, 2018; Barile et al., 2014).

Finally, there are potential and practical implications for patient safety given that Lantzy and Anderson's (2020) study linked poor reviews on PRWs to HCPs' likelihood of being sanctioned by the medical board. Analysing such trends in patient-supplied feedback may help health regulators identify specific risks to the safety and wellbeing of patients. For example, PRWs could highlight poor-quality practitioner–patient therapeutic relationships, malpractice, or errors and mistakes that signal problems with medical system processes and procedures. As recently noted in the media, an Australian cosmetic surgeon is under investigation after he paid a patient to change a one-star review to a five-star review (Ferguson & Day, 2021). There are other examples of PRW utility for patient safety; for example, negative reviews have been used to identify at-risk healthcare centres (Kleefstra et al., 2016), and ratings have been found to be lower for doctors on probation (Murphy et al., 2017). Arguably, PRWs may not conclusively be a measure of quality of care, but they do contain signals of low-performing HCPs.

1.8 Thesis Structure

This thesis is divided into nine chapters, and an overview is presented in Table 1.1.

Table 1.1

Overview of Chapters

Chapter	Description
Chapter 1	Introduces the healthcare context, study aims, and contribution to knowledge, and provides the thesis structure
Chapter 2	Discusses the theoretical frameworks of technology adoption and motivation
Chapter 3	A narrative literature review that contextualises health care and the evolution of PRWs with a focus on their characteristics
Chapter 4	A systematic literature review of PRW adoption by HCP
Chapter 5	Discusses and integrates theory, system, and adopter characteristics into a conceptual model
Chapter 6	Explains the research methodology
Chapter 7	Presents the results, including SEM processes
Chapter 8	Discusses the results in the context of the extant literature
Chapter 9	Concludes, including academic and practical contributions, strengths and limitations, and recommendations for future studies

Chapter 2 examines the underlying theory in which this research is grounded and builds the foundation of the conceptual model to answer the research questions. It reviews theories in the domain of motivation and innovation adoption and develops the theoretical foundation for the conceptual model to integrate both a motivation and innovation adoption theory. The underlying theory has two characteristics that this study investigates: the characteristics of the adopting unit (HCPs) and the perceived characteristics of the innovation (PRW).

Chapter 3 investigates the characteristics of the innovation (PRW) to inform the conceptual model. The need for change in healthcare due to inefficiencies is highlighted, and the influence of the PCC movement and literature is reviewed to establish the state of knowledge about PRWs, focusing on PRW characteristics.

Chapter 4 examines the current research of HCP characteristics as it relates to the adoption of PRWs, by systematically reviewing the literature.

Chapter 5 combines the theories of SDT and DOI discussed in Chapter 2, PRW characteristics identified in Chapter 3, and HCP characteristics in Chapter 4, and illustrates, together with the knowledge gap, the conceptual model. The conceptual model provides the foundation on which to test the developed hypotheses using quantitative analysis.

Chapter 6 describes the methodology and methods employed to understand the body of knowledge and how the framework relates to current research standards. It starts with a description of the research paradigm, defines the purpose of the chosen research method, and describes the rationale and process for participant selection. The methodology sets the scene for the choice and description of the methods and measures. Participants' descriptive statistics are presented and compared to the general population of health professionals. Statistical validation of the scales follows, including comparison with results of prior studies that have used the same scales. Finally, the statistical methods for analysis and testing of the conceptual model and its hypotheses are presented.

Chapter 7 presents the results and explains the process required to ensure SEM parameters have been met. It commences with an explanation of the data screening process. Next, the measurement model is specified and described. The measurement model is then tested for validity through a specific SEM process of evaluation. Finally, the results are presented for each hypothesis.

Chapter 8 commences with a discussion of the principal findings in relation to the research questions and developed hypothesis. The results are also explained in the context of the two theories. Chapter 9 presents the conclusion and defines the academic and practical contributions of the research, discusses the strengths and limitations of the study, and provides recommendations for further research.

1.9 Conclusion

Innovation adoption in health care is significant to all stakeholders because of the benefits that flow to the community in the form of addressing PCC, patient safety, and healthcare efficiencies. However, attending to service user public ratings in the form of PRW adoption by HCPs is slower than in other industries. The purpose of this study was to explore the adoption relating to PRWs, where the consumers of healthcare services are adopting PRWs at a faster rate than HCPs. In an applied context of allied health professionals, this research sought to discover whether the motivation of a HCP or the characteristics of a PRW provided insights into their adoption rate. In the following chapter, the theoretical foundations of SDT and DOI as applied to this research problem are described and integrated to explain such adoption.

Chapter 2. Theoretical Context

To understand the link between motivation and the BI to adopt a PRW, two theoretical models are integrated and discussed in this chapter: E. M. Rogers' (2003) DOI theory and Deci and Ryan's (1985) SDT (see also Ryan & Deci, 2017). Together, these theories inform the conceptual framework for the research. Theoretically, this study is based on the premise that the adoption of a PRW is constructed through individual intrinsic or extrinsic motivation, which is mediated by perceptions of the characteristics of a PRW. This chapter first provides an understanding of technology adoption and motivation theories. Next, each theory is compared with other theories that could or have been used in similar applied contexts. Finally, DOI and SDT are explained in detail their selection and integration discussed.

2.1 Technology Adoption

Technology adoption theories are relatively abundant such that Wisdom et al. (2014) identified 20 theoretical frameworks linking constructs and their relationships with innovation adoption. Further, Sharma and Mishra (2014) reviewed the evolution of theories and models of technology adoption and found 10 theoretical frameworks. A review conducted by Rad et al. (2018) of literature published between 2006 and 2015 ranked technology adoption theories based on the number of times they were used in information technology adoption studies. They found 21 in total, and the top five, in order of most used, included the technology acceptance model (TAM; Davis, 1989), the DOI theory (E. M. Rogers, 2003), the unified theory of acceptance and use of technology (UTAUT; Venkatesh et al., 2003), the theory of planned behaviour (TPB; Ajzen, 1991), and the technology–organisation–environment framework (TOE; Tornatzky et al., 1990), although there are many other technology adoption theories. This research, given its scope, restricts the discussion to the five most frequently applied, detailed next.

Davis (1989) developed TAM, and it has been in common use since then. TAM has been used to predict the extent of new technology adoption at an individual level and consists of two constructs: perceived usefulness and perceived ease of use (Sharma & Mishra, 2014). The two constructs in TAM are theoretically grounded in Bandura et al.'s (1999) self-efficacy theory, whereby perceived usefulness occurs when an individual believes that the innovation will enhance their job performance. E. M. Rogers

and Shoemaker (1971) defined perceived ease of use as the degree to which a person believes using the innovation will be free of effort (Davis, 1989; Sharma & Mishra, 2014). TAM has been widely applied because of its simplicity; however, there is limited evidence of HCPs using TAM to adopt information systems (Baskerville et al., 2014). TAM was unsuitable for this study as one of the aims of this research was to investigate adopter and system characteristics. The DOI theory, discussed next, provided a theoretical framework for the integration of adopter and system characteristics, which is not possible using TAM alone.

E. M. Rogers' (2003) DOI theory is defined as the process by which an innovation is communicated through certain channels over time among the members of a social system. Central to the theory are PCIs, which are key influencers in the adoption decision (Rogers, 2003). DOI is a theory of how, why, and at what rate new ideas and technology spread through cultures, operating at both the individual and organisational level (Oliveira & Martins, 2010). There are four main elements to DOI: the innovation itself, communication channels, time, and the social system (Rogers, 2003). These four elements are connected through a model of five stages that comprise the innovation decision process. One of the advantages of the DOI model, unlike TAM, is its use to investigate adoption at the individual and organisational level. An individual-level focus was appropriate for the present study because participants were individual HCPs.

UTAUT was formulated by Venkatesh et al. (2003) after empirically testing eight user acceptance models in four settings: banking, public administration, entertainment, and telecom services. Analysing the results of prior studies, they combined the pertinent elements and devised UTAUT with key independent variables influencing adoption, including performance expectancy, effort expectancy, social influence, and facilitating conditions. In comparison to their previous empirical testing, the new model outperformed the other eight by at least 17%. The theory was extended in 2012 to incorporate the rise of consumer technologies, and it now includes hedonic motivation, price value, and habit as independent variables (Tamilmani et al., 2021). In a systematic literature review, Tamilmani et al. (2021) found that UTAUT was predominantly formulated as "a micro level theory with consumers as a focal phenomenon" (p. 8). UTAUT was not an ideal fit for this research as the subjects were individuals who used the technology in a discretionary way within their professional

roles rather than consumers or health providers who were required to use the technology.

Ajzen (1991) founded TPB on the notion that three considerations guide human behaviour: an individual's attitude towards the behaviour, subjective norms (the influence of people in their social environment), and perceived behavioural control (the individual's perception of how difficult it is to perform a particular behaviour) (Sharma & Mishra, 2014). Perceived behavioural control was added to Fishbein and Ajzen's (1975) theory of reasoned action (TRA). TPB has been widely used to explain and predict behaviour in such domains as physical activity and consumer behaviour (Ajzen, 2020). The theory considers attitudes, subjective norms, and perceived controls as predictors of intention to act and actual behaviour (Ajzen, 2020). TPB has been criticised for the construct of attitude being relatively static and not useful in predicting behavioural outcomes (Sharma & Mishra, 2014). DOI was more suited to this study as the PCIs represented an opportunity to examine system characteristics.

Tornatzky et al.'s (1990) TOE framework is an organisational-level theory, consisting of three constructs (technology, organisation and environment) that influence an organisation's adoption process of technological innovation (Oliveira & Fraga, 2011). These constructs include the technological context, both internal and external to the firm, the organisational context, such as size scope and management structure, and the environmental context, including competitors, industry, and government. While TOE is useful for a range of innovations and contexts, it is considered insufficiently distinct from other like theories, such as DOI, rather than developed further (Baker, 2012). TOE has similarities to DOI; however, it does not easily account for technology innovation at the individual level as was required for this research.

The process of technology adoption is complex and multifaceted, requiring investigation into the technology-related aspects as well as dimensions of user personality and attitudes, to name a few (Greenhalgh et al., 2004; Venkatesh et al., 2012; Wisdom et al., 2014). DOI was chosen over the other theories for the following reasons. First, TAM and UTAUT assume the technology in question is used for productivity gains (Rosen & Kluemper, 2008). As such, using the traditional measure of perceived usefulness of a system applied to websites like PRWs could potentially yield confounding results. Second, the UTAUT model has insufficient focus on individual variables (Van Raaij & Schepers, 2008). Third, TOE is an organisation-level theory, and this research required both individual and organisational level. Fourth, TPB

assumes that individual-level factors are mediated through the components of TPB, which would confound results from the application of the motivation-specific theory employed. DOI was well suited to this research because of its diverse applications in health care at the individual and organisational level, and a detailed overview follows.

2.2 Diffusion of Innovation

DOI is considered the most influential theory in the field of knowledge utilisation (Nilsen, 2015). It is used to predict diffusion paths for innovations before there is a significant amount of data available (Peres et al., 2010). MacVaugh and Schiavone (2010) stated, "The theory of adoption and diffusion of innovations . . . is a useful systemic framework to describe either adoption or non-adoption of new technology" (p. 198). For the purposes of this research, an innovation is defined as "an idea, practice, or object perceived as new by an individual or adoption unit" (E. M. Rogers, 2003, p. 12). Adoption is defined as a decision to make complete use of an innovation, all options considered (E. M. Rogers, 2003).

There are five stages in the innovation decision process, describing a series of choices and actions through time (E. M. Rogers, 2003). In the context of this study, the units of study were individual HCPs who could adopt PRWs. Individual HCPs rather than organisations are predominantly rated on PRWs. For example, a study in Canada examining the scope and breadth of PRW ratings reported that 57,412 unique HCPs had 640,604 individual ratings (J. J. Liu et al., 2018). The adoption process describes how an individual evaluates an innovation and decides whether to adopt it into existing practice. The five stages are illustrated in Figure 2.1. E. M. Rogers' (2003) five stages are as follows:

1. Knowledge, which occurs when an individual is exposed to an innovation's existence and gains an understanding of how it functions—for example, a HCP who has knowledge about a PRW but has never checked their own profile,

2. Persuasion, which occurs when an individual forms a favourable or unfavourable opinion—for example, when a HCP visits a PRW and, as a minimum, reads what has been said about them,

3. Decision, which takes place when an individual engages in activities that lead to a choice to adopt or reject an innovation—for example, the HCP checks their

profile as discussed in the persuasion stage and they decide to adopt the innovation, or not, premised on the opinion they formed in the previous stage,

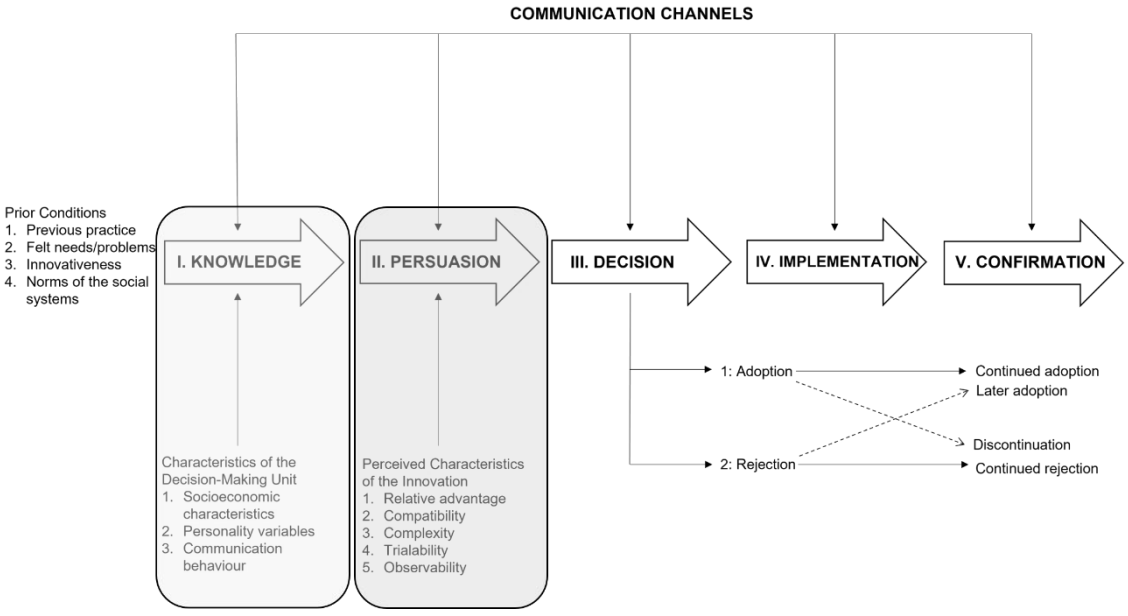
4. Implementation, which occurs when an individual puts a new idea into use—for example, going back to a PRW to continue to see the feedback given or developing a strategy to use the feedback derived from PRWs consistently,

5. Confirmation, which is when an individual seeks reinforcement of the innovation decision, and if they are not satisfied with the innovation, they will reverse the decision.

The first two stages, knowledge and persuasion, are discussed in further detail in the next section as they contain the two salient variables under investigation—that is, adopter characteristics and PCIs, respectively.

Figure 2.1

Model of Five Stages in the Innovation Decision Process



From *Diffusion of Innovations—5th ed* (p.170) by E. M. Rogers, 2003, New York: Simon and Schuster. Copyright 2003 by The Free Press. Reprinted with permission (see Appendix A).

2.2.1 Diffusion of Innovation Stage: Knowledge

The knowledge stage commences when an individual becomes aware of an innovation and how it functions (E. M. Rogers, 2003). Awareness of an innovation is

further described by Rogers (2003) as requiring motivation by the individual in the form of an interest, a need, and an existing positive attitude towards the innovation. Individuals tend to expose themselves to ideas that are in accordance with their attitudes and beliefs and avoid messages that conflict with existing attitudes, referred to as selective exposure (Rogers, 2003). Even though the individual is exposed to the innovation, there may be little effect if it is not relevant to their needs. In addition to awareness, during the knowledge stage, there are two other antecedents to moving through the innovation decision process. These are *how-to knowledge* and *principles knowledge* and are discussed next.

How-to knowledge requires that the individual understands how to use the innovation correctly, and principles knowledge is acquired when the individual understands the underlying principles of how an innovation works. For example, a pen would not be an innovation for a person who is illiterate. Principles knowledge is not required for adoption of an innovation, but there is a risk that the new innovation will be misused and possibly discontinued in its use (Rogers, 2003); for example, a person who is illiterate would not continue to use a pen if they were not enrolled in a literacy class to use the pen.

The knowledge stage requires more than just superficial awareness as during this stage, adopter characteristics, such as an individual's needs, motivation, and values, influence both the process of information intake and the process of decision-making (Greenhalgh et al., 2008; Greenhalgh et al., 2004; Wejnert, 2002). To move to the persuasion stage, the individual needs to perceive the innovation as relevant and acquire sufficient and appropriate knowledge to consider it.

2.2.2 Diffusion of Innovation Stage: Persuasion

The persuasion stage describes a process whereby the individual forms a favourable or unfavourable attitude towards the innovation (E. M. Rogers, 2003). Rogers (2003) distinguished between the knowledge stage and persuasion stage through an individual mental activity: "knowing" for the knowledge stage and "feeling" for the persuasion stage. In this stage, the PCIs (described in the next paragraph) represent a rich set of influences shown to affect adoption in various settings and have a significant impact on the final adoption decision (Agarwal & Prasad, 1997; Higgins et al., 2007; Jackson et al., 2013).

The five PCIs are relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003) and are described as follows:

- Relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes.
- Compatibility is the degree to which the innovation is perceived to be consistent with individuals' existing values, past experiences, and needs.
- Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. At the time of defining complexity Rogers (2003) noted that research evidence for complexity was not conclusive. In a review of the validated scales of PCIs developed by G.C. Moore and Benbasat (1991), complexity was renamed by Higgins et al. (2007) to ease of use and was defined as the degree to which an innovation is perceived as easy to use, the opposite of complexity. Complexity is retained when referring to original studies that used the term, otherwise complexity will be referred to as ease of use from this point forward.
- Trialability is the degree to which an innovation may be experimented with on a trial basis.
- Observability is the degree to which results of an innovation are visible to others.

In early sociological studies, PCIs accounted for 49% to 87% of the variance in the rate of adoption (E. M. Rogers, 1995). PCIs represent an important set of characteristics in any innovation diffusion process.

PCIs are a recurring theme in the innovation diffusion literature (Agarwal & Prasad, 1997). Relative advantage has been consistently found to be a dominant innovation characteristic positively related to adoption (Dearing et al., 1994; Gagnon et al., 2012; Greenhalgh et al., 2004; Higgins et al., 2007; G. C. Moore & Benbasat, 1991; Tornatzky & Klein, 1982). In health care, relative advantage is the most significant and consistent attribute determining adoption (Greenhalgh et al., 2004). Other PCIs universally held to positively influence adoption are compatibility and complexity, while others have been found to be context sensitive (Higgins et al., 2007; Tornatzky & Klein, 1982). The three PCIs of relative advantage, complexity, and compatibility have been identified as providing the most consistent significant associations with innovation

adoption in an organisational setting (Jeyaraj et al., 2006). In contrast, a meta-analysis that sought to validate the underlying constructs of DOI theory and TPB in information systems research, Weigel et al. (2014) found that relative advantage, compatibility, and observability ranked as the top three PCIs to affect innovation adoption. Of note, only one study included in the analysis related to a telemedicine healthcare setting. This finding contrasts with the original meta-analysis study by Tornatzky and Klein (1982), who examined innovation characteristics and their influence on innovation adoption and implementation. They reported that complexity, relative advantage, and compatibility were in the top three influencers of PCIs.

PCIs are not a complete explanation of innovation adoption. The broad definition of relative advantage has been criticised for not being a factor in its own right; rather, it is "a garbage can into which a variety of advantages can be tossed" (G. C. Moore & Benbasat, 1991, p. 197). PCIs have been evaluated in reference to some internalised systems of values or cognitive frameworks, and hence, Downs and Mohr (1976) described PCIs as secondary attributes, not primary. Downs and Mohr (1976) conceptualised primary attributes as inherent in the technology and without variant across settings; for example, the cost of the innovation would be a primary attribute. Tornatzky and Klein (1982) argued that even cost was subject to influence in that different adopters would have different primary characteristics and hence react in different ways; for example, cost would be evaluated relative to the adopter's finances. This highlights the importance of the characteristics of the decision-making unit (Tornatzky & Klein, 1982). In the next section, motivation is discussed as one of the characteristics of the HCP decision-maker.

2.3 Motivation Theories

Workplace motivation has been defined as a drive to complete some action, which relies on an energy that gives direction in performing work tasks (Ryan & Deci, 2017). Other authors suggest that motivation is a natural occurring unobservable force, controlling, stimulating, and maintaining behaviour over time and changing settings (Diefendorff & Chandler, 2011). The central theme is the force of energy that drives behaviour, and in pursuit of explaining the energy, several theories have evolved. In a review of work-based motivation theories, Kanfer et al. (2017) proposed a three-cluster meta-framework for understanding the different approaches of work motivation theories, findings, and advances. The meta-framework highlights the theories currently

considered relevant. In the section that follows, SDT is contrasted to other motivation theories using the meta-framework and discussed as the most appropriate motivation theory to address the research questions and aims of this study.

SDT is a needs-based macro theory of human motivation (Deci & Ryan, 1985) that is being increasingly used in the field of employment (Cesário et al., 2017). In a motivation context, it describes humans as being proactive and engaged or passive and alienated, depending on the social conditions in which they develop and function (Ryan & Deci, 2000b). SDT's underlying assumption is that people are curious, exploring, adventurous, and self-motivating by nature, and that success in and of itself is the greatest reward, not necessarily what comes as a result externally (Ryan & Deci, 2017). SDT proposes that people are wilfully committed to and engage in tedious tasks when the meaning and value of tasks are understood (D. N. Stone et al., 2009). SDT can be explained through higher order motivation concepts that are subsequently distinguished into a discrete continuum of motivation categories.

2.3.1 Content-Based Approaches

Content-based approaches construct motivation through individual choices, either hardwired or learned, and specify the psychological traits, motives, and orientations that create motivation or free-will processes (Kanfer et al., 2017). Content-based approaches are distinguished as either a need or an achievement fulfilment. Need fulfillment is a state of internal tension due to an unmet need, and to release the tension, the exertion of effort is required (Ramlall, 2004). Some examples of theories under need fulfillment include equity theory (J. S. Adams, 1963), Maslow's (1943) needs hierarchy, protection motivation theory (PMT; R. W. Rogers, 1975), and SDT (Deci & Ryan, 1985). Achievement fulfillment is the desire to complete a difficult task by reaching higher standards of excellence (J. M. Phillips & Gully, 1997).

Equity theory recognises that motivation is not just a function of individual rewards but is rather how a person's ratio of efforts to the outcome are perceived relative to their peers' ratios (Kanfer et al., 2017). The theory posits that an individual will feel inequitably treated if they perceive that co-workers who put in an equivalent amount of effort into their work earn more (Inegbedion et al., 2020). This equity assessment is premised in comparison with other individuals either within the same organisation or outside their organisation (Ritz et al., 2016). This imbalance creates a psychological tension that the individual is motivated to reduce (Kanfer et al., 2017;

Ramlall, 2004). The need for fairness is the energising force that becomes the basis for motivation. This research does not compare fairness and justice with respect to the allocation and use of resources in an organisational setting; rather, the interest relates to the motivation of HCPs working in their chosen profession, and consequently, equity theory was not suitable for this study.

Maslow's (1943) needs hierarchy posits that needs satisfaction is hierarchal and requires the satisfaction of lower order needs to progress to higher order needs. Needs are represented in a pyramid with higher order needs at the top (Gagné & Deci, 2005). The higher order represents a level of complexity of needs rather than a greater quantity of needs. The needs can be explained in a work context as follows (Abulof, 2017):

- Physiological needs are at the base of the pyramid and represent basic needs such as food, air, and water and in a work context would be the minimum salary to cover basic living expenses.
- Safety needs are further up the pyramid and activate after the physiological needs are met and relate to feeling secure in a work environment and free from threats.
- Social needs follow and require the individual to feel affiliated with an organisation in some way.
- Esteem needs require the need for approval and self-respect.
- Self-actualisation is where all the other needs are meet and the individual can achieve their full potential.

In an SLR that investigated the motivation of students to choose medical degrees, Maslow's (1943) needs hierarchy was reported as the most frequently used theory (Goel et al., 2018). In contrast, an SLR that also investigated motivation in medical education reported many such studies are based on SDT (Brissette & Howes, 2010). Maslow's theory has been criticised for lacking sufficient empirical grounding for the proposition of self-actualisation, and that the needs hierarchy reflects Western cultural values (Fallatah & Syed, 2018). SDT was selected as the preferred motivation theory for this study for the following reasons. First, while Maslow's needs-based theory describes what drives a person into action, similar to SDT, it does not account for how the actions are directed, unlike SDT (Gagné and Deci, 2005). Second, unlike Maslow's theory, the SDT questionnaire for assessing motivation type has greater

international coverage, having been validated in seven countries (Gagné et al., 2015), and continues to gain empirical support in non-Western cultures (Alqarni & Khan, 2020; Smokrović et al., 2018).

PMT explains how protective behaviours are initiated or maintained (R. W. Rogers, 1975, 1983; R. W. Rogers & Prentice-Dunn, 1997). PMT posits that when individuals are confronted with a threat, they cognitively assess the threat and possible remedy by conducting a threat or coping appraisal. In assessing the threat, factors such as response efficacy, self-efficacy, and intrinsic and extrinsic rewards are considered. The resulting response will either be adaptive or maladaptive behaviour (Menard et al., 2017). Maladaptive behaviour avoids a response to the threat, and adaptive behaviour protects the individual against the threat (Kemp et al., 2020). PMT has been used to explain the way fear-arousing communication influences health attitudes and behaviour. An example of a fear-arousing communication is the HIV/AIDS prevention campaign in Australia called The Grim Reaper that depicted the severity of the HIV/AIDS virus. The advertising campaign only lasted 3 weeks but is the most remembered HIV/AIDS media campaign in Australia (Slavin et al., 2007). While PMT has been applied to many domains, it is predominantly applicable when there is a threat for which there is an effective recommended response (Floyd et al., 2000). PMT was used in a study examining HCPs' attitudes and concerns towards online feedback and reported HCPs expressed risk perceptions relating to PRWs (Kemp et al., 2020). Kemp et al.'s (2020) research provides a valuable insight into HCPs' attitudes towards PRWs; however, one of the study's limitations was that it did not account for possible intrinsic motivation influences or recognise the positive attributes of a PRW that benefited HCPs (identified in Chapters 3 and 4). This research complements the previous work of PMT in relation to PRWs by investigating both intrinsic and extrinsic motivations in an innovation adoption framework and takes into account the advantages afforded by PRWs, detailed in Section 3.3.12.

2.3.2 Context-Based Approaches

Context-based motivation theories focus on the features of the work environment that affect motivation and performance, such as supervisor support (Kanfer et al., 2017). They are different to needs-based approaches in that they focus on the environment that affects motivation. One of the prominent theories in this area is job characteristics theory (Hackman et al., 2005). The theory posits that organisations can

best motivate individuals through optimal job design, consisting of five key job features and specifying the psychological pathways by which these job features are achieved (Gagné & Deci, 2005). The five key job features include skill variety, task identity, task significance, autonomy, and feedback (Oerlemans & Bakker, 2018), and the psychological pathways include meaningfulness of work, experienced responsibility, and knowledge of the results (Kanfer et al., 2017). Simply stated, if a job is designed to illicit the antecedent psychological states, then the job itself becomes its own reward. The job characteristics model is extensively used and influential in understanding how job design can motivate employees (Parker et al., 2017). Y. Liu et al. (2021) recently used the model to integrate job characteristics into a conceptual model with SDT, reporting that job characteristics had a positive effect on basic needs satisfaction, which in turn positively affected intrinsic forms of motivation and negatively influenced extrinsic motivation. While job design is important for motivating employees, it was not suitable for use in this study where the objective was to understand the motivation type of a HCP in their adoption of a PRW.

2.3.3 Process-Based Approaches

Process-based approaches perceive motivation as comprising a system governing goal selection and one regulating goal enactment (Kanfer et al., 2017). Such approaches identify work motivation as a resource allocation, goal-directed process that changes over time, and simple manipulations can change how employees view goals with beneficial effects on work outcomes (Kanfer, 2012; Kanfer et al., 2017). Examples of such theories include action regulation theory (Hacker, 2003) and goal-setting theory (Locke & Latham, 1990) and are discussed next.

Action regulation theory posits that actions are goal oriented and need to be regulated (Hacker, 2003). The theory focuses on an individual's goals and the mechanisms required to keep individuals focused on those goals (Zacher & Frese, 2018). It provides a framework for integrating goal choice and goal striving and details how an employee deals with tasks and objects and the environment related to those tasks (Kanfer et al., 2017). Optimal performance and wellbeing can be achieved by allowing the individual flexibility to make the decisions related to the task that are not overly complex (Gagné, 2005; Windlinger, 2021). The theory has been applied in various fields; however, its limitation relates to not adequately accounting for

individual preferences and social influences that are implicated in technology adoption (Windlinger, 2021). Thus, it was not used in this study.

Goal-setting theory posits that conscious goals regulate an individual's task performance, and in the absence of goals, the individual will not achieve performance excellence (Locke & Latham, 1990). Goal-setting theory is based on achievement motivation and is distinct from theories relating to intrinsic motivation. It has a specific purpose of driving the goal of excellence in organisations, as well as personal change (Locke & Latham, 2019). Research is generally supportive of the tenets of goal-setting theory in that performance is highest when goals are specific, are used to evaluate performance, and are integrated into feedback and then internalised by the employee (Locke & Latham, 2019; Lunenburg, 2011).

Goal-setting theory is considered by authors in the motivation domain as a dominant theory that is both empirically supported and useful (Fried & Slowik, 2004; Miner, 1984; Pinder, 1984). However, it is arguable whether goal-setting theory addresses why an individual would choose one goal instead of another (Y. Hwang et al., 2016). In addition, HCPs potentially hold a value towards altruism, which may be a driver for their choice of work. Such intrinsic motivations are not addressed in goal-setting theory, and consequently, the theory was not considered suitable for this study.

2.3.4 Comparison of SDT to Other Motivation Theories

SDT has substantial empirical support (Gagné & Deci, 2005) and is appropriate for studying HCPs' adoption of a new technology. SDT is both a drive- and needs-based theory in that an individual's behaviour to achieve a goal (their drive) is regulated by innate psychological needs of autonomy, competence, and relatedness (Ryan & Deci, 2000b). SDT is differentiated from other needs-based theories as it elaborates beyond the individual's needs to explain motivation in the form of regulatory processes that underly the behaviour to take action (Gagné & Deci, 2005). SDT is differentiated from context- and process-based motivation theories in two key ways: First, motivation is represented as a continuum rather than a unitary concept, and second, SDT is able to make a differentiated prediction about performance based on the continuum of motivation types (Gagné & Deci, 2005). SDT is discussed in further detail in the next section.

2.4 Self-Determination Theory

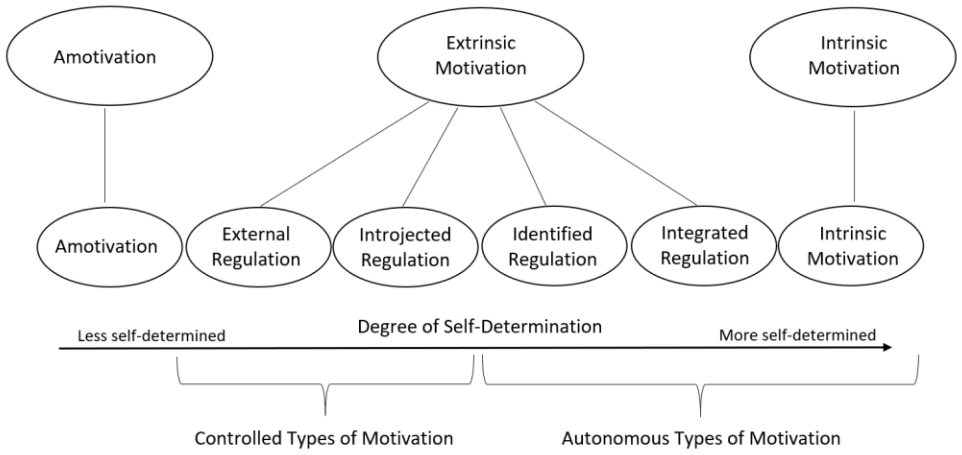
SDT's main tenet is that it explains motivation to complete a task either as intrinsic or conceptualises extrinsic motivation as a continuum, varying by the degree of individual autonomy, competency, and relatedness. The degree to which these basic human needs are supported or thwarted affect both the type and strength of motivation (Deci & Ryan, 2008). These innate human needs are described next.

2.4.1 Needs-Based Approach

According to SDT, humans have three core psychological needs of autonomy, competence, and relatedness that are universal and transcend culture and context (Gagné & Deci, 2005; D. N. Stone et al., 2009). Competence is an inherent need to improve oneself by gaining skill through experience, autonomy is an environment rich in encouragement and empowerment, and relatedness requires a sense of belonging to a particular group, an ethical set of social and cultural norms. The more the innate needs are met, the greater the sustainability of the motivation, often referred to as autonomous motivation. The reverse is also the case such that, when needs are thwarted, motivation must be sustained with contingencies other than free will, which is called controlled motivation. These needs are included in motivation categories that follow higher order motivation. Figure 2.2 provides a diagrammatic representation of the theory, which is described next.

Figure 2.2

Representation of Motivation in Self-Determination Theory



From "Self-Determination Theory and Work Motivation", by M. Gagné and E. L. Deci, 2005, *Journal of Organizational Behavior, 26*(4), 336 Copyright 2005 by John Wiley & Sons. Reprinted with permission (see Appendix A).

2.4.2 High-Order Motivation

SDT proposes three high-order motivation types: amotivation, extrinsic motivation, and intrinsic motivation. Amotivation is described as a state in which a person lacks intention to carry out an action (Deci & Ryan, 2000; Gagné & Deci, 2005)—for example, "I am a qualified speech pathologist but I'm not going to work as one as I don't have to, and I don't like it". Intrinsic motivation is a state of motivation when the BI to act is based on that person's interest in the activity in itself; they find it interesting and pleasurable—for example, "I work as a speech pathologist because I love the work I do, and I could do it every day without getting bored". Intrinsic motivation is referred to as a form of autonomous motivation in the SDT literature (Gagné & Deci, 2005). Extrinsic motivation describes taking an action or behaviour as it is perceived to be contingent on some form of desired consequence—for example, "I work as a speech pathologist because of the money, or my parents wanted me to do it"; they are not working as a speech pathologist because they are inherently interested in what the profession does. Extrinsic motivation is referred to as a controlled form of motivation (Deci & Ryan, 2000). The higher order motivation types can be simply viewed as "I don't want to do it" (amotivation), "I had to do it" (extrinsic motivation), and "I love doing it" (intrinsic motivation). Except for amotivation, the discrete

motivation categories that sit below these higher order types, as depicted in Figure 2.2, are described in the next section.

2.4.3 Motivation Category: Extrinsic Motivation

SDT is distinguished from other motivation theories as it divides extrinsic motivation into four distinct categories. Each type of motivation has consequences for learning, performance, personal experience, and wellbeing (Ryan & Deci, 2000b). The categories are differentiated according to what SDT terms regulatory processes (Ryan & Deci, 2000b). Regulatory process describes how a behaviour by an individual is initiated and maintained. The variation in behaviour regulation is derived from a perceived locus of control; that is, the greater the autonomy over actions, the greater the locus of control at one end of the motivation continuum. At the opposite end of the continuum, behaviour is controlled in some form by perceived external factors. Howard et al. (2017) referred to this behavioural continuum as a continuum of self-determination where the degree of control relates to a different motivation type and predicts different task outcomes.

The extrinsic motivation types are named according to the type of regulatory process: externally regulated, introjected regulation, identified regulation, and integrated regulation. External regulation occurs when the behaviour is initiated and maintained by contingencies external to the person; for example, people act with the intent of either obtaining or avoiding a desired consequence such as a material reward or social acceptance (Gagné & Deci, 2005). An example of externally regulated behaviour would be a speech pathologist whose only interest is in financial return; the behaviour (speech therapy) is contingent on an externally administered reward (salary).

The three remaining extrinsic motivation types differ according to how much of the regulation is internalised. Internalisation is the term used to describe three different processes: introjection, identification, and integration (Gagné & Deci, 2005). Gagné and Deci (2005) defined internalisation as “people taking in values, attitudes, or regulatory structures, such that the external regulation of a behaviour is transformed into an internal regulation and thus no longer requires the presence of external contingency” (p. 334). Internalisation is influenced by the degree of autonomy, competency, and relatedness that a person experiences, with autonomy being at the top of the hierarchy. The greater the experience of these three factors, the higher the internalisation and the closer it relates to intrinsic motivation.

Introjected regulation is when the individual has accepted the regulation in behaviour but has not accepted the action or behaviour as their own as it is not fulfilling the needs of autonomy, competency, and relatedness. The contingent consequences of the behaviour are administered by the individuals themselves (Gagné & Deci, 2005); for example, “I am a doctor as it makes me feel worthy”. The feeling of worthiness comes from within; no external regulatory forces instruct the person to become a doctor to feel worthy.

Identified regulation describes a behaviour whereby the individual identifies with the value of the behaviour for their own self-directed goals (Gagné & Deci, 2005). The behaviour is said to have a greater degree of autonomy, making the individual feel more competent, and contributes to relatedness. The behaviour is more self-directed than introjected regulation—for example, a nurse may not find interesting the hygiene activities required to maintain a high-care elderly person. However, they accept that it is a key requirement of their role and accept the importance of the task. This type of regulation is more likely to sustain a behaviour as it has been self-endorsed by the person (Deci & Ryan, 2000) even though they do not enjoy the tasks associated with the role.

Integrated regulation is considered a form of autonomous motivation (Gagné & Deci, 2005) and is the most developed form of extrinsic motivation in terms of need satisfaction. The key difference between integrated regulation and intrinsic motivation is that the former requires the activity to be instrumentally important for an individual’s goals rather than being interested in the activity itself. While this type of regulation has been theorised, when empirically tested in the context of work, integrated regulation frequently overlapped with identified regulation or intrinsic motivation (Van den Broeck et al., 2021). Following the recommendations of Van den Broeck et al. (2021), integrated regulation was removed from the measure used in this study (as discussed in Chapter 6).

2.4.4 Motivation Category: Intrinsic

Intrinsic motivation is defined as having the highest level of perceived locus of causality (Howard, Morin, and Gagné, 2020), which means that an individual performs a task for the enjoyment or interest in and of itself, requiring no external reinforcement or separable consequence (Ryan & Deci, 2000a). The more autonomous the activity, the more positive the outcomes (Deci & Ryan, 2008; Silva et al., 2014; Wang, 2016).

Intrinsic motivation is inherently autonomous and relates to the person's experience of having choice and being endorsed by what they are doing rather than being compelled by outside or other internal forces (D. N. Stone et al., 2009).

2.4.5 Applications of Self-Determination Theory

The significance of the types of motivation is that they lead to different outcomes for the individual in terms of psychological health and effective performance. In a meta-analysis investigating teacher vocation and SDT, Slemp et al. (2020) reported intrinsic motivation to be associated with better overall health and decreased distress, whereas extrinsic motivation had unfavourable outcomes relating to teachers' mental health. Mahmoud et al. (2020) reported further empirical evidence of SDT extrinsic motivation subtypes in their intergenerational study, whereby millennials were motivated by external regulation material and identified regulation, whereas older generations were motivated by external motivation social and introjected regulation. In the engineering domain, Johari and Jha (2020) reported that external regulation material had no statistically significant influence on construction labour productivity compared to the other subtypes of extrinsic motivation. There is substantial empirical support for the main tenet of SDT, that different motivation types lead to different task outcomes, and as such, it was appropriate for this study.

Howard et al. (2017) identified SDT as one of the most-cited motivation theories in the literature applied across service-oriented settings, including education (Hagger & Chatzisarantis, 2015; W. C. Liu et al., 2015), physical activity and exercise (Bartholomew et al., 2014; Van den Berghe et al., 2014), and psychopathology (Y.-W. Chen et al., 2015). In a study relating to worker motivation that surveyed 630 knowledge workers in the not-for-profit and for-profit service sectors, results indicated that not-for-profit workers were motivated by identified and integrated regulation, whereas for-profit workers were more motivated by extrinsic regulation (De Cooman et al., 2009). Put simply, while the motivation was not intrinsic for not-for-profit workers, it was more autonomous than their for-profit sector peers. Arguably, different motivation types lead to different choices in work.

SDT has been used to understand the different patterns of participation on the internet, including social media; however, findings are equivocal. Different types of motivation lead to different types of participating behaviours on social media; autonomous motivation (intrinsic and integrated regulation considered together) has

been positively related to posting new comments, and controlled motivation (all forms of extrinsic motivation except for integrated regulation) has been positively related to commenting on others' content (Wang, 2014). In an empirical study on content contribution to Wikipedia (Xu & Li, 2015), results suggested that content contribution was more often driven by extrinsically oriented motivations, including reciprocity and the need for self-development. By contrast, community participation such as sharing and partaking in voting was more often driven by intrinsically oriented motivations, including altruism (Stvilia et al., 2008).

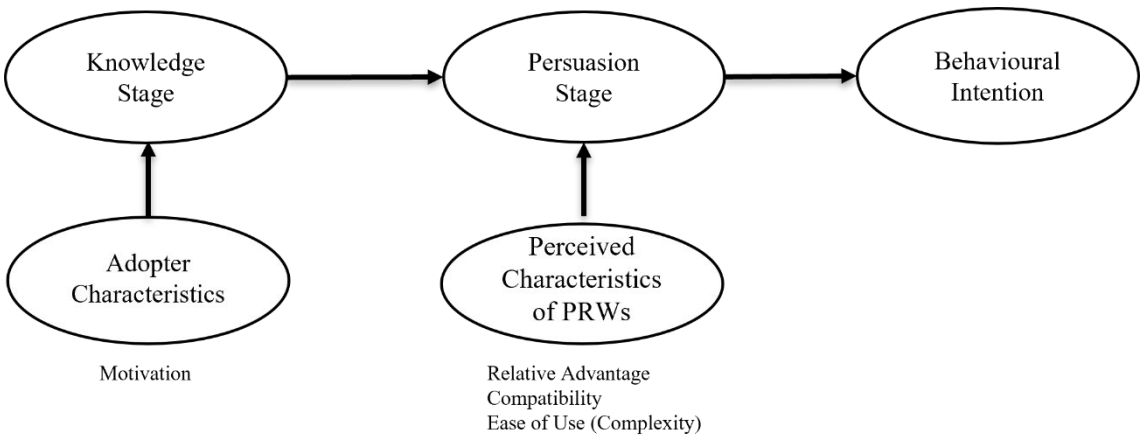
An explanation as to the differences in usage types may be gleaned from a study by Demircioglu and Chen (2019). These authors found that employees who used social media for work purposes perceived a higher level of intrinsic work motivation because social media interaction (the right level of) with the public increased relatedness and competency. Further empirical evidence shows that having different types of motivation results in different types of use on social media sites; however, motivation types appear to be context specific (Xu & Li, 2015). In a study of motivation types and e-learning in the workplace, intrinsic motivation had a statistically significant direct positive impact (r = 1.01) on intention to use e-learning, and extrinsic motivation had a nonsignificant but negative effect on e-learning (r = −.33) (S. J. Yoo et al., 2012).

2.4.6 Integration of Self-Determination Theory and Diffusion of Innovation

The two theories that underpin this study are integrated through the first two of the five stages of E. M. Rogers' (2003) innovation decision framework, illustrated in Figure 2.3. Under the first stage, knowledge, adopter (HCP) characteristics are investigated in the form of motivation. Motivation is of interest as it influences the process of information intake (Rogers, 2003). This influence may take several forms. The first is selective exposure; HCPs may not expose themselves to PRWs as this may conflict with existing attitudes relating to online feedback. Second, PRWs may not be relevant to their needs, and in the context of SDT, may not fulfil needs of autonomy, relatedness, or competency. The selective information intake may have implications for how HCPs develop principle knowledge of PRWs—that is, only considering a PRW as a reputation management tool rather than a form of feedback.

Figure 2.3

SDT and DOI Integration Through the Innovation Decision Framework



Adapted from *Diffusion of Innovations—5th ed* (p.170) by E. M. Rogers, 2003, New York: Simon and Schuster. Copyright 2003 by The Free Press. Reprinted with permission (see Appendix A).

In the second stage, persuasion, the influence of the previous stage has implications for how HCPs perceive the characteristics of PRWs, such as the relative advantage, compatibility, or ease of use. Tornatzky and Klein (1982) described perception as referring to an internalised system of values, often resulting in a subjective opinion of the concept under consideration; as such, HCP motivation type could theoretically affect their objectivity when evaluating the PCIs of PRWs.

Adopter characteristics, including motivation, have an important bearing on innovation adoption in services industries, although these were previously overlooked by researchers studying DOI (Greenhalgh et al., 2008). In a recent SLR of early adopters in the context of DOI, personality variables such as outward focus and economic values influenced adoption more consistently than a sociodemographic factor (Dedehayir et al., 2020).

SDT and DOI have been concurrently used as a theoretical lens in research to explain adoption behaviour in various forms, including mobile banking and co-creation services adoption in South Africa (Venter de Villiers et al., 2020), scaling up educational innovations (Krainer et al., 2019), and adopting an experimental professional development approach (S. D. Moore et al., 2014). Motivation in each of these studies was used to explain influences of the PCIs. The integration of SDT and DOI theories can also usefully explain how motivation in the occupational context,

either intrinsic or extrinsic, where PCIs may be favourable or unfavourable, can lead to BI and subsequent adoption of PRWs by HCPs.

2.6 Conclusion

In sum, this study posits that motivation relating to occupation, either extrinsic or intrinsic, directly influences a HCP's intention to adopt a PRW or significantly influence their perception of an innovation (PRW) characteristic and consequently their intention to adopt a PRW. SDT and DOI were chosen as they represented established theories in their respective fields. The integration of the theories builds on the work of previous researchers Venter de Villiers et al. (2020), Krainer et al. (2019), and S. D. Moore et al. (2014). A broad narrative literature review follows to describe the characteristics of PRWs to inform the conceptual model for this study.

Chapter 3. Narrative Literature Review

This chapter outlines the forces that are changing the nature of health care, giving rise to innovations such as PRWs. It starts with a description of the healthcare context, arguing the need for change, and then describes the emerging trend of patient satisfaction measures. A review of the literature relating to PRWs follows and includes patient adoption, PRW history, ownership, patient awareness, content, characteristics of patient adopters, and the potential generic benefits to healthcare systems and potentially HCPs. The literature review informs the conceptual model by detailing the characteristics of PRWs and the environment in which they are situated. The chapter concludes by explaining the rationale for an SLR of HCPs' adoption of PRWs to understand the current knowledge of adopter characteristics in relation to PRWs.

3.1 Health Care

This research is situated in the healthcare context, which is typically characterised by escalating costs and the view that current healthcare systems are unsustainable due to ageing populations, increasing chronic disease, and rising patient expectations. For example, the National Disability Insurance Scheme (NDIS) reported a cost overrun of AUD4.43 billion in the 2019–2020 financial year compared to the original estimates of the Australian Productivity Commission in 2017 (National Disability Insurance Scheme, 2021). The healthcare sector stakeholders are patients, payers, and employees, including HCPs, who comprise this study's participants.

Healthcare services are inefficient, according to a range of authors, from policy to practice; for example, an investigation into healthcare efficiency by the Australian Productivity Commission (2015) found it could be raised by 20% by adopting best practice. A scoping review evaluating evidence-informed healthcare delivery models in Australia reported that opportunities for efficient delivery of health services are being lost due to the underuse of Australian evidence on best practice healthcare delivery models (Roseleur et al., 2020). Furthermore, recent research investigated 31 countries in their use of resources, such as health expenditure and number of tests performed per million of the population, to manage the flattening of their COVID-19 contagion curves and reported that 19 countries were inefficient, including the wealthiest countries such as Germany and the United States (Breitenbach et al., 2021). As long ago as 1998, the IOM in the United States published an article (Chassin & Galvin, 1998) labelling the

quality problems associated with the fundamental design of U.S. health care as "overuse", where healthcare resources were used without evidence that they assisted patients, and "misuse", where there had been a failure to execute clinical care plans appropriately (Berwick, 2009). A recent field experiment, where a test patient was sent to 180 dentists in Zurich, Switzerland, to receive treatment recommendations, found that the overtreatment recommendation rate was 28% higher for those with a low socioeconomic status and for dentists with shorter wait lists (Gottschalk et al., 2020). Brownlee et al. (2017) found evidence of overuse in specific healthcare services in several countries including Australia. Elshaug et al.'s (2012) literature review of healthcare practices reported that 156 healthcare services flagged as either unsafe or ineffective were in fact eligible for fee rebates provided by the Australian Government public healthcare insurance agency (Medicare) and claimable by the patient upon receiving the service. While there are examples of inefficiencies, as described above, the following discussion outlines how analysts have explained the likely causes.

Inefficiencies may be explained by the sector's business model response to several challenges (Christensen et al., 2009). The classic business model in health care is to diagnose and recommend solutions to complex healthcare problems (Garrety et al., 2014), commonly referred to as a "solution" shop, requiring highly skilled and often highly paid HCPs (J. Hwang & Christensen, 2008). This model contrasts with what J. Hwang and Christensen (2008) identified as "value-adding" process businesses, whereby the business transforms inputs such as people or equipment into outputs of high quality and often at lower costs, the focus being process excellence, not resources—for example, retail and restaurants. The solution shop business model of health care requires a highly trained, skill-sensitive HCP workforce, which creates variability in quality among providers (Berry & Bendapudi, 2007). As a result of the solution shop environment, patients are unable to compare and evaluate HCPs prior to service delivery as each service encounter is unique, and their knowledge or access to information on providers and health conditions is limited (Corbin et al., 2001; Gottschalk et al., 2020). Without process innovations in health care, such as improving patients' access to information and knowledge, the ability to eliminate or reduce these inefficiencies may be
limited.

In their seminal work, Arrow (1963) recognised imperfect information as a defining feature of healthcare markets. Imperfect information is commonly referred to

as information asymmetry and is defined as a condition where one party has more or better information than another (Akerlof, 1970; Bergh et al., 2018). In the medical context, a patient may be able to describe their symptoms but unable to decide on a diagnosis or course of treatment, and the healthcare expert has more power and may exploit this situation (Bloom et al., 2008). In some instances, the service provided by the HCP is high in credence value, which means that the patient cannot ascertain quality before or even after the purchase, and as such, credence goods result in significant information failure (Saifee et al., 2020). Several studies have focused on healthcare information asymmetry, identifying it as one of five reasons that healthcare markets fail from a free-market perspective and require a form of government regulation (Barile et al., 2014; Bloom et al., 2008). However, perfect information may not be the only solution to improving healthcare quality outcomes. In a recent working paper, Frakes et al. (2021) found that patients with greater knowledge were able to garner only modest improvements when selecting a HCP based on quality of care. Even when there are improvements in measured quality, there is little evidence of corresponding changes in consumer demand (Epstein et al., 2001; Kolstad, 2013). Improving access to healthcare information and knowledge in various forms is only part of the explanation in driving improvements in quality of care.

Health care is arguably transforming from a top-down approach of transparency and quality of care to a bottom-up approach (McLennan, Strech, and Reimann, 2017). One explanation for this shift emerged following World War II in what was labelled the "golden age of doctoring" (McKinlay & Marceau, 2002). During this period, the medical profession achieved professional dominance, whereby doctors controlled the scope of their own work, reinforced by governments affording them legal protections (Timmermans & Oh, 2010). An example of such legal protection is that a person can be prosecuted for practising medicine without the appropriate qualifications determined by the profession. In return, such professionals put their clients' interests ahead of any economic consideration (Timmermans & Oh, 2010). This approach changed during the 1960s and the next three decades, whereby the profession's potential for market economic returns attracted corporatisation, followed by diminished altruism within the profession and consequently, falling trust levels in the profession (Lipset, 1987; Huang et al., 2018; Tur-Sinai et al., 2021). These falling trust levels arguably started a change in health-seeking behaviours, where in the 1980s, people requiring health care were encouraged to seek second opinions (Hibbard & Weeks, 1987, Shmueli et al., 2019).

These shifts in health care created a consumer movement in healthcare services leading up to the internet age.

Health is one of the frequently searched topics online in the United States and Australia. The Pew Research Center in the United States found that 72% of adult internet users searched for health-related information online (Fox, 2014). This was similar in Australia, where 69% of male survey participants of a health behaviour survey conducted by the Population Research Laboratory at Central Queensland University reported that they used the internet to search for health-related information (Nikoloudakis et al., 2018). Google Trends (Google Trends, n.d.) was used in May 2020 to identify searches for the term "health" conducted in Australia. Such searches were consistently ranked in the top 50% of all internet activity. This increasing online activity has the potential to transform how consumers engage with health information and HCPs (Bernstein & Mesfin, 2020; Bussey & Sillence, 2019; Carbonell & Brand, 2018; Widmer et al., 2019).

The internet provides easy access to health-related information to equip patients with details of their symptoms and possible treatments prior to visiting a HCP. It facilitates the gradual breakdown of information asymmetry between HCP and patient. The information that has become readily available online covers a broad spectrum, such as obtaining medical treatment, alternative treatments, medical advice, and identifying symptoms (Conrad & Stults, 2010; Deng et al., 2019; Timmermans & Oh, 2010). At the same time, sharing patient experiences about HCPs via online forums and medical websites has become common practice (Sobin & Goyal, 2014; Zhang et al., 2018). PRWs, enabled by readily available health information on the internet, provide another built-for-purpose mechanism for reducing information asymmetry between HCPs and patients (Menon, 2017) and empowering patients.

The internet has changed the experience of illness from private in nature to a shared public experience, as patients become more proactive in disease management and lifestyle (Conrad et al., 2016). Patients not only consume information on health care but create it on various social media sites and PRWs (Wallace et al., 2014). Additionally, consumers use internet sources to assist them in making treatment decisions, supplementing information provided by health professionals, and choosing a healthcare provider (Ramsey et al., 2017). This increased dissemination of healthcare information, including patient experience data, has been identified as a means to more efficiently allocate healthcare funding (Dixit & Sambasivan, 2018).

The increasing information dissemination in health care is tempered by the type of healthcare funding model. Healthcare funding models in Organisation for Economic Co-Operation and Development (OECD) countries have been classified into two broad categories: those that rely on market mechanisms in service provision and those that mostly involve public provision and public insurance (Joumard et al., 2010). The market systems are further divided into services being funded through private insurance for basic coverage, including countries such as Germany and the Netherlands, or public insurance for basic coverage that are topped up by private insurance, including countries such as Australia and France. The public system is further divided into two categories based on the amount of control (gatekeeping) the government exercises in the administration of health care. Countries with no gatekeeping include Iceland and Sweden, and higher levels of gatekeeping include countries such as Denmark and Italy (Joumard et al., 2010). Countries with market-based service provision, such as the United States, would benefit from overall wider access to patient experience data to reduce information asymmetry (Dixit & Sambasivan, 2018), and those in the public model could also use patient experience data as a mechanism to provide self-regulation in lieu of other gatekeeping mechanisms such as government audits of health services or government-sanctioned patient surveys. Independent of the mechanism to allocate funding in healthcare systems, both market-based and public healthcare systems would benefit from patient experience data.

The use of patient experience measures is becoming a feature of healthcare funding allocation internationally. The United States was one of the first countries to link patient satisfaction to measures of health system performance through pay-for-performance schemes (Farley et al., 2014). In the United States, the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) was developed by the U.S. Centers for Medicare and Medicaid Services (CMS) and the Agency for Healthcare Research and Quality to publicly report measures of hospital patient satisfaction (H.-C. Chen et al., 2020). One of the assessment's goals is to increase transparency of hospital care quality. The measure consists of 22 questions administered to recently discharged patients that cover aspects of the healthcare experience, such as how well doctors and nurses communicate with patients and how clean and quiet patient rooms are (CMS, 2021). Significantly, HCAHPS measures provide the basis for annual performance and reimbursement programs (Belasen & Belasen, 2018) and have been adopted in other countries such as Germany and Poland (Islam & Muhamad, 2021). While the research

community is divided on whether patient satisfaction is a measure of quality, and that they may be in different domains (Farley et al., 2014), patient satisfaction has become embedded in financial funding models. These satisfaction measures herald the start of other mechanisms that payers of health care may use to highlight opportunities for improvement in the efficiency and quality of healthcare services.

In Australia, there has been a gradual transformation of healthcare funding models for disability services that extends patient empowerment beyond satisfaction surveys (Australian Institute of Health and Welfare [AIHW], 2016). Currently, payers of healthcare services in Australia are a mix of public and private sources (Willis et al., 2016). The Australian federal government provides payment or reimbursement of healthcare services through the national Medicare program, while Australian state governments provide services through public hospitals. Private health insurance companies provide rebates on services to more than 44.5% of Australians (The Australian Prudential Regulation Authority [APRA], 2021). In 2013, the Australian Government created a healthcare body, the National Disability Insurance Agency (NDIA). The role of the NDIA is to manage the delivery of healthcare funding for people with a disability. The expenditure on healthcare services for the 2019–2020 financial year was AUD19.2 billion, a net increase of AUD7.38 billion (62%) on the previous financial year (NDIS, 2020). One of the key platforms of the NDIA is patient empowerment. Rather than providing annual recurring funding to nongovernmental organisations for the provision of such services, the government allocates funding directly to the patient, empowering them to choose how the funding is spent on their needs. This shift to healthcare consumerism will see more of the financial accountability shifted from service providers to patients or consumers. The changing role of healthcare consumers, from passive recipients to active participants, increases their information needs (Sloane et al., 1999) and requires HCPs and their organisations to be responsive to the transition.

3.2 Patient-Centred Care

In response to consumer empowerment, many healthcare organisations have embraced the notion of PCC as central to their strategic mission and values (Rathert et al., 2012). This trend has been noticeable since the IoM (US) Committee on Quality of Health Care in America (2001) put forth PCC as one of its six objectives for improving efficiencies in health care. Policymakers have also embraced PCC, by WHO at a global

level and at a regional level by countries including the United States, United Kingdom, and Australia (Kitson et al., 2013). Rathert et al. (2012) found in their systematic review of PCC that most studies, independent of methodology, found positive relationships between the PCC process and patient satisfaction. Given the growing evidence to justify PCC approaches, evaluation of HCPs' effectiveness could conceivably become tied to measures of PCC, which will require the particular attention of HCPs.

As the term PCC has become more ubiquitous, the definition has lacked unanimity (Fix et al., 2018). The IOM defines PCC as providing care that is respectful and representative of individual patient preferences, needs, and values and ensures that patient values guide all clinical decisions. Referencing IOM's deliberations, Berwick (2009) provided a patient-centric-control definition of PCC, referring to it as "the experience (to the extent the individual patient desires it) of transparency, individualization, recognition, respect, dignity, and choice in all matters, without exception, related to a *person's* circumstances, and relationships in health care" (p. 560). The broad and general definition of PCC makes its application in day-to-day health care burdensome; for example, an examination into the politics of PCC by Kreindler (2015) using discourse analysis reported that HCPs used the discourse of PCC to imply their own healthcare team was patient centred, while the other healthcare team was not. The concept of PCC was found to be counterproductive for HCPs, and Kreindler (2015) suggested PCC should be about inclusion rather than what HCPs should not be doing. Further, a qualitative study investigating how HCPs conceptualise PCC reported that while some frontline HCPs identified PCC as a cultural shift more than an initiative of its own, leadership conceptualisation was all encompassing and lacked the scaffolding to implement the cultural transformation needed (Fix et al., 2018). While definitions vary for PCC, in this study, PCC is defined as embracing the principle that a patient's care plan is based on respect for an individual's needs, patient choice, and patient voice (S. A. Adams, 2011).

While the definition of PCC does not specifically state that patient feedback is a mandatory condition, it does mention respect and choice, which implies that HCPs should hear the patient's voice in their treatment recommendations. There is limited research on how and whether HCPs prefer to receive feedback on their performance (Evans et al., 2007; Farrington et al., 2016). Researchers have found that methods of peer feedback for HCPs lack proven validity, and patient assessment surveys that predate PRWs have been negatively received, citing HCPs as defensive and resistant

unless feedback is specific and the source credible (Baines et al., 2018; Farrington et al., 2016; Evans et al., 2007). While HCPs reported they were committed to incorporating patient feedback into improving quality of care, no study reported improvements to patient health and wellbeing as a consequence of the feedback (Baines et al., 2018). In contrast, an SLR investigating patient feedback to improve PCC in public hospitals reported some improvements in patient-experience outcomes for 11 of the 20 included studies; however, only five of those studies reported measures (Wong et al., 2020). The SLR found better outcomes were achieved when multiple interventions were used rather than single interventions that targeted the individual and organisational level. For example, interventions such as interpersonal communication training for HCPs combined with policies for behaviour standards and targets were associated with improved patient experience (Wong et al., 2020). The scarcity of empirical research that reports on the success or otherwise of implementing specific strategies based on patient feedback to improve PCC prohibits drawing any conclusion at this stage.

Patient feedback data are reported in many forms, and their importance is evidenced by the growing literature in the field that originates from within or external to healthcare institutions (Bull et al., 2019; Calixto et al., 2018). The shift to PCC is supported by the emergence of patient-reported measures (Calixto et al., 2018). Patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs) are two forms of such measures stemming from within the healthcare system. PROMs assess patients' views on their symptoms, functional status, and health-related quality of life; they were originally developed and used for research purposes then adapted by HCPs to enhance clinical management of individual patients (N. Black, 2013). PREMs differ to PROMS in that they capture elements of an episode of care, including what happened and how it happened, to provide a more detailed perspective than PROMs (Bull et al., 2019). A criticism of these measures is that they are not co-created with patients (Wiering et al., 2017), and nor do they provide information at the individual HCP level (N. Black, 2013). One form of patient-reported measures external to healthcare institutions are PRWs. As PRWs are a form of public reporting that contribute to information symmetry, there is the potential to shift the balance to consumers of health services rather than the entities providing the service. While PROMs and PREMs are more statistically robust measures of selected healthcare experiences, PRWs are of interest in this study as they record voluntarily given patient views and provide information at the HCP rather than organisational level.

The complex interplay of stakeholders, such as patients, providers, and payers, requires stakeholders to embrace new initiatives to become more effective and efficient and to ensure sustainability. Usher (2011) suggested that HCPs' adoption of new initiatives such as PRWs is necessary to cater for contemporary health service requirements. Innovation and its diffusion are crucial to enhance quality of care (Varkey et al., 2008), as discussed in the next section. Given the potential of PRWs in the era of consumer-driven health care, HCPs who understand the valuable information they supply, how these websites work, and what factors affect ratings may have a competitive advantage (Dwyer et al., 2019; Kalagara et al., 2019). Furthermore, patient satisfaction is becoming as important as conventional quality metrics (Arthur et al., 2019). The PCC movement is gaining momentum, and HCPs need to equip themselves with the capabilities to respond to the change; adopting PRWs can be considered one of many approaches.

3.3 Physician-Rating Websites

3.3.1 Definition

PRWs have been variously described as being similar to online user rating sites from other industries (Fisher & Clayton, 2012) and internet-based social networking tools, providing a new form of public reporting of HCPs' performance. PRWs consist of experiential feedback and star ratings (Kleefstra et al., 2016; Lagu et al., 2010; S. Patel et al., 2015; Sharma et al., 2016). Unlike institution-sanctioned, self-administered patient surveys, such as PROMs (Detz et al., 2013), PRWs provide anyone the opportunity to discuss and review a HCP in an anonymous and self-driven manner. For the purposes of this review, a PRW is defined as an internet-based platform that allows users to read or post reviews of service performance about HCPs (Syed et al., 2019; Waxer et al., 2019; Zaki et al., 2020b). Similarweb.com (Similarweb.com n.d.) was used to identify website traffic to PRW sites in September 2021 and found examples that included generic consumer review sites, such as Google My Business and Yelp.com (127.88 million visits worldwide in 6 months to September 2021), and purpose-built HCP ratings sites, such as Healthgrades.com (19.87 million visits worldwide in 6 months to September 2021) and RateMDs.com (2.01 million visits worldwide in 6 months to September 2021).

A major objective of PRWs is to collect and present information about patients' experiences and satisfaction with individual physicians and their practices (Reimann &

Strech, 2010). PRWs are a convenient method to seek information and insights on healthcare professionals, enabling patients to make an informed choice before selecting a HCP (Deng et al., 2019; Emmert, Adelhardt, et al., 2015; Lagu et al., 2010; Sharma et al., 2016). PRWs also support patients' health literacy as they improve transparency and reduce information asymmetry (Strech, 2011), enabling patients to make more informed choices about the HCP they select (McLennan, 2019). PRWs also have the potential to improve quality and engage patients as better-informed consumers by making other patients' experiences publicly available (Faber et al., 2009; Holliday et al., 2017; Strech, 2011). When combined with other health institution-collected data, online narrative reviews can provide useful information to patients and hospitals (Lagu et al., 2013). In sum, PRWs are a novel source of HCP information and play an important role in healthcare literacy.

3.3.2 Physician-Rating Website History

User ratings of HCP experience is not a new phenomenon (Hong et al., 2019; Schulz & Rothenfluh, 2020). One of the origins of HCP ratings can be traced to a U.S. private research company, Castle Connolly, which has been publishing an annual medical directory book, *America's Top Doctors*, since the early 1990s (Sarasohn-Kahn, 2008). Castle Connolly determines ratings of medical doctors based on research into a HCP, once they have been nominated by their peers (McGrath et al., 2018). While the Castle Connolly ratings have worked as a marketing tool for highly rated HCPs wanting to grow and maintain their business, those HCPs with lower ratings have derived limited benefit. For example, there is no information on how they could improve their service delivery for their own patients. HCP feedback has since evolved and experienced growth through the combination of technology innovation, predominantly the internet, and social reform towards PCC (Schulz & Rothenfluh, 2020; Hong, 2019).

In the last two decades, new streams of public reporting of HCPs have emerged. National health systems, such as the U.K.'s National Health Service (NHS), have adopted public online healthcare reporting instruments that allow patients to write or read reviews on HCPs or organisations such as hospitals (Strech, 2011). The two main drivers for such reporting originated with healthcare organisations taking steps to remain relevant and competitive and as a result of pressure from payers and regulators calling for improved healthcare services (Ofili, 2014). The aims of such online feedback tools were to support consumer choice, make hospitals and HCPs accountable, and

ultimately improve the quality of care through feedback-driven service improvements. While the survey instruments made theoretical sense, operationalising the instruments to the satisfaction of all stakeholders was difficult, and limited empirical evidence was available as to whether the feedback from the instruments translated to improvements (Eid et al., 2020).

Developing and implementing patient satisfaction metrics requires sophisticated test development protocols, usable tools, detailed procedures, and advanced statistical analysis (Long, 2017; Schirmer, 2019; Stover et al., 2020). Donabedian (1988) discovered that measuring healthcare outcomes or HCP performance was not a unidimensional concept. They questioned the patient satisfaction measures in terms of weighting clinical attributes versus nonclinical attributes such as interpersonal skills. More difficult to ascertain was identifying which benchmark in health care to use; for example, the challenge for HCPs is to weigh the costs and benefits of providing a gold standard of service for every encounter. In their critical review of patient satisfaction, Gill and White (2009) highlighted the complexity of measuring patient satisfaction and called for interdisciplinary studies requiring services marketing and the healthcare community to come together. Such an approach may have addressed the need for consensus as to what constitutes the right instrument and/or measures (Ofili, 2014). While the academic and professional communities debated the merits of valid and relevant instruments, those who had operationalised PRWs identified that patient experience and satisfaction expressed by the receiver, and with respect to individual physicians, was more important than institutions, such as hospitals (Reimann & Strech, 2010). About the same time, Gill and White (2009) discussed the limitations of existing instruments in that PRW operators were able to leverage the internet's power and fill the information vacuum of easily accessible and broadly available quality ratings of HCPs. Arguably, some of the limitations of publicly available survey instruments gave rise to the growth of PRWs.

The number of PRWs in operation is growing in popularity and importance around the world (Burkle & Keegan, 2015; Emmert, Halling, and Meir, 2015; Emmert & Meszmer, 2018; Gao et al., 2012; Haffey et al., 2020; Hanauer et al., 2014b). The total number of PRWs has steadily increased; a 2018 study of PRWs across 12 countries found that 143 PRWs were in operation (Rothenfluh & Schulz, 2018). This is in comparison to 20 such sites identified by Lagu et al. (2010). In Germany, the number of PRWs grew from eight in 2012 to 29 in 2018 (Emmert & Meszmer, 2018). No research

was uncovered in this review that identified the drivers behind the growth of PRWs; however, it appears that the ownership of PRWs may provide some explanation and is discussed next.

3.3.3 Physician-Rating Website Ownership

Understanding the nature of PRW ownership provides insights into the potential conflicts of interest or bias identified by HCPs. Over 80% of PRWs worldwide are operated by commercial, for-profit entities (Rothenfluh & Schulz, 2018). In Australia, Whitecoat (whitecoat.com.au) is a PRW run by an insurance company. Concerns have been expressed by the Australian Medical Association that such ownership will result in information asymmetry, whereby the insurers own all the information (Rollins, 2016). Private ownership of such PRWs creates a potential conflict of interest—for example, a known case where PRWs hosted by insurance companies were questioned because of the conflict of interest in reporting data that could potentially drive patients to low-cost providers, not because they provided a high quality of care (Glenn, 2008). Another area of concern related to commercial operators whose business models rely on advertising. Rothenfluh and Schulz (2018) found that 75.5% of PRWs did not clearly separate advertising from content. Mulgund et al. (2020) reported that this was usually deliberate. Further, Menon's (2017) interviews with cosmetic surgeons found that most surgeons questioned the authenticity of the reviews and were sceptical because third-party platforms such as Yelp.com were tainted by commercial interests.

Of greater concern to HCPs should be the shift away from dedicated PRW platforms to generic ratings hosted by internet search platforms. Google is becoming a major influence in the review of HCPs, having more ratings of HCPs than three other dedicated PRW sites in Switzerland (McLennan et al., 2019). Commercial PRW operators are, in the main, for-profit entities motivated by commercial return, and the collection and presentation of content will be optimised to that end, an argument supported by cosmetic surgeons who stated review platforms had an interest in maintaining negative reviews (Kordzadeh, 2019). In McLennan et al.'s (2020) study of a Swiss PRW Medicosearch (www.medicosearch.ch/), examining 2,352 rejected online reviews from patients, they reported that there were no clear reasons for the rejections, and concerns were raised that patient feedback was being improperly manipulated. Regulators and HPAs should be concerned that transparency of PRWs may be subject to alteration, reducing the value of PRWs to HCPs and patients alike.

3.3.4 Physician-Rating Website Content

The primary focus of PRWs is to rate, discuss, and view the ratings and comments about HCPs; however, they also display location information opening hours and HCP certification (Lagu et al., 2010). In an analysis of PRW content across 12 countries, it was found that the majority of PRWs (76.9%) requested numeric and written reviews of HCPs (Rothenfluh & Schulz, 2018). There is little consistency in the content of various PRWs. In a study comparing content differences between U.S. and German PRWs, it was reported that 13 dimensions of patient experiences were measured across 21 different PRWs, with no one PRW presenting all 13 dimensions. The majority of measures (63%) reported on practice staff and process rather than HCPs; for example, wait time was frequently raised as an issue (Emmert et al., 2012). In a similar review of PRWs, only 25.9% of PRWs had technical or medical criteria that were rated or commented on. There is a lack of uniformity in the measures provided by PRWs, which appear to focus mainly on patient satisfaction.

Patient satisfaction measures significantly influence the overall star rating of HCPs. In a comprehensive study of over 200,000 online comments of the NHS directory service (formerly known as NHS Choices) in the United Kingdom, staff interpersonal skills were a key factor contributing to higher ratings (Brookes & Baker, 2017). Consistent with those findings, HCPs who developed empathic communications with patients and provided quality experiences with office staff also received higher ratings (Asanad et al., 2018; Kalagara et al., 2019; Langerhuizen et al., 2020; Moradzadeh et al., 2018; Randhawa et al., 2018; Yu et al., 2020). Wait times are a recurring theme in the literature that has consistently been shown to reduce overall ratings; a wait time of 31 to 45 min was associated with a drop in overall satisfaction of 1.35 points on a five-point rating scale (Zhao et al., 2020). There is little doubt that nonclinical measures are most often reported on PRWs and influence ratings; however, health care encompasses a broad spectrum of services that are not all credence goods.

Credence goods, in a healthcare context, occur when patients are unable to determine whether the treatment they received was effective or appropriate (Gottschalk et al., 2020) and by definition are difficult to evaluate. Patients generally rate what they can observe, and this may explain the variability in the themes rated across subspecialties (Daskivich et al., 2018). Some conditions are treatable but not curable, making it difficult to assess whether the treatment has worked—for example, long-term

conditions such as chronic obstructive pulmonary disease (Saifee, 2020). This observation contrasts with cosmetic surgery procedures, oncology, or surgical procedures where the clinical outcomes are measurable (E. W. Black et al., 2009; Ferrara et al., 2014; Zillioux et al., 2020).

Even when HCP service delivery outcomes are measurable or observable by the patient, PRW content is not consistent. In a study of cosmetic surgeons, reviews centred on consumer-related service factors rather than the surgeon's outcomes (Menon, 2017). However, in other research analysing comments and ratings for cosmetic surgeons across three PRWs in the United States, it was reported that aesthetic outcome was the most mentioned theme (46.3%) in one study, and in another, the ineffectiveness of clinical procedure represented 65% of the negative comments (Qiu et al., 2019; Watchmaker et al., 2020). The probability is that HCPs who treat chronic disease will be subject to reviews that are more likely to measure factors other than clinical efficacy or service quality (Arthur et al., 2019; Rothenfluh & Schulz, 2017). PRW measures, and in particular those that contribute to an overall positive review, are central to how they are perceived by HCPs. The question for future research is whether PRWs are a measure of patient satisfaction, a proxy for a measure of clinical quality service outcomes, parts of both, or neither.

3.3.5 Physician-Rating Websites as a Measure of Clinical Quality of Care

One area of discourse in the literature examines whether PRWs are a measure of clinical quality of care. An SLR by Placona and Rathert (2021), which examined whether online patient reviews were associated with healthcare outcomes, identified 11 studies related to PRW and clinical quality of care. The results showed heterogeneity in both measures of clinical quality of care and the overall intent of PRWs, which indicated that they may not be reliable indicators of high-quality care.

There is, however, some evidence to support PRWs being associated with clinical quality of care. In the hospital setting, online ratings were associated with clinical performance measures but not so with other clinical measures (Emmert et al., 2018). In the Netherlands, the body responsible for risk detection in hospitals initially was reluctant to use PRWs as part of their risk assessment to target audits for poor quality of care; however, 23% of inspectors surveyed stated that negative PRWs were relevant for risk estimation (Kleefstra et al., 2016). In a follow-up longitudinal study, Kool et al. (2016) found that quality inspectors identified the same hospitals at risk as

those that patients rated as underperformers on PRWs. In the United States, online ratings for hospitals (with greater than five ratings) were found to be correlated with the HCAHPS survey (.49, $p < .001$), the instrument used by CMS to assess in-patient experiences (Bardach et al., 2013). Further, in a study by Kilaru et al. (2016) examining the correlation of online reviews of emergency departments with traditional patient surveys, the authors found that Yelp.com reviews, when considered in aggregate, reflected established domains of patient-centred quality.

In contrast to the studies identified in the preceding paragraph, competing research has found little correlation between PRWs and clinical quality of care. No correlation was found between surgeon-specific outcomes for knee replacements, as measured by the Statewide Planning and Research Cooperative System in the United States, compared to the online ratings on Healthgrades.com and Vitals.com (Trehan et al., 2018). Further, no significant correlation was reported between cardiac surgeons' online ratings and risk-adjusted mortality rate ($r = -.06$, $p = .13$; Okike et al., 2016).

It is worth noting some findings from Placona and Rathert's (2021) SLR. First, few studies have had similar outcome measures of clinical quality, suggesting that measures of clinical quality are diverse, and comparing dissimilar measures and constructs requires a body of evidence before conclusions can be drawn. Second, their findings suggested that sample size affects results, whereby the greater the sample size, the more association with clinical quality of care (Bardach et al., 2013; Okike et al., 2019). Finally, in addition to the variation in clinical quality of care associated with HCP discipline, the healthcare setting may also account for some variation in results.

While there appears to be little consensus as to whether PRWs are a measure of quality (Saifee et al., 2019), the growing levels of patient awareness and usage should attract the attention of HCPs. There is no definitive answer as to whether PRWs are a measure of clinical quality of care as measured by traditional patient surveys or other outcome-based measures; however, it appears they can highlight differences in HCP performance, which is important in reducing information symmetry and guiding patients in selecting HCPs.

3.3.6 Physician-Rating Websites: Influence on HCP Selection

The growth of PRWs and their usage could influence HCP selection (Pike et al., 2019; Zillioux et al., 2020), although the extent of the effect is debated among writers. Research found that patients' choice of HCP was affected by negative reviews on

PRWs, and in one instance, PRW reviews were the sole determinant of HCP selection (Emmert, Meier, et al., 2013). A number of limitations have been identified that diminish the importance of PRWs in HCP selection. They include ensuring PRWs have sufficient ratings (McLennan, Strech, and Reimann, 2017; Schulz & Rothenfluh, 2020) and, in the case of star rating sites, sufficient variation in HCP scores to enable patients to distinguish between HCPs. A study that examined the distribution of star ratings identified that the narrow band of star rating scores made it difficult to differentiate between HCPs to facilitate patient choice (Lagu, Norton et al., 2019). In contrast, other studies have reported that respondents placed more importance on the opinions of family and friends to select a new physician than on a PRW (Burkle & Keegan, 2015; McLennan, Strech, Meyer, and Kahrass, 2017), and some consumers were more trusting of selecting a hotel using ratings sites than selecting a HCP (Rothenfluh et al., 2016).

It is important to understand the differences in how patients use PRWs as they add to the complexity that HCPs need to navigate to effectively adopt PRWs. In an online experiment conducted in Germany comparing star ratings (positive vs negative), exemplars (comments—positive vs negative), and their presentation, star ratings influenced HCPs' selection more than exemplars. However, together, star ratings and comments influenced physician selection more than star ratings alone; that is, a physician with positive comments and a high star rating was chosen over a physician with just a high star rating (Reinhardt et al., 2018). This result contrasts with Nettelhorst et al.'s (2019) findings that psychologists' patients placed more weighting on qualitative reviews than star ratings when both were presented together on PRWs.

Patients differ in how they use ratings from different types of online feedback platforms. In a study comparing how research participants used rating information derived from CMS with commercial PRWs (such as Vitals.com), Yaraghi et al. (2018) found participants relied more on CMS for clinical ratings and PRWs for nonclinical ratings. Evidence suggests that patients use PRWs to make choices between competing HCPs; however, there is a high degree of variability in how star ratings are used compared to narrative comments for HCPs to understand how that directly affects their services.

3.3.7 Physician-Rating Websites: Reputational Effects

While HCPs may find PRWs challenging to use for service improvement, the significance of PRWs for HCP reputation management is increasing. Anecdotal

evidence in the form of litigation provides insight into a possible trend. For example, a dentist in Australia took court action over a potentially defamatory review, claiming it had cost him significant amounts of money, and legal judgement confirmed there was evidence that financial loss had occurred. The federal court requested that Google identify the name of the online reviewer so legal action could proceed (Friedman & Levitan, 2020). This case shows where a HCP acknowledges the reputational damage and consequential losses from negative reviews on PRWs.

In another recent example, a cosmetic surgeon in Australia is under investigation for posting glowing false reviews about his practice and is accused of paying a patient to change a one-star review to a five-star review (Ferguson & Day, 2021). The significance of his actions resonates with the reputational risk that PRWs present. The surgeon judged that the reputational risk to his business was greater than the penalty imposed by the regulator, which included up to AUD10,000 and restrictions on an individual HCP registration (Australian Health Practitioner Regulation Agency [AHPRA], 2017).

PRWs have been found to diminish physician power as their reputation becomes vulnerable to online reviews (Menon, 2017). In examining the effect of online reviews in the cosmetic surgeon domain, Menon (2017) argued the domain was notable for its pronounced medical consumerism. Independent of the complexity a PRW presents to a HCP, they could feasibly impact the reputation of HCPs.

3.3.8 Influence of HCP Variables on Ratings by Patients

Research into patient usage of PRWs has been further extended to understand other independent variables that may contribute to how a patient rates a HCP. The results conflict and appear to vary by many factors, such as the HCP's discipline, years practising, education, and having a social media presence. Discipline-specific studies have found that HCP gender has no influence on ratings of orthopaedic surgeons, spinal surgeons, or neurologists (Goshtasbi et al., 2019; Melone et al., 2020; Runge et al., 2020). Other studies have found female gender in the field of dentistry and primary care physicians to be a positive influence (Li et al., 2018; Lin et al., 2020).

Studies found that HCPs practising for less than 10 years had more positive ratings than their older counterparts (Lin et al., 2020; Nwachukwu et al., 2016; Runge et al., 2020). In contrast, radiation oncologists with greater than 10 years' experience had higher overall rating scores than their younger counterparts (Randhawa, 2018), whereas

orthopaedic surgeons with 6 to 10 years' experience also rated higher than their younger counterparts. Education and academic rank were reported to have a positive influence on ratings for orthopaedic surgeons (Earp et al., 2020; Frost & Mesfin, 2015). In a study of arthroplasty surgeons, surgeons' presence on social media was found to increase the number of ratings but had no influence on the overall ratings (Damodar et al., 2019). This finding is in contrast to a study that reported a social media presence correlated with higher online review scores on Healthgrades.com (r = 0.25, p = .01) and on Google (r = .29, p = .04) (Donnally et al., 2020). In a discipline-specific study for neurologists that examined over 500 scores, ratings were highly dependent on patient perceptions of physician competence, as measured by medical school ranking, caring bedside manner, and office management (Goshtasbi et al., 2019). There appeared to be little consensus in the research at a discipline-specific level or antecedents to positive ratings. The findings indicate there is a level of complexity to be considered prior to HCP adoption, and it is pertinent that discipline-specific studies examine the effect of adoption on HCPs.

3.3.9 Physician-Rating Websites: Patient Awareness and Use

Patient awareness of PRWs is increasing and varies by country; however, in comparison to other consumer services, it is low but increasing. A study conducted almost a decade ago in England found awareness of PRW sites low, with only 15% of survey respondents aware of their existence (Galizzi et al., 2012). In contrast, 74% of patients surveyed in the United States were aware of online rating sites for HCPs; this was lower in comparison to online rating sites for motor vehicles at 92% (Hanauer et al., 2014b). In a 2016 study that random sampled 1,542 residents of Northern Germany, 72.5% responded that they were aware of available online ratings through PRWs (McLennan, Strech, Meyer, and Kahrass, 2017). The authors also identified that while this was lower than awareness levels for other services, such as hotels and restaurants (94%), the awareness was still higher than that of online rating sites for hospitals (54%). Patient awareness is growing and is an important precursor to actual adoption of such sites.

PRWs enable both the consumption of curated online ratings content of HCPs provided by others and contribution by a patient in the form of a review or numerical rating. The usage rates for consuming others' feedback are greater than contributing a narrative or numerical review. The evidence appears consistent across different geographies. A telephone survey of 1,745 adults in the United Kingdom who reported

going online for health-related information found 41% of respondents used an online review site to select a HCP; however, only 9.9% contributed to those sites with a rating or review (Thackeray et al., 2013). In similar studies, the number of people in the United States using PRWs to find a doctor was 28% (Hanauer et al., 2014a; Kadry et al., 2011), and in Germany, 43.6% of research participants had used a PRW to find a physician (McLennan, Strech, Meyer, and Kahrass, 2017).

There are possible reasons for the lower patient contribution rates to PRWs. First, patients tend to rate a HCP only if they had a very positive or negative experience or if they had confidence that their rating would be anonymous (McLennan et al., 2018; Velasco et al., 2019). Second, lower content contribution may be related to patients' perception they are not qualified to rate aspects of medical care (McLennan et al., 2018). These reasons raise a potential concern for HCPs as PRWs may be unrepresentative of the general patient population, with those who comment tending to be disgruntled patients, influenced by others' comments, or, as discussed next, from a narrow demographic cohort (Atherton et al., 2019: Gao et al., 2012; S. Patel et al., 2015).

3.3.10 Physician-Rating Websites: User Differences

The patient users of PRWs vary by sociodemographic such as age and gender and psychographic characteristics such as attitudes and values. Those aged under 50 years, female, with higher digital literacy, better educated, and with chronic disease are more likely to use PRWs than other groups (Burkle & Keegan, 2015; Emmert et al., 2014; Holliday et al., 2017; McLennan et al., 2018; McLennan, Strech, Meyer, and Kahrass, 2017; Terlutter et al., 2014). In selecting a primary care provider, significant differences are reported in relation to the reliance females place on nonclinical ratings versus male respondents (Yaraghi et al., 2018). Further, an investigation into the adoption of mobile physician-rating applications found young males were more likely to use and pay for such services (Bidmon et al., 2014). Other than age and gender, McLennan, Strech, and Reimann (2017) found married participants were more likely to use PRWs than nonmarried; the authors found no other predictors had a relevant impact. As digital literacy improves, and digital natives mature, their health care increases in salience, the influence of internet rating sites may increase (Reimann & Strech, 2010).

Variation in ratings can also be attributed to cultural and geographic variables. In Canada, frequency and quality of ratings varies by geographic location of the practice

(J. J. Liu et al., 2016). The differences may also be cultural in nature; Hao et al. (2017) found that PRW users from the United States put forward a higher percentage of negative reviews than PRWs users from China, reflecting possible differences in norms for expressing negative opinions among diverse cultures. These differences emphasise the importance of research that is specific to a geographic region to identify local differences in both healthcare and PRW use.

3.3.11 Physician-Rating Website Reviews: Positive or Negative?

HCPs are concerned that online patient reviews have become an outlet for patients who are dissatisfied for not receiving their preconceived medical outcome despite receiving appropriate medical care (Gao et al., 2012; Hao & Zhang, 2016; Kadry et al., 2011; Kleefstra et al., 2016). Anecdotal evidence of HCPs fearing that most online reviews will be negative is not reflected in the empirical research. The global trend is that most ratings are found to be positive (Bovenzi et al., 2020; Ellimoottil et al., 2013; Emmert & Meier, 2013; Ferrara et al., 2014; Haffey et al., 2020; Kadry et al., 2011; Lagu, Norton et al., 2019; Lopez et al., 2012; Menon, 2017). For instance, a study in Poland found that of 4,375 eligible comments, 3,294 (75.39%) were generally positive, 1,002 (22.90%) were negative, and only 79 (1.81%) were neutral (Tymiński et al., 2015). In the United States, research identified 40,093 five-star ratings, compared to 132 one-star ratings (Wickner et al., 2019). Emmert et al.'s (2014) study of narrative comments on Jameda.de, a popular review site in Germany, found 80% of all comments were positive. In Canada, a review of ratings for urologists found that more than 67% of reviews were positive, with a rating of four or above (Ferrara et al., 2014).

Positive reviews are prevalent across other medical specialities. Research found reviews of cosmetic surgeons to be positive, averaging 4.84 (of 5) for the review site RealSelf.com and 4.41 stars for Yelp.com (Menon, 2017), and for radiation oncologists, the mean score on Healthgrades.com for likelihood to recommend was 4.51 of 5 (Prabhu et al., 2017). On Vitals.com, 78% of radiation oncologists received an overall rating score of greater than 4 of 5 (very good or above) (Randhawa et al., 2018). In contrast, a literature review of PRW data quality issues reported that ratings were dichotomous, with extreme ratings at either end of the scale and identified a lack of negative ratings (Mulgund et al., 2020). However, the emerging international evidence that most reviews are positive may not suggest sufficient impediment for HCPs to avoid adoption of PRWs, and by contrast, there are potential advantages.

3.3.12 Physician-Rating Websites: Advantages and Disadvantages

PRWs may be regarded as unstructured and unregulated, and patient satisfaction may not always align with responsible patient care (Kilaru, 2016). PRWs have also been regarded as inaccurate (Lagu et al., 2018), showing bias against the HCP (Turk et al., 2020), contributing to burnout and stress (S. Patel et al., 2015), and not regarded a measure of quality of care (Gross et al., 2021).

Researchers, however, emphasise that HCPs should regard PRWs as an important source of information (Lopez et al., 2012; Terlutter et al., 2014). One reason is that they provide an economical, real-time, invaluable measure of patient experience and capture service quality concerns not captured in advance with traditional surveys (Alemi et al., 2012; Detz et al., 2013; Kilaru et al., 2016; Lockie et al., 2015; Merrell et al., 2013; Verhoef et al., 2014; Thielst, 2011). Other U.S.-based research reported that 25% of HCPs noted PRWs would improve the practitioner–patient relationship, and one third recorded that patient experience would improve (Holliday et al., 2017).

The benefits of online ratings extend beyond improving quality of care. HCPs can use PRWs to discover what patients are saying about them relative to their competitors. A survey of 2,360 HCPs in Germany reported that 87% of those that read online reviews were concerned about comments regarding their practice, 47% read comments about their competitors, and 36% read comments to know which measures might improve patient care (Emmert et al., 2016; Waxer et al., 2019). PRWs provide HCP professionals with advantages that extend beyond reputation management and deliver insights into patient satisfaction and quality of care. The question that remains is whether this trend in feedback could become pervasive enough to command attention and change behaviour.

3.4 Conclusion

This chapter discussed the reported inefficiencies in healthcare services, the PCC movement, and how PRWs are growing globally. Arguably, PRWs influence a proportion of patient decision-making when selecting a HCP. There is no doubt that PRWs are a measure of patient satisfaction; however, they can provide insights into some aspects of clinical quality of care. HCPs do not adopt PRWs at the same rate as patients, while patients' purpose and differences likely influence how they use these sites. Nonetheless, PRWs are a potential force that HCPs could use to their practice advantage. This narrative review provided an understanding of PRW characteristics that

HCPs may evaluate in their adoption decisions. These include how the history, ownership, content, and benefits of a PRW may influence HCP perception of relative advantage, the significance of PRWs as a measure of quality of care, and how this may influence HCP perception of compatibility in relation to how they would normally receive feedback and how patient awareness and use may influence ease of use. However, the literature review raised a number of questions to be examined before the research aims of the study can be addressed. These are:

- What are healthcare practitioners' attitudes and behaviours towards physician-rating websites?
- What are the different theoretical lenses adopted by researchers to conceptualise healthcare practitioners' adoption of physician-rating websites?
- What are the common findings, limitations, and opportunities within current research in relation to healthcare practitioner adoption?

The SLR in Chapter 4 addresses these questions by examining the state of knowledge of adopter characteristics, namely, HCPs. It also identifies opportunities to understand the rate of adoption of PRWs among HCPs and draws together the findings to establish the conceptual model for this study.

Chapter 4. Systematic Literature Review

The previous chapter examined the system characteristics of PRWs and current research on PRW use and user factors. This chapter investigates adopter characteristics and presents an SLR of the HCPs' adoption of PRWs. The objective of the SLR was to analyse the research progress and opportunities that warranted further investigation. The chapter is structured into five sections: the first section outlines the SLR process, the next details the background to the SLR and presents the research questions and review method, Section 4.3 presents a synthesis of the review, Section 4.4 addresses the SLR questions with observations emerging from the review, and the final section discusses the findings and concludes with a renewed research agenda.

4.1 Introduction

This chapter has three main objectives. The first objective is to systematically collect, summarise, and synthesise information regarding previous studies published in the literature between 2010 and 2021, a period chosen consistent with other PRW SLR findings, discussed in Section 4.2.3. The second objective is to report the empirical findings that pertain to HCPs' adoption of PRWs. The final objective is to identify knowledge gaps and opportunities that require further exploration and to propose a renewed research agenda.

To be of scientific value, SLRs require thoroughness and fairness (Kitchenham, 2004). There are various SLR methods, including the *Cochrane Reviewers' Handbook*, *The Guidelines* prepared by the Australian National Health and Medical Research Council, the Centre for Reviews and Dissemination *Guidelines* for those carrying out or commissioning reviews, and the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) guidelines (Kitchenham, 2004; Moher, 2009). These research methods are predominantly used in clinical and scientific research. This SLR followed guidelines proposed by Kitchenham and Charters (2007), who modified the aforementioned review protocols for the field of software engineering, making them more applicable to the nonmedical field. The guidelines are used for research in the domain of social media and knowledge sharing (Ahmed et al., 2019). The main stages of the systematic review include (a) planning, which explains the needs for the review, review questions, and review protocol, (b) conducting the review, which includes the

review method, and (c) reporting, which presents the results, discussion, and conclusion.

4.2 Literature Review Planning

4.2.1 Background

PRWs have gathered momentum as a form of consumer empowerment (Lopez et al., 2012; Menon, 2017). While much is written in the literature about patient adoption of PRWs, much less is known about HCP adoption. A review of the PRW literature that relates to HCP adoption is important to uncover the influences or attitudes of HCPs towards PRWs. The analysis of the findings may go part of the way to explaining the difference between patient and HCP adoption. By evaluating the depth, quality, and influence of empirical studies in this area, areas of knowledge deficit can be identified and propositions for a new research agenda developed. This understanding of HCP adoption is timely as patient usage is increasing, as evidenced in the previous chapter. In response to PRW users' feedback, successful defamation proceedings have been instigated recently by HCPs in countries such as Germany, the United Kingdom, and Australia (Freckelton, 2020).

Research relating to PRW adoption by patients, as described in Chapter 3, has matured to a limited degree over the last decade. The focus of research on PRWs has evolved from defining the phenomenon, through investigating its characteristics, to the different forms of adoption by patients and HCPs. In 2010, two studies that examined the characteristics of PRWs and patient experience were published (Lagu et al., 2010; Reimann & Strech, 2010). They investigated the structure and content of such sites and identified measures of patient satisfaction. At the same time, another stream of work compared PRWs to healthcare quality metrics (Gao et al., 2012; Greaves et al., 2012). While no support for PRWs' effectiveness in identifying the quality of doctors was evident, these studies have set an alternative research agenda for PRWs, challenging their efficacy. This finding contrasts with other emerging research areas that have taken PRWs as a measure of patient satisfaction, supporting greater healthcare transparency. Given that findings are equivocal, PRW adoption is ready for further study.

As content on PRWs, in the form of ratings and narrative reviews, started to increase through growing patient adoption, the extant research sought to understand the nature and intent of those reviews (Lagu et al., 2010; Lopez et al., 2012), the volume of ratings (Segal et al., 2012), and the characteristics of PRW users (Detz et al., 2013;

Emmert, Meier, et al., 2013). At that stage, few research articles had provided a review of the literature. Emmert, Sander, and Pisch (2013) were the first to conduct a systematic review of PRWs with a focus on content and characteristics, identifying that PRWs had gained in popularity and should not be ignored. While no SLR of HCP adoption was identified, subsequent and recent systematic reviews have examined the nature and scope of such PRWs and the views that patients express. Such reviews also explored issues associated with the data quality of PRWs and whether such user ratings on PRWs are associated with healthcare outcomes (Emmert, Sander, and Pisch, 2013; Hong et al., 2019; Mulgund et al., 2020; Verhoef et al., 2014). The focus on accuracy and quality represents a dichotomy; the healthcare community advocates reviews that judge quality on their terms, while arguably, consumers of health care use PRWs to express their opinions about their service experiences as a whole. Although disputes exist among authors with respect to the value of PRWs, the focus has largely been the system characteristics of PRWs (Lagu, Norton et al., 2019; Runge et al., 2020; Yu et al., 2020). As of 2021, a paucity of research has investigated HCPs' adoption and whether adopter characteristics influence PRW usage. This SLR examines research that has investigated HCPs' adoption of PRWs to understand current knowledge and identify opportunities to build knowledge, which informed the development of the conceptual model.

4.2.2 Systematic Review Questions

The standardised systematic search strategy used in this literature review is the population, intervention, comparison, and outcome (PICO) framework. PICO facilitates rigour in research, aids in forming questions for the review, and facilitates the literature search (Schardt et al., 2007). The following literature review questions were examined:

1. What are healthcare practitioners' attitudes and behaviours towards physician-rating websites?

2. What are the different theoretical lenses adopted by researchers to conceptualise healthcare practitioners' adoption of physician-rating websites?

3. What are the common findings, limitations, and opportunities within current research in relation to healthcare practitioner adoption?

4.2.3 Search Strategy

The objective of the search strategy was to report studies that address the SLR questions (Kitchenham, 2004). The following electronic databases were searched between 2010 and 2017 and then extended to 2021 to ensure the findings were contemporaneous: MEDLINE, Cochrane Library, APA PsycINFO, PubMed, and CINAHL with full text. These online databases were selected after a pilot search showed they provided the most results. The start year for the systematic review was selected, following Hong et al.'s (2019) systematic review that identified 96.8% of the studies on PRWs were published after 2010 and Mulgund et al. (2020) who located 49 studies relating to data quality issues of PRWs of which 48 were dated 2010 onwards. The searches were performed using the following PICO framework:

P = ("physician" or "doctor" or "provider" or "allied health" or "HCP" or "Psychologist" or "speech pathologist" or "physiotherapist" or "occupational therapist") AND

I = ("online patient feedback*" OR "PRW" OR "Physician Rating Websites" or "online reviews" or "online ratings" OR "patient experience feedback online" OR "consumer reviews" AND

C = No comparative intervention is applicable. Normally in the domain of literature reviews involving medical trials, a comparative intervention would take the form of a placebo tablet as an example. In addition, it is often difficult to use the "C" in qualitative analysis (Cooke et al., 2012)

I ("adoption" or "use" or "usage" OR '"behav*" or "attitude" or "perception" or "beliefs" or "awareness" or "concerns" or "decision" or "responses")

Mulgund et al. (2020) and Placona and Rathert (2021) employed similar search terms for their literature review of data quality and healthcare outcomes of PRWs. Specific terms related to the subjects of this study population were added, which included speech pathologists, psychologists, occupational therapists, and physiotherapists. In addition, all bibliographies (backward searching) and citations (forward searching) of included studies were examined, and any new articles that met the criteria were included.

4.2.4 Inclusion and Exclusion Criteria

Exclusion and inclusion criteria are used to transparently establish which studies can effectively address the SLR questions. Studies were considered eligible if they (a)

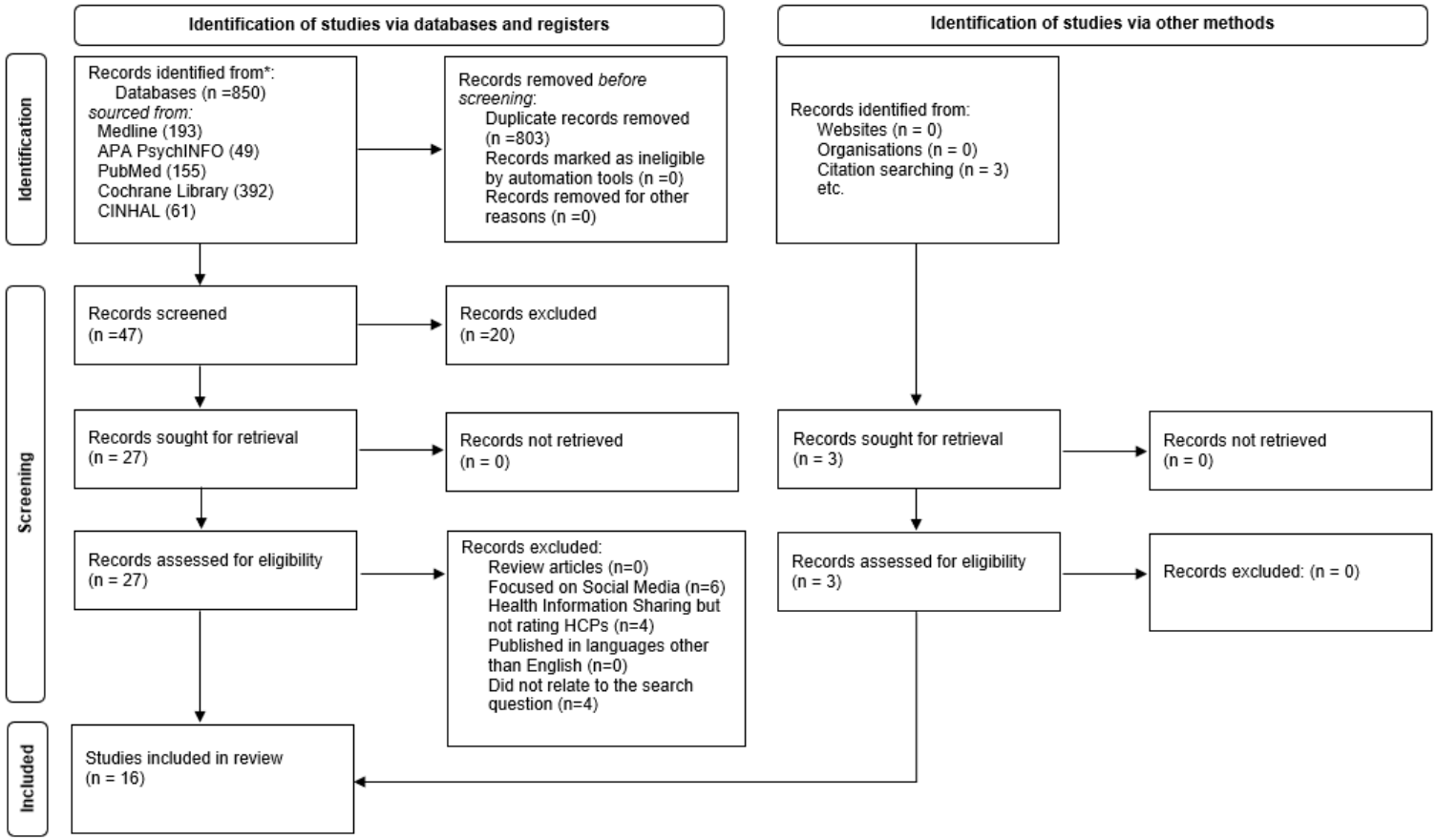
focused on HCPs' use or adoption of PRWs (b) were original empirical research studies, (c) were published between 2010 and 2021, (d) were written in English, and (e) were available as full text and had an explicit (identifiable) methodology. Ineligible studies were (a) review articles, conference papers, or abstracts, (b) those where the primary focus was health condition information sharing without reviewing the performance of a HCP, (c) primarily focused on social media or internal HCP platforms that were not published into the public domain, (d) published in languages other than English,, (e) outside the search timeframe, (f) did not relate to the research questions, and/or (g) duplicated studies (in which case, the original study was retained).

4.2.5 Study Selection Process

The initial search of the electronic databases returned 850 articles, presented in Figure 4.1. For each manuscript, preliminary relevance was determined by title and abstract screening. After the removal of duplicates, the exclusion and inclusion criteria were applied to the remaining 47 studies. The preliminary relevance of each study was determined by examining the abstract and title for each study, a screening method recommended by Okoli and Schabram (2010). A further 20 studies were removed as they did not meet the inclusion criteria. Each remaining study was read in full and assessed against the exclusion or inclusion criteria, following which a further 14 studies were removed as they did not meet the inclusion criteria. An additional three studies were included following a search of citations of reviewed studies.

Figure 4.1

Reporting Items for Systematic Reviews



Note. From 'The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews' by M. J. Page et al., 2021, *British Management Journal*, 372(71), p. 19.

For each study, data were extracted and categorised by publication year, publication, country of origin, authors, theme, theoretical basis, dependent and independent variables, data source, results, conclusion, methodology, journal ranking, and impact score. All information was recorded in a Google Sheets spreadsheet to facilitate retrieval and summary. A summary of the results is presented in Table 4.1

Table 4.1

Literature Review Summary

Author	Study design	Population	Intervention	Outcome	Theories used	Country	Journal and impact factor (2020)	Scimago scientific journal rank	Scopas citations as at 12 Nov 21
Atherton et al. (2019)	Observational cross-sectional	General practitioners	HCP attitudes and behaviours	Unrepresentative; limited value for improving services	Nil	United Kingdom	*Journal of Health Services Research and Policy* (2.377)	Quartile 2	6
Emmert et al. (2016)	Observational cross-sectional	Mixed: existing users of a PRW	HCP use and purpose of online reviews	54.66% users	Nil	United Kingdom	*Journal of Medical Internet Research* (4.559)	Quartile 1	39
Emmert et al. (2017)	Observational	Mixed: had a response to a rating	HCP responses to online reviews	1.58% responded to reviews	Nil	Germany	*Journal of Medical Internet Research* (4.559)	Quartile 1	8
Gross et al. (2021)	Observational	Orthopaedic surgeons	Perception of online feedback	79.2% used; 10.3% felt pressure to prescribe narcotics due to a bad review; 77% strongly agreed could permanently damage a surgeon's reputation	Nil	United States	*Journal of Bone & Joint Surgery* (4.90)	Not available	0
Holliday et al. (2017)	Observational cross-sectional	Doctors at hospitals	HCP views on PRWs	47% never visited; 78% posting narrative would cause job stress; 46% negative effect on patient–doctor relationship	Nil	United States	*Journal of General Internet Medicine* (5.128)	Quartile 1	49

Author	Study design	Population	Intervention	Outcome	Theories used	Country	Journal and impact factor (2020)	Scimago scientific journal rank	Scopas citations as at 12 Nov 21
Kemp et al. (2020)	Observational cross-sectional	Mixed: hospital doctors	Attitudes and concerns of public online feedback	HCP expressed risk perceptions that influence attitudes towards rating system	Protection motivation theory	United States	*International Journal of Healthcare Management (2.19)*	Quartile 3	1
Lagu, Haskell, et al. (2019)	Observational	Mixed	HCP attitudes towards PRWs in HCP selection	Uninformed or sceptical; stated not helpful in choosing a HCP	Nil	United States	*Journal of General Internal Medicine* (5.128)	Quartile 1	2
Menon (2017)	Interview	Cosmetic surgeons	HCP perception of online reviews	HCPs see them as a threat to their reputation	Nil	United States	*Social Science and Medicine* (4.296)	Quartile 1	3
S. Patel et al. (2015)	Thematic analysis	General practitioners	HCP attitudes towards online feedback	Validity, usability, transparency, and subsequent impact on them and their businesses	Nil	United Kingdom	*Journal of Medical Internet Research* (4.559)	Quartile 1	24
Ramsey et al. (2019)	Observational	Doctors at hospitals	HCP typology of responses	Five response types: no response, generic, appreciative, offline, transparent, and conversational	Nil	United Kingdom	*Patient Experience Journal* (not available)	Not available	5

Author	Study design	Population	Intervention	Outcome	Theories used	Country	Journal and impact factor (2020)	Scimago scientific journal rank	Scopas citations as at 12 Nov 21
Samora et al. (2016)	Observational cross-sectional	Hand surgeons	Attitudes and behaviour changes towards PRWs	65% unfavourable attitude; 39% change referral patterns	Nil	United States	*Journal of Hand Surgery* (1.941)	Quartile 1	29
Syed et al. (2019)	Observational cross-sectional	Shoulder and elbow surgeons	HCP perspective and use	74% did not use; 88% indifferent or unfavourable towards online reviews	Nil	United States	*The Archives of Bone and Joint Surgery* (not available)	Quartile 2	5
Turk et al. (2020)	Qualitative free-text comments in a quantitative survey	General practitioners	HCP attitudes	Scepticism, caution, limitations, challenges	Nil	United Kingdom	*Digital Health* (3.343)	Quartile 2	1
Waxer et al. (2019)	Observational	Radiation oncologists	HCP awareness and how utilised	HCP concerned (97%); 58% unfamiliar with PRWs; 57% did not check online reviews	Nil	United States	*Journal of Medical Internet Research Cancer* (4.7)	Quartile 1	1
Zaki et al. (2020b)	Observational	Radiation oncologists	Online patient feedback	45% of HCP agreed or strongly agreed that online assessment tools contribute to burnout	Nil	Worldwide	*Applied Radiation Oncology* (not available)	Quartile 4	1
Zwier et al. (2019)	Observational	Mixed	Online feedback	Nil	Nil	United Kingdom	*British Journal of Healthcare Management* (0.21)	Quartile 4	1

A quality assessment of the selected studies was performed, which is important to reduce bias and maximise internal and external validity (Kitchenham, 2004). Quality assessments also distinguish the differing levels of evidence in the literature, and while not all low-quality studies may be excluded, the higher quality studies will be recognised (Okoli & Schabram, 2010). The quality assessment was developed with the following criteria:

a. The topic was related to third-party platform PRW adoption.

b. The theoretical basis for the study was articulated.

c. The research was ranked in the first quartile (Q1) or second quartile (Q2) of its category in the Web of Science classifications or Scimago Journal & Country Rank. Both are ranking measures of bibliometrics, accounting for scientific influence and number of citations. Q1 represents a high-quality journal.

d. The journal impact factor was greater than 3.

The criteria were uniformly applied to both quantitative and qualitative studies, as recommended by Okoli and Schabram (2010). Each article was scored on the quality criteria from 1 to 3; a score of 1 meant that the study only met one of the three criteria, while a score of 3 meant all the criteria were met. A minimum quality standard was at least a score of 2. The results of the quality assessment showed most studies scored 2 (n = 12) and 1 (n = 4). No study had the highest quality ranking, predominantly because of a lack of theoretical basis. Though most studies scored a quality score of 2, 85% of studies originated from one specialised topic journal in Q1 Web of Science or Scimago category rank.

4.3 Data Extraction and Synthesis for Systematic Literature Review

The data extraction process facilitates the collection of all the information necessary to address the SLR questions (Kitchenham, 2004). This section details the authorship, quality, publication, methodology, methods, and topic of the included literature.

4.3.1 Study Characteristics

A common understanding of what a PRW is and what it does is important for two reasons; first, for research in the field to be comparable, the researcher must

measure the same phenomenon, and second, when making recommendations for future research, the phenomenon must be clearly understood. The included studies lacked consistency in defining PRWs. For studies that provided a definition (*n* = 9), they included phrases such as a repository of directory information (*n* = 2), online scoring, evaluation, or measures (*n* = 6), providing experiential feedback (*n* = 3), and a tool for transparency and quality (*n* = 2) Those studies without a definition (*n* = 7) challenges the synthesis of research findings in terms of identifying common constructs, themes, and meanings within diverse definitions of PRWs. With this limitation in mind, further characteristics of PRWs follow.

There is limited research on HCPs' adoption of PRWs (Gross et al., 2021; S. Patel et al., 2015); the first included in this SLR appeared in 2015 (S. Patel et al., 2015). The number of publications has fluctuated from year to year; two publications appeared in 2016, three in 2017, two in 2018, four in 2019, three in 2020, and one in 2021. The volume of studies on patient adoption of PRWs is more extensive. A supplemental literature search is at Appendix B. These searches aimed for comprehensive coverage by using broader search terms that included patient adoption. A search found 118 studies related to other PRW topics, including content analysis, patient adoption, and PRWs as a measure of quality, and 10 studies related specifically to HCP adoption or usage (only the latter are included in this SLR). Mulgund et al. (2020) identified 49 studies in their literature review on data quality issues of PRWs, Hong et al. (2019) identified 63 that related to patient contributions and in an adjacent area of interest, and Baines et al. (2018) identified 20 studies that examined the role of PRWs for patient feedback. Notwithstanding there being ample research on PRWs, only 10 were found in the supplemental literature search that focused on HCP adoption of PRWs.

The samples in the studies were collected from unspecified healthcare groups or settings (*n* = 5), general practitioners (*n* = 3), HCPs in hospitals (*n* = 2), radiation oncologists (*n* = 2), cosmetic surgeons (*n* = 1), hand surgeons (*n* = 1), orthopaedic surgeons (*n* = 1), and shoulder and elbow surgeons (*n* = 1). The sample population sizes varied from a low of 20 participants for an interpretivist study (S. Patel, 2015) to a high of 2,360 participants for a positivist study (Emmert et al., 2016). The identified studies were conducted in three countries—United States (*n* = 8), United Kingdom (*n* = 6), and Germany (*n* = 1)–and one was conducted with members of the American Society for Radiation Oncology members practising internationally. Of note, no studies in the SLR were conducted in Australia or had a sole focus of allied health professionals. The

sample population of the study described in this thesis included allied health professionals (speech pathologists, occupational therapists, psychologists, and physiotherapists) in Australia. The SLR articles did not specifically investigate the same HCP occupations.

4.3.2 Publication Journals and Study Quality

The quality of journals was noted as high if they were ranked in Q1 or Q2 of the Scimago Journal & Country rank (*N* = 11), and low if they were ranked in quartile three (Q3) or below Q3 (*N* = 3). Two were not ranked through Scimago. The impact factor of the journals is recorded where available. A journal with an impact factor greater than 3 is considered a good journal; however, specialist journals with a niche focus may have a lower impact, so any score above 10 is considered a very high standard (Stirling, 2001). Being allocated an impact factor indicates the journal's standing and how it compares to others in the same category; the higher the number, the higher the impact of the journal. There were no journals with an impact factor greater than 10, nine journals with a score greater than 3, four journals with a ranking below 3, and no result for three journals. More than 50% of the journals identified in this SLR are considered good quality.

The journals featured diverse academic and professional disciplines: those with a specific focus on the internet and health care (*N* = 7), those with a management or social science origin (*n* = 5), and those from a healthcare professional association publication (*N* = 4). To understand the dissemination of the included studies, the citation index from Scopas was examined for all included studies. The variability was high for the most-cited paper (Holliday et al., 2017; *n* = 39) to the lowest cited papers (*n* = 1; Kemp et al., 2020; Turk et al., 2020; Waxer et al., 2019; Zaki et al., 2020b; Zwier, 2019), and one yet to be cited (Gross et al., 2021).

4.3.3 Research Methodology

The chosen methodologies for studies of HCP adoption of PRWs were varied. The most predominant methodology used was the positivist approach representing 12 (71.4%) of all studies, followed by interpretivism used in four studies, and no study reported using mixed methods. The quality of research design was assessed using the five levels of evidence promoted by the National Health and Medical Research Council (NHMRC) in Australia (Merlin et al., 2009). The strongest level of evidence, Level I, are systematic reviews of Level II studies, Level II studies are randomised control trials,

Level III studies include comparative studies with concurrent controls, case control studies and cohort studies, and Level IV are defined as case series or cross-sectional studies (NHMRC, n.d.). The SLR did not identify any SLRs that solely focused on HCP attitudes or perceptions of PRWs. Cross-sectional and case series studies comprised 100% of all included studies. Adding to the low quality of evidence was the low statistical predicative power of the methodology employed, descriptive statistics (n = 2), descriptive statistics and regression (n = 4), descriptive statistics and chi-square tests (n = 3), and descriptive statistics and correlation analysis (n = 3). While the research methodology would be considered Level IV, the included studies would still make a meaningful impact having been published in high-quality journals (N = 11), and four articles had been cited more than 24 times since 2015.

4.3.4 Study Topics

The outcomes label, as described in the PICO analysis, was used both to define the search terms and as a means to describe findings. A study was classified as an adoption study if the study sought to understand adoption, attitudes, and perceptions without identifying awareness or usage statistics (n = 5). The key outcomes reported in these studies were unfavourable attitudes towards online reviews and PRWs. The outcomes reported included HCP attitudes of scepticism, increased risk of use, threat to their reputation, difficult usability, and doubts as to PRW validity. Studies were classified as decision studies if they identified usage statistics without reporting attitudes, adoption, or perceptions (n = 5). The reporting of usage rates was difficult to compare as they measured different variables; in one study, the number of HCPs who read comments was 87%, while in another study, the number responding to reviews was only 1.58%. Both studies did not report the corresponding result; that is, the study that reported read comments did not report the percentage that responded to reviews. Finally, studies were classified as mixed if they reported both usage and behaviours and attitudes, or perceptions (n = 6). The attitude of HCPs towards PRWs was also reported as unfavourable, varying from 78% to 97%. Even though the attitudes were unfavourable, usage varied from 21% to 57%. The association between HCP adoption stage and decision stage of PRWs was not clearly explained. Studies that reported adoption variables, such as unfavourable attitudes, also measured the decision to adopt a PRW.

4.4 Responses to Systematic Review Questions

4.4.1 Question 1: What are Healthcare Practitioners' Attitudes and Behaviours Towards Physician-Rating Websites?

The analysis revealed that distinguishing between HCPs who had yet to make an adoption decision (knowledge and persuasion stage), those who had used it (decision stage), and those who put PRWs into use (implementation stage) was not possible. The studies reviewed in the SLR did not separate attitudes towards PRWs between the different stages of the innovation decision process. The results therefore focus on the main findings of the pre-adoption, knowledge, and persuasion phases of DOI.

The analysis found that more studies examined adoption and use of PRWs by HCPs (n = 15) than pre-adoption studies alone (n = 1), providing insights into how rather than why HCPs utilise PRWs. Awareness, the first stage of the innovation adoption process (E. M. Rogers, 2003), was greater than 50% across all studies that reported awareness statistics (n = 10); the lowest value was 59% (Waxer et al., 2019) and the highest 100%, which derived from studies that surveyed HCPs already using PRWs.

The study by Kemp (2020) was the only pre-adoption study of attitudes and perceptions. The findings from that study of 38 physicians confirmed two relationships: First, risk perceptions associated with the online review system were negatively related to adoption intention, and second, risk perceptions associated with the online rating system were negatively associated with favourable attitudes towards the rating system. The research identified that if risk perceptions were mitigated, by ensuring a fair and equitable online review system and organisational support during implementation, HCPs may be more likely to adopt the system.

The other adoption and usage studies identified that HCPs' attitudes and concerns in relation to PRWs could be construed as unfavourable. Two studies specifically reported unfavourable attitudes of 65% and 40%, respectively (Samora et al., 2016; Syed et al., 2019). Seven studies did not report specifically on unfavorability but identified concerns relating to the validity and accuracy of PRWs (n = 7), and four studies reported statistics ranging from a low of 33% to a high of 43%. Other concerns included bias or unrepresentativeness of PRWs (n = 2); 66.3% of the population sampled by Atherton et al. (2019) were in agreement, while the other study by S. Patel et al., (2015) did not report frequencies as it was a qualitative study. A concern reported

across four studies related to the effect of PRWs on HCP burnout and stress. Of the three studies that reported statistics, one reported 45% in agreement, while the other two reported 77% and 78%. One study reported on the degree of risk presented by HCPs, but no statistics were reported on how many endorsed that the risk was high in adopting a PRW. Across categories of both potential adopters and users of PRWs, findings suggested that HCPs viewed PRWs as either unfavourable or expressed various concerns.

The analysis found three types of HCP usage reported across 10 of the 16 studies; the first type was that HCPs read online reviews about themselves to understand what had been written (n = 5). The reported results for this type of usage was varied, as reflected in the respective statistics that reported 26%, 34%, 43%, 49%, and 87% reading usage rates. The value of 87% usage was reported in a study by Emmert et al. (2017) of HCPs already subscribed to a PRW in Germany called Jameda. The second type of usage was by those who responded to reviews. The reported measures (n = 4) for this type of usage were mixed, starting at a low of 1.6%, 27.8%, and 39% to the highest response usage of 88.2%. The study reporting 88.2% examined use of the PRW Care Opinion, which required the patient to write a story about their experience. The site was moderated, and Care Opinion actively engaged the HCP for a response. If the 88.2% usage frequency was seen as an outlier and disregarded, the number of HCPs responding to reviews was less than 50% of those surveyed. The third type of adoption was related to implementing or the intention to implement patients' feedback on PRWs. The rate (n = 5) for this intention and usage was also low with the exception of an outlier study. In a qualitative study, the intention to implement was favourable; however, in other studies of adoption and usage, the reported incidence was low, ranging from 6% intention to implement feedback to a maximum of 12%. In one study, 10.3% of HCPs reported the perceived necessity to prescribe narcotics to avoid a negative review (Gross et al., 2021). In the outlier study, 55% of HCPs who were already subscribed to a PRW reported that they had implemented measures from feedback on PRWs (Emmert et al., 2016).

The analysis identified differences in the attitudes and behaviours towards PRWs by HCPs' discipline (e.g., medical speciality) and levels of analysis, such as individual or organisational. One study reported differences between doctors and nurses, finding that general practitioners were less accepting of PRW feedback than nurses. The results showed that 40.9% of general practitioners did not report PRWs to

be useful, while 73.6% of nurses agreed that they were useful. Emmert et al. (2016) found that ophthalmologists (68%) were more likely to implement improvements identified by PRWs than psychiatrists (38%). Ramsey (2019) reported that organisational responses may differ to individual responses, which could be attributed to the person responding to the review who may not be the HCP subject to the review. Second, more complex organisational influences, such as online media policies, may affect the organisational level responses.

Definitive conclusions were difficult to draw with respect to HCP attitudes towards PRWs. From the limited evidence, HCPs' attitudes towards PRWs appeared generally unfavourable, and HCPs expressed concerns about the validity and lack of representation of PRWs. Further, HCPs reported that PRWs caused stress and burnout and could affect their reputations. There may be differences in the attitudes of HCPs towards PRWs as well as variability in behaviour such as implementing changes suggested by the PRW feedback. PRWs may be used in the context of reputation management; for example, PRWs may be used for reviewing what patients have said rather than using the feedback to innovate and improve their services. The unfavourable attitudes towards PRWs reinforce this finding demonstrated in concerns expressed, including stress and burnout as well as challenging the feedback posted by patients. HCPs' opinion that patients do not have the experience to judge HCP quality and the value of any feedback is questionable (Gross et al., 2021; Holliday et al., 2017; Lagu, Haskell, et al., 2019; Menon, 2017; S Patel et al., 2015; Samoa et al., 2016; Turk et al., 2020).

4.4.2 Question 2: What are the Theoretical Lenses Adopted by Researchers to Conceptualise Healthcare Practitioners' Adoption of Physician-Rating Websites?

Very few studies of HCPs used a theory-based approach; indeed, just one study utilised PMT (R. W. Rogers, 1975). As discussed in Section 2.3.1, PMT posits that when individuals are confronted with a threat, they cognitively assess the threat and possible remedy by conducting a threat or coping appraisal. In assessing the threat, factors such as response efficacy, self-efficacy, and intrinsic and extrinsic rewards are considered.

In the context of PRWs, PMT was used to investigate the attitudes and concerns of physicians regarding a star rating system to be implemented at a major nonprofit

healthcare system in the United States (Kemp et al., 2020). The PMT-oriented study (Kemp et al., 2020) argued that HCPs feared PRWs and online rating systems. There was no prior evidence that identified empirical research to support this assumption. The two references provided to support these concerns were Butcher (2017) and V. Lee (2016); both articles were opinion pieces and not empirically based.

Further, the statistical significance of the study results may be questioned given the small sample (n = 38). Regression analysis was the method performed, and consequently, the reported outcome could only relate to association rather than cause. A larger sample size, as a minimum over 100 (Byrne, 2016; Loehlin 1992), and statistical methodology such as SEM would facilitate the analysis of data for inferential purposes rather than simple association (Byrne, 2016).

PMT has limitations such as difficulty in capturing user intentions in an organisational setting (Yang et al., 2020) and inconsistent results in the field of information technology relative to its application in health promotion studies (Menard et al., 2017). The key limitation of PMT in relation to this study is that adopter characteristics independent of the system or innovation characteristics are of interest for understanding adoption. SDT was used in the present study to investigate the different types of HCP motivation for working as a health professional. PMT had limited value in the current study as the motivation factors were constrained and, specifically, the influence of adopter characteristics such as intrinsic motivation were not considered.

4.4.3 Question 3: What Are the Common Findings, Limitations, and Opportunities Within Current Research in Relation to Healthcare Practitioner Adoption?

The SLR revealed a number of opportunities to be explored which could broaden understanding of HCP adoption of PRWs. Providing a theoretical and robust methodological basis, including larger sample sizes, future studies could more reliably estimate adoption variables and their predictive capacity on behaviour. Estimating both the antecedents and mechanisms of adoption is made more possible by incorporating both latent constructs and observed variables (Byrne, 2016).

As reported in Section 3.1, there are differences in international healthcare systems, whereas the selected studies in this analysis were based only in three countries. Therefore, future studies should examine HCP attitudes in other countries to understand if different healthcare systems, available technologies, and norms or policies for

embracing such technologies likely influence HCP attitudes towards PRWs. Moreover, the SLR found differences in responses across disciplines. There was a notable absence of allied health professionals in the research studies. Consequently, including diverse HCP disciplines in future studies could be useful to understand if professional attitudes and norms influence adoption among HCP specialities.

This analysis of 16 studies identified three different types of usage, which require further examination to understand why or if the differences exist across more and better quality studies. Arguably, the extant evidence from this limited review suggests that some HCPs had made a partial adoption decision. Some HCPs reviewed PRWs to read what had been written about them, but may not take further action. The majority of HCPs in the reported studies did not use PRWs for reputation management nor to improve the services they provided. Some studies reported unfavourable attitudes and concerns of PRWs, such as burnout and stress, as well as questionable concerns that the content was not representative of the HCP role and context. In sum, the evidence derived from this limited SLR as expected is equivocal about the way in which PRW feedback compares to other types of feedback, such as patient surveys, or whether PRWs have a legitimate role in reputation management innovations.

The efficacy of PRWs as a measure of clinical quality was a common theme found in the narrative literature review (see Section 3.3.5); however, only Gross (2021) reported a statistic on HCP attitudes. Gross's study found that 73% of HCPs did not consider PRWs as a measure of clinical quality. Further, exploration of the effects of PRWs' design diversity on HCP perceptions was absent—for example, how content such as star ratings relative to narrative comments influence HCP perceptions of PRWs.

Kemp's (2020) study into the perceived risks of using a PRW identified that adopter characteristics could influence adoption decisions. While one of the first studies to look at adopter characteristics in the context of PRW adoption by HCPs, the study did not explore other types of motivation. Given motivation is a broad concept, distinguishing the different types of motivation and differentiating those from system characteristics has the potential to provide deeper understanding of their relative influence on HCPs' adoption and use of PRWs.

There is discourse in the literature about whether a need for an innovation precedes knowledge of the innovation (E. M. Rogers, 2003). If a HCP has knowledge of a PRW, it does not necessarily follow that they perceive it as an innovation. In the context of technology adoption, a need is a state of dissatisfaction between actualities

and a person's desires (E. M. Rogers, 2003). Understanding an individual's motivation provides insights into a portion of their needs. Knowledge of PRWs may create a motivation for a HCP to learn more; this would be contingent on whether unsatisfied needs exist. Consequently, evaluation of HCPs' motivations is a fruitful area for further research. Motivation is of interest as it influences the process of information intake, which may lead to the persuasion stage and then adoption (E. M. Rogers, 2003). If HCPs do not perceive PRWs to be relevant to their needs, or they do not have enough information on the capabilities of PRWs, the innovation decision process would not extend beyond the knowledge stage to the persuasion stage.

Understanding the differences between HCPs' adoption of PRWs compared to other online rating websites would be significant. Such a comparative analysis would enable researchers to understand if low adoption of PRWs was associated with HCPs being the subject of the rating or if it was consistent with their behaviour across all online rating websites.

Characteristics of the decision-making entity (HCPs) have been given limited attention in the research community. The included studies in this SLR did not comprehensively report differences in personality variables such as motivation, socioeconomic factors, or communication behaviour, the characteristics identified by E. M. Rogers (2003) in the knowledge stage. Understanding and controlling for adopter characteristics in comparison to the PCIs of PRWs would extricate respective influences for further analysis.

4.5 Discussion

This review sought to understand recent empirical research pertaining to HCP attitudes and behaviours towards PRWs. While several studies explored adopter characteristics, such as attitudes and perceptions of PRWs, and others separately examined system characteristics, no studies examined adopter and system characteristics together. This SLR concludes that individual characteristics of HCPs may influence adoption separately to the effect of system characteristics. The analysis of articles identified differences in attitudes and usage types as well as differences between intention to use and actual usage.

There is a greater volume of research exploring how, rather than why, HCPs use PRWs. There are a number of possible explanations that could be investigated. Given the limited evidence of PRW feedback implemented into practice, an opportunity exists

for HCPs to go beyond reviewing their profiles and leveraging the feedback to improve efficiencies in the way they work. Studies that explore other adopter characteristics could enable a better understanding of the implications for HCP needs and how they influenced their attitudes to the PCIs.

Following on from adopter and system characteristics, understanding whether HCPs perceived PRWs as a tool for reputation management or performance feedback would enable exploration into different streams of research. For example, if PRWs were perceived as a tool for reputation management, marketing theory could be explored to understand how it applies in other industries relative to health care and whether HCPs could leverage the available knowledge. Baines et al.'s (2018) systematic review investigating the impact of patient feedback on medical performance, which specifically excluded online feedback, reported that medical culture may play a role in feedback acceptance, noting that being positively viewed by others was an important part of being a HCP. If HCPs perceived PRWs as a mechanism for both clinical and process feedback, exploration of how other forms of feedback are received and implemented by HCPs may uncover underlying barriers to adoption, independent of the platform used for feedback.

While studies on patient adoption of PRWs are geographically diverse, research on HCP adoption is limited to three countries, predominantly the United States (n = 8), the United Kingdom (n = 6), Germany (n = 1) and an international study (n=1). PRWs are a global phenomenon, but healthcare services are set in a geopolitical environment, and each country has a set of unique healthcare system characteristics. The United States and Germany are known for their market-based healthcare systems, while the United Kingdom is a heavily regulated public system (Joumard et al., 2010). The Australian healthcare system is founded on public basic insurance coverage and a reliance on market mechanisms, distinct from the United States and Germany, and generalising any reported findings to Australian HCPs would not account for all idiosyncrasies.

The strengths of this review include the application of a recognised systematic process and one of the first reviews to examine HCP attitudes and behaviours towards PRWs; however, there are limitations. The methodological quality of the included studies with small sample sizes, a limited number of disciplines, and few comparable awareness of PRW statistics make it difficult to generalise the findings to wider populations. The conclusions drawn may be limited in nature as all studies were

observational and noncomparative. In addition, while this SLR was comprehensive and supplemented by other reviews, a search of the grey literature was not in scope, meaning that potentially relevant non-peer-reviewed studies were not included.

4.6 Conclusion

The consumer adoption of PRWs is growing at a faster rate than HCPs' adoption, especially when compared to other industries (Boylan et al., 2020). Published studies on HCPs' PRW awareness and usage are few, and findings are difficult to generalise. The limited research in the field of PRWs suggests HCPs do not use the feedback detailed on PRWs to change the way they practise. PRWs are growing, and HCPs will not be able to avoid online evaluation; HCPs who embrace PRWs are most likely to succeed (Merrell et al., 2013).

There are no current research studies that examine allied health professionals' awareness or usage of PRWs in Australia. To address these shortcomings, this study explored HCPs' BI to adopt PRWs in Australia. The perceived gap examined in this study in researching the BI of HCPs to adopt PRWs supports the call for more research in the field. Lopez et al. (2012) identified that future studies should explore HCPs' reactions identified by internet reviews and observe their effect on medical practice and communication. Emmert et al. (2017) recommended that further research is needed to learn more about the motivations of physicians to respond, or not, to web-based patient ratings. In reviewing physician effort into using the Chinese PRW The Good Doctor, through the lens of social exchange theory, Deng et al. (2019) identified that more attention should be paid to the behaviour of physicians in this online environment. The understanding of HCP adoption of PRWs is lacking empirical evidence. Hong et al. (2019) also called for research on PRWs to use rigorous design. Following the literature review and the empirical studies identifying gaps in knowledge, this research aimed to increase the knowledge on HCP adoption of PRWs by examining the adopter characteristic of motivation and the system characteristics of a PRW identified in Chapter 3.

5. Conceptual Framework

This chapter first explains innovation adoption in health care and discusses how DOI and SDT provide a theoretical lens to investigate HCPs' adoption of PRWs. Second, the theories are revisited and specifically applied in the healthcare context. Following is the conceptual framework, which explains and integrates the two theories in an applied context and provides the foundation of the study hypotheses.

5.1 Innovation Adoption in Health Care

In health care, new innovations are abundant; however, the dissemination of innovation in the sector can be complicated by inherent characteristics of diverse organisations. A decade ago, Rao et al. (2011) found less than 2% of healthcare businesses with two clinicians or fewer had adopted electronic health records for their practices. Notwithstanding significant advances in health-related research, implementation delays are common, which is both costly and harmful (Berwick, 2003). For example, randomised control trials identified that cheap antibiotics were best for first-ear infections, yet a study in the United States found 30% of 12,000 children with an ear infection received expensive and hazardous antibiotics with an excess cost of USD200,000 (Berwick, 2003). The push by WHO Europe et al. (2016) for HCPs to adopt new initiatives to address modern health problems and escalating costs suggests that HCPs' reluctance to adopt new innovations is contributing to inefficiencies. J. Brown et al. (2014) found that in Australia, medical doctors had yet to fully integrate online communication and social media into their clinical practice, and many were unable to protect their personal information online. The slow uptake of new innovations in health care is a global phenomenon, and its adoption is important to improve healthcare outcomes. However, the COVID-19 pandemic has hastened the implementation of communications through technologies (Clipper, 2020; Golinelli et al., 2020), suggesting change can be quicker.

Various factors contribute to the nature of innovation adoption in health care. In an organisational healthcare setting, Berwick (2003) explored three factors influencing the rate of adoption, including perceptions of the innovation, characteristics of the individual, and managerial factors within the organisation, with the first two relevant to the current study. More recent analysis of innovation adoption in health care identified the importance of strategic innovation management (Flessa & Huebner, 2021). Some

examples of potential barriers to adoption that relate specifically to the characteristics of PRWs include that online reviews are biased (S. Patel et al., 2015), lack transparency and confidentiality (Turk et al., 2020), and have numerous data quality issues (Mulgund et al., 2020). There is also little evidence to support the implementation of feedback provided through PRWs (Samora et al., 2016), and patients who contribute to the reviews do not have the technical skills to properly judge the service encounter with the HCP (Holliday et al., 2017; Menon, 2017). In terms of characterising the barriers in accordance with the PCIs in DOI theory, the first three barriers relate to relative advantage and the last relates to compatibility. Examples of the characteristics of HCPs contributing to slow adoption include lack of trust and organisational support (Kemp et al., 2020), increase in perceived job stress and burnout (Holliday et al., 2017; Zaki et al., 2020a), new innovations representing a challenge to HCP authority, and HCPs preferring to wait until they know the innovations will not burden them financially (Baines et al., 2018; Fleuren et al., 2004; Hawn, 2009). The SLR in Chapter 4 found that few PRW studies have used a theoretical lens to examine the phenomenon and even less have investigated system perspectives and individual characteristics of the user. The following section discusses DOI and SDT individually and collectively and how they relate to PRWs.

5.1.1 Diffusion of Innovation in Health Care

E. M. Rogers' (2003) DOI theory has been applied in dissemination and diffusion research in health care for many decades. Examples include public health promotion and behavioural change (Oldenburg & Glanz, 2008), adoption of evidence-based practice (Wisdom et al., 2014), adoption of patient portals (Emani et al., 2018), adoption of mobile electronic records by nurses (Hsu et al., 2013), and factors that influence Generation Z in their adoption of the COVID-19 vaccine (Jose, 2021). DOI has been used to examine the adoption of social media by public relations practitioners in public health departments (Avery et al., 2010) and in the diffusion of a new clinical procedure for ambulatory orthopaedic extremity surgery (Leggott et al., 2015). In both studies, the findings confirmed that DOI is useful for understanding innovation diffusion. The DOI is helpful when determining the adoption of specific clinical behaviours (Sanson-Fisher, 2004), and a recent systematic review of medical technologies concluded that taking a DOI approach increased their clinical implementation in health care (Warty et al., 2021). The application of Rogers' (2003)

DOI enables examination of technology-related characteristics while being complementary to other theoretical models of human factors.

5.1.2 Self-Determination Theory in Health Care

Professional services occupations are arguably motivated by intrinsic values that uniquely define that profession (Madara & Burkhart, 2015). The motivation of HCPs is the subject of much discourse. An SLR of medical students' motivation to select medical studies internationally found the most-cited motivation factors included interest in medicine, work independence, professional growth, work for people, help underprivileged, social status, financial security, and family tradition (Goel et al., 2018). Altruism has been considered an inherent part of a doctor's motivation at least since the Hippocratic Oath (Wicks et al., 2011). Kolstad (2013) confirmed evidence of this motivation, whereby coronary artery bypass surgeons were four times more likely to choose the intrinsic incentive of higher quality than the extrinsic incentive of more patients for more financial gain. However, such motivation has been questioned since the 1970s following malpractice suits that have challenged the social contract between practitioners and clients. Patients' interest in the question of whether HCPs are primarily motivated by financial gain or altruism has grown (Harris, 2018). The motivation of HCPs is of interest because of its diversity within the profession.

HCPs' motivation type has been linked to different outcomes in the nature and quality of their work. HCPs who are more intrinsically motivated at work report better occupational health. Therefore, instilling strategies that support intrinsic motivation may benefit the wellbeing of patients (Moller et al., 2019). A Netherlands survey of hospital medical specialists found that external material rewards or punishments had the least effect on HCPs' motivation to maintain their knowledge and skills and provided up-to-date patient treatments (van der Burgt et al., 2018).

SDT research in health care is abundant and varied; studies range from examining the motivations of patients to adopt a healthier lifestyle (Sevild et al., 2020; Vansteenkiste et al., 2005) to research on the motivations of HCPs to adopt new treatments for patients (Kosmala-Anderson et al., 2010; Ridgway & Hickson, 2020). The effectiveness of interventions to change health behaviour using SDT was supported by a meta-analysis conducted by Ng et al. (2012). Despite the significant research on motivation, few studies have applied SDT to understanding communications technology adoption (Y. Lee et al., 2015). The SLR in Chapter 4 located no empirical research at

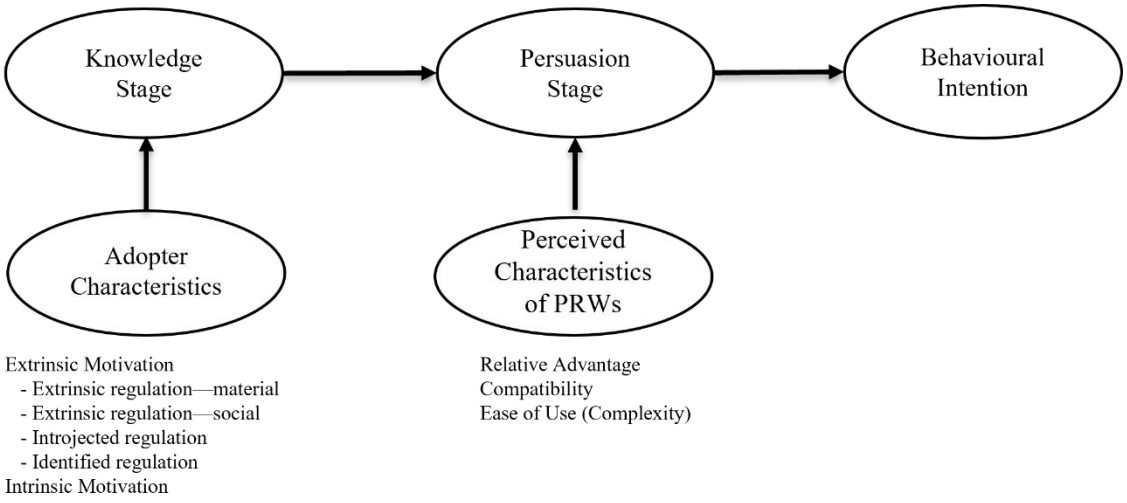
that time on how intrinsic motivation types influence PRW adoption. Ferraro et al. (2020) recommended that future studies should examine the motivation of HCPs at work using SDT to balance the extant focus on extrinsic motivators.

5.2 Conceptual Framework

The conceptual framework draws on E. M. Rogers' (2003) DOI theory to measure BI to adopt a PRW. The knowledge and persuasion stage of Rogers' (2003) five stages of the innovation decision process was deemed relevant for this research. Specifically, the stage encompasses the typology of PCIs, shown to reliably predict adoption decisions (Higgins et al., 2007). Understanding motivation through SDT at the knowledge stage of the framework enables determination of whether intrinsic or extrinsic motivation influences BI to adopt a PRW, as shown in Figure 5.1.

Figure 5.1

Integration of SDT and DOI Into the Five Stages in the Innovation-Decision Process

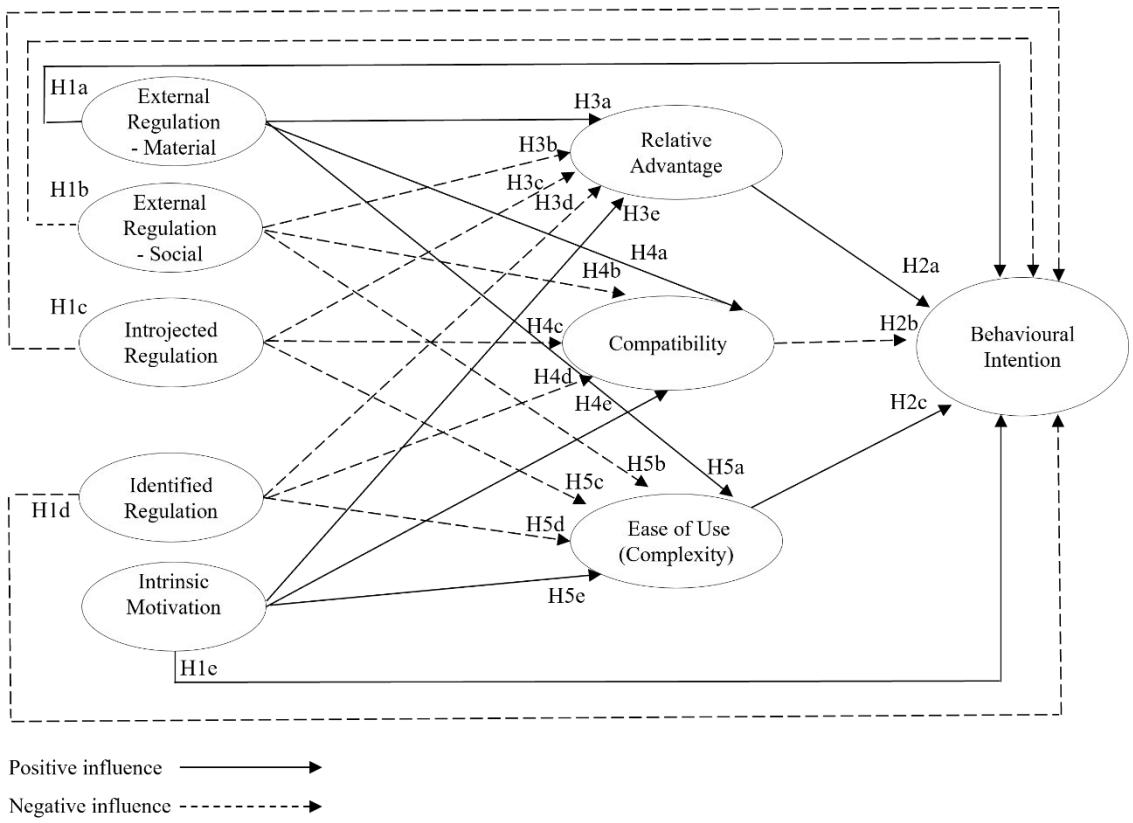


Adapted from *Diffusion of Innovations—5th ed* (p.170) by E. M. Rogers, 2003, New York: Simon and Schuster. Copyright 2003 by The Free Press. Reprinted with permission (see Appendix A).

Theoretical integration of SDT and DOI suggests that motivation influences HCPs' BI to adopt, either directly or indirectly, mediated by the perceptions of PRW characteristics. The study hypotheses derived from this integration are depicted in Figure 5.2.

Figure 5.2

Conceptual Framework and Hypotheses for the Proposed Research



5.2.1 Motivation Type and Behavioural Intention

Both intrinsic and extrinsic motivation have been shown to lead to different task outcomes and participatory behaviours (Gagné & Deci, 2005; Van den Broeck et al., 2021; Wang, 2016). Extrinsic motivation energises people into action only when the action is instrumental to meet an end (Gagné & Deci, 2005). Intrinsic and extrinsic motivation are two critical factors in encouraging workers to adopt information technology (Davis, 1989; Davis et al., 1992; Venkatesh, 1999). Important advances have been made in the development of measures of worker intrinsic and extrinsic motivation based on the MWMS developed by Gagné et al. (2015).

Researchers have used the MWMS instrument to examine the association between work motivation and doctors' occupational health (Migliorini et al., 2019), how social media use affects employees' motivation (Demircioglu & Chen, 2019), and how lifelong learning is predicted by work motivation profiles (van der Burgt et al., 2018). The results from the MWMS research identified that each motivation type makes a unique contribution in describing outcomes such as employee wellbeing, attitudes, and

performance (Van den Broeck et al., 2021). SDT-based research showed extrinsic motivation did not affect users' intention to use e-learning technology in the workplace (J. J. Yoo et al., 2012). Second, in the Indian construction industry, amotivation and extrinsic regulation (social, introjected regulation and identified regulation) each affected construction labour productivity. However, intrinsic and external regulation (material) did not affect intention (Johari & Jha, 2020). Further, the MWMS has been validated by researchers in different countries and work contexts (Gagné et al., 2015; Van den Broeck et al., 2021). Examining adopter characteristics, such as motivation, also addresses Wejnert's (2002) and Greenhalgh et al.'s (2008) call for more research to explain behaviour in innovation adoption.

Extrinsic motivation is required to accomplish a task when the fulfilment of the task is not driven by a genuine interest in the task at hand. This type of motivation is driven by the desired outcome (Gagné & Deci, 2005). Theoretically, extrinsic motivation is the most externally regulated and split into two MWMS subscales: external regulation—material (ERM) and external regulation—social (ERS). The difference between the two is that ERM comprises outcomes that are material in nature, such as a salary or some form of financial incentive. On the other hand, with ERS, an individual is energised into action when there is a social reward such as acceptance or acknowledgement in a social group. Theoretically, HCPs who have selected health care as a profession for financial reward only would be identified as having ERM. By contrast, those who entered the profession predominantly for the social standing associated with the profession would be considered to have ERS. In the context of adopting a PRW, the HCP's energisation to action would be different for an ERM compared to an ERS. An ERM would make an adoption decision based on the prospective material rewards that a PRW could bestow. Research reported that HCPs who responded to negative reviews were more likely to have higher ratings (Skrypczak et al., 2020), which in turn could lead to being chosen over another HCP who had a lower rating (Yaraghi et al., 2018). This experience could be motivating for an ERM when considering the adoption of a PRW. However, an ERS would consider how PRWs could contribute to achieving their goal to seek social approval or avoid criticism by others. The SLR in Chapter 4 identified that some HCPs perceived PRWs tend to be negative (Atherton et al., 2019; Zaki et al., 2020b). An ERS HCP could perceive PRWs as criticism and therefore be less likely to adopt a PRW.

There is support for such differences between ERM and ERS. In a meta-analysis of SDT using the MWMS of worker motivation in 21 samples from 13 authors, Van den Broeck et al. (2021) reported a difference between ERM and ERS. ERM had a stronger turnover intention ($r = -.19$) compared to ERS ($r = -.03$). Further, Gagné et al. (2015) identified future research should consider the differential outcome between ERM and ERS. From the foregoing review and discussion of the literature, the following hypotheses emerge:

H1a: External regulation—material will have a positive influence on a health practitioner's behavioural intention to adopt a physician-rating website.

H1b: External regulation—social will have a negative influence on a health practitioner's behavioural intention to adopt a physician-rating website.

Introjected regulation and identified regulation are two extrinsic motivation types, whereby the external regulation that energises a person into action has some form of internal regulation (Gagné et al., 2015). The action a person takes is not inherently interesting to them, but the outcomes fulfil one of the three essential needs of competence, relatedness, or autonomy (Gagné & Deci, 2005). In the context of health care, theoretically, a HCP participates in setting health policies not because they find it interesting but to fulfil their need of competence, which is reinforced when their contribution has been acknowledged. The acknowledgement from peers makes them feel competent and worthy. The internal regulation to complete the task (feeling competent) is not controlled by the individual but rather the external feedback they receive. The degree of internalisation distinguishes introjected regulation from identified regulation; higher levels of internalisation would mean the action originates from a HCP with identified regulation.

PRWs are a growing source of feedback for HCPs, both positive and negative. While empirical evidence suggests that most PRW feedback is positive, HCPs and their professional associations have noted they are an outlet for a disgruntled vocal minority (Gao et al., 2015; S. Patel et al., 2015; Samora et al., 2016). When considering adoption of a PRW, the perceived negative feedback is less likely to energise a HCP with introjected or identified regulation into adopting a PRW, as doing so would not fulfil their innate need for competence, relatedness, or autonomy. From the foregoing review, the following hypotheses are proposed:

H1c: Introjected regulation will have a negative influence on a health practitioner's behavioural intention to adopt a physician-rating website.

H1d: Identified regulation will have a negative influence on a health practitioner's behavioural intention to adopt a physician-rating website.

In the work context, intrinsic motivation occurs when an individual acts because they understand the rationale of an activity and can integrate that activity into their own values rather than for external rewards (Ryan & Deci, 2000b). Intrinsic motivation guides people to seek out complex and challenging tasks (Tremblay et al., 2009). Further, it demonstrates a statistically significant and direct effect on employees' intention to use technology (Venkatesh, 2000; S. J. Yoo et al., 2012). Limitations of prior studies require further exploration given small or distinct samples that prohibit making causative associations or generalisation of the findings (S. J. Yoo et al., 2012). Second, a state of playfulness has been used as an intrinsic motivator to understand the difference between a game-based training program and a traditional training program for employees (Venkatesh, 1999). In Venkatesh's (1999) study, game-based (playfulness) training was used as a proxy for intrinsic motivation rather than using a standardised measure of intrinsic motivation.

HCPs who are intrinsically motivated to work in health care find their work inherently interesting. PRWs are a relatively new phenomenon that many HCPs are yet to be convinced about as a measure of quality of care (J. Chen et al., 2018; Emmert & Meszmer, 2018; Haskins et al., 2017). Similarly, HCPs question the value of the feedback provided by PRWs and whether it can be used to improve the way they deliver their service (Greaves et al., 2012; Kadry et al., 2011; Lagu et al., 2013; Smith & Lipoff, 2016). HCPs who are intrinsically motivated could perceive positive or negative PRW feedback as a means of making their work more interesting and fulfilling. From the foregoing discussion, the following hypothesis is offered:

H1e: Intrinsic motivation will have a positive influence on a health practitioner's behavioural intention to adopt a physician-rating website.

5.2.2 Perceived Characteristics of a Physician-Rating Website and Behavioural Intention

PCIs are a valuable set of influences on adoption of technology in various settings (Higgins et al., 2007). Perceptions of an innovation are a subjective measure held by the adopting entity (Tornatzky & Klein, 1982). This research investigated three innovation characteristics—namely, relative advantage, ease of use, and compatibility—that have been positively correlated with intention to adopt new technology in a variety

of settings. Consumers' perceptions of relative advantage and compatibility of electronic grocery shopping positively influenced BI to adopt, whereas complexity negatively affected BI to adopt (Verhoef & Langerak, 2001). Verhoef and Langerak (2001) acknowledged that online grocery shopping was only one possible context and called for more research in other contexts as well to examine users and nonusers of the technology.

Relative advantage is perceived when an innovation is considered better than the idea it supersedes (Oldenburg & Glanz, 2008). There are many benefits of a PRW, including that it provides live updates of a HCPs' profile and a low-cost means to record patients' voices, so it could be seen as patient centred (Hao et al., 2017; Kadry et al., 2011; Lopez et al., 2012). Other potential advantages of a PRW are that it could complement data derived from traditional patient surveys (Greaves et al., 2013; Lagu et al., 2013), and HCP performance can be assessed relative to competitors (Emmert et al., 2016). These relative advantages of PRWs compared with other information suggest the following hypothesis:

H2a: The perceived characteristic of innovation—relative advantage—will have a positive influence on the behavioural intention to adopt a physician-rating website.

Compatibility is the degree to which an innovation is perceived as being consistent with potential adopters' existing values, needs, and past experiences (Higgins et al., 2007). Compatibility is influenced by sociocultural values and beliefs, previously held ideas or client/patient needs for the innovation (E. M. Rogers, 2003), a finding repeated in other studies of technology acceptance (Karahanna et al., 2006). PRWs provide a public evaluation of HCPs' service delivery. Such feedback may not align with how HCPs evaluate themselves given that other forms of feedback challenge HCPs self-appraisal, which affects assimilating the data into practice (Baines et al., 2018).

PRWs are perceived by some HCPs as an outlet for disgruntled patients (Atherton et al., 2020; S. Patel et al., 2015). In a systematic review examining patient and public involvement in the medical performance evaluation processes, HCPs reported that patient feedback would be used to judge their clinical problem-solving skills and could be used for disciplinary action (Baines et al., 2018). Where evaluation approaches are not compatible with how HCPs prefer to be assessed, the evaluation approach may be rejected. From this reasoning, the following hypothesis is developed:

H2b: The perceived characteristic of innovation—compatibility—will have a negative influence on the behavioural intention to adopt a physician-rating website.

Ease of use (complexity) has been used to explain the adoption of technology in areas such as the internet (Cheung et al., 2000), mobile entertainment (Leong et al., 2013), and mobile banking (Venter de Villiers et al., 2020). Arguably, HCPs are uncertain about how to respond to or engage with PRWs because of medico-legal issues including privacy laws, how such laws relate to health care and data quality issues (Emmert, Meir, et al., 2013; Mulgund et al., 2020; Samora et al., 2016; Turk et al., 2020). However, PRWs are being used by patients and studies have reported that patients find them easy to use and navigate (Rothenfluh & Schulz, 2018), easy to access and understand (Fisher & Emmert, 2015) and are reported easier to interpret than institution sanctioned patient metrics such as risk-adjusted mortality rates (Lagu & Greaves, 2015). PRWs are unique in that the user interfaces, in most cases are intuitive, which makes them easy to use. This was a finding of the patient centric studies, while the interface may be easy to use the content that HCP may need to contribute or read from a PRW may decrease the ease of use. Additionally, the short scales for ease of use in Section 7.3.1, after factor analysis, only relate to ease of use, rather than the full scale which incorporated elements of complexity. The foregoing suggests the following hypothesis:

H2c: The perceived characteristic of innovation—ease of use—will have a positive influence on the behavioural intention to adopt a physician-rating website.

5.2.3 Motivation Type and Perceived Characteristics of Physician-Rating Websites

PCIs have been criticised as being a secondary rather than primary influence on innovation adoption and adopter characteristics (Tornatzky & Klein, 1982). The innovation's capability often bounds what PCIs are available to the adopter. However, adopter characteristics can also affect the subdimensions of PCIs that are most important to the adopting entity (E. M. Rogers, 2003). Work motivation as an adopter characteristic warrants further research. Represented as the locus of control, discussed in Section 2.4.3, motivation influences the perception of an innovation. Specifically, intrinsic motivation mediated by perception of ease of use of technology influences subsequent intention to adopt (Venkatesh, 2000).

In Section 5.2.1 and 5.2.2, motivation types and perceived characteristics of PRWs were considered in the context of direct influences on BI to use a PRW.

Discussed in this section is HCPs' motivation type, which is hypothesised to influence the PCIs of a PRW.

5.2.3.1 Motivation and Relative Advantage

HCPs who are identified as ERM are driven by material outcome and likely view the relative advantages of a PRW in the context of economic gain. The advantages of a PRW that could lead to economic gain were discussed in Section 3.3.12. HCPs with ERS likely perceive the relative advantage subdimension of social status as the most important aspect. Given the unfavourable attitudes of HCPs towards PRWs identified in the SLR, HCPs with ERS are unlikely to see the relative advantage of PRWs from a positive perspective. Emerging from this discussion, the following relationships are hypothesised:

H3a: External regulation—material will have a positive influence on the perceived characteristic of an innovation of relative advantage.

H3b: External regulation—social will have a negative influence on the perceived characteristics of an innovation of relative advantage.

The motivation types of introjected and identified regulation vary to the degree that the individual internalises an action to be congruent with their needs for autonomy, relatedness, and competency. Evidence is limited that PRWs contribute to these needs; rather, the available evidence suggests PRWs reduce competence and relatedness. HCPs' attitudes towards PRWs are that they contribute to stress and burnout (Gross et al., 2021; Holliday et al., 2017; C. N. Patel et al., 2019; Zaki et al., 2020a; Zwier, 2019). Some HCPs have expressed concerns about the validity and accuracy of PRWs, resulting in HCPs scepticism about their usefulness (S. Patel et al., 2015). Based on the previous discussion, the following is hypothesised:

H3c: Introjected regulation will have a negative influence on the perceived characteristics of an innovation of relative advantage.

H3d: Identified regulation will have a negative influence on the perceived characteristics of an innovation of relative advantage.

An intrinsically motivated HCP provides healthcare services to satisfy all three motivation needs: relatedness, autonomy, competence. Mechanisms that improve the healthcare service experience could be perceived as enhancing their innate needs of competency, relatedness, and autonomy. PRWs could be a sound indicator of patient satisfaction by incorporating additional information to that which is captured through

traditional institutional patient surveys (Bovenzi et al., 2020; Kilaru et al., 2016). The online feedback received via a PRW could be construed as enhancing HCP relatedness and improving rather than reducing their competency. Based on the previous discussion, the following is hypothesised:

H3e: Intrinsic motivation will have a positive influence on the perceived characteristics of an innovation's (physician-rating website's) relative advantage.

5.2.3.2 Motivation and Compatibility

Compatibility of an innovation is positively related to the rate of adoption; the more consistent the innovation is perceived with existing values, past experience, and adopter needs, the greater the adoption (E. M. Rogers, 2003). PRWs arguably measure aspects of patient satisfaction rather than service quality (Saifee et al., 2020), though quality metrics have been identified in some PRWs (Lantzy & Anderson, 2020). Motivation types of HCPs may differentially contribute to the PCI of compatibility. An adopter's judgement of compatibility is made with reference to an individual's values and needs. Work motivation may play a role in how they perceive compatibility with the PRW innovation.

PRWs have been identified, paradoxically, as a measure of quality and/or a measure of patient satisfaction. HCPs with ERM are motivated by economic gain. Any feedback or action that contributes to economic gain could be compatible with this category of motivation. There is evidence that responding to a negative review on a PRW improves the overall rating of a HCP (Skrypczak et al., 2020). An ERM-oriented HCP could find responding compatible with their values and enhance the compatibility characteristic in responding to a PRW. In contrast, a HCP with ERS could find that a PRW is not compatible with their social cultural beliefs, whereby patients are not capable of judging quality or qualified to give feedback. Given the previous discussion, the following is hypothesised:

H4a: External regulation—material will have a positive influence on the perceived characteristics of an innovation of compatibility.

H4b: External regulation—social will have a negative influence on the perceived characteristics of an innovation of compatibility.

The potential for negative and unregulated reviews would make PRWs incompatible with the views of HCPs who are the motivation type introjected and identified regulation. HCPs with this type of motivation experience the drive to action,

less as a result of the enjoyment of the task and more as internal regulation such as ego or identifies the value of the action for their own self-directed goals. Responding to or reading a negative review on a PRW could diminish HCPs' experience of competency. Feedback read on PRWs would not positively contribute to their internal regulation. The potential for negative reviews could affect their self-worth and deplete ego resources. Therefore, the following hypothesis is developed:

H4c: Introjected regulation will have a negative influence on the perceived characteristics of an innovation of compatibility.

H4d: Identified regulation will have a negative influence on the perceived characteristics of an innovation of compatibility.

Intrinsically motivated HCPs obtain enjoyment from all aspects of their role. Adopting a PRW could be compatible with their motivation by being seen as an opportunity to enhance enjoyment rather than be concerned with material benefits. The adoption of a PRW would extend their enjoyment and improve experience by searching out and welcoming feedback through online reviews. Negative reviews would be perceived as an opportunity to improve service rather than as a personal criticism. Based on this discussion, the following hypothesis is developed:

H4e Intrinsic motivation will have a positive influence on the perceived characteristics of an innovation of compatibility.

5.2.3.3 Motivation and Ease of Use

The ease of use of an innovation is reported to be positively related to its rate of adoption (Higgins, 2007). The PRW interface may be easy to use, however there exist potential ease of use barriers with PRWs that include authentication issues accessing third-party platforms, identifying which PRWs to use, regulatory issues with respect to patient confidentiality and healthcare promotion, moral issues defining the HCP–patient relationship, and reputational issues in the presence or absence of a response to a review. Different types of motivation may affect the perception of ease of use in diverse ways.

HCPs with ERM could perceive the ease-of-use issues as addressable. Their drive to continue working as a HCP is motivated by material rewards. Ease of use issues are simply another barrier to be overcome to attain material goals. As reported in Section 3.3.12, adoption of PRWs could have positive material effects.

HCPs with ERS could perceive the ease-of-use issues as difficult to overcome as the goal of social acceptance/reward is difficult to subjectively measure. Being the first to adopt a PRW is high risk as the social or regulatory effects are uncertain.

Based on the previous discussion, the following hypotheses are developed:

H5a: External regulation—material will have a positive influence on the perceived characteristics of an innovation of ease of use.

H5b: External regulation—social will have a negative influence on the perceived characteristics of an innovation of ease of use.

The innate needs of autonomy and competency are most affected by the PRW ease of use. PRW are inherently complex to navigate, not as a result of the user interface but due to the different codes and regulations of professional associations or governments, which could lead to breaching privacy laws (S. Patel et al., 2015). In addition, there are moral and ethical issues associated with replying to online reviews (Rothenfluh & Schulz, 2018). Low ease of use could lower the perceived autonomy and competence in adopting PRWs. Given the previous discussion, the following are hypothesised:

H5c: Introjected regulation will have a negative influence on the perceived characteristics of an innovation of ease of use.

H5d: Identified regulation will have a negative influence on the perceived characteristics of an innovation of ease of use.

A HCP who is intrinsically motivated would enjoy their total role and welcome opportunities to improve and contribute to their innate needs. The ease-of-use issues of a PRW would be perceived as a learning opportunity to improve their enjoyment of the role. Given the previous discussion, the following is hypothesised:

H5e: Intrinsic motivation will have a positive influence on the perceived characteristics of an innovation of ease of use.

5.3 Test for Mediation

In addition to testing for the direct effect of motivation types and PCIs, an examination of the indirect effect is warranted due to the inherent human–technology interaction. An indirect effect occurs when there is an influence on two constructs (motivation type and BI) from an intervening variable (PCIs). This intervening variable (PCIs) is the mediator (Collier, 2020). The mediation effect was hypothesised based on theorising relationships as depicted in the conceptual model (Fig 5.2) and the five stages

of the innovation decision process. Logically, motivation precedes PCIs, and consequently PCIs, will mediate the effect of motivation type on BI to adopt the PRW innovation. A series of mediation hypotheses for each of the motivation types in relation to PCIs were tested. Premised on the sequential nature of the five stages of the innovation decision process, the following hypothesis was developed.

The perceived characteristics of innovation of physician-rating websites will mediate the relationship between healthcare practitioners' motivation type and behavioural intention to adopt the physician-rating website innovation. Specifically,

H6a: The perceived characteristics of innovation, being relative advantage, will mediate the relationship between health practitioners' motivation type and behavioural intention to adopt the PRW with the same directional influences proposed in hypotheses H3a-H3e.

H6b: The perceived characteristics of innovation, being compatibility, would mediate the relationship between HCPs' motivation type and behavioural intention to adopt the PRW with the same directional influences proposed in hypotheses H3a-H3e.

H6c: The perceived characteristics of innovation, being ease of use, would mediate the relationship between HCPs' motivation type and behavioural intention to adopt the PRW with the same directional influences proposed in hypotheses H3a-H3e.

5.4 Conclusion

The dissemination of innovation in health care is challenging, and innovation adoption has been slow in some technologies. The slow diffusion may be attributable to factors including the innovation characteristics and characteristics of the adopting entity. The motivation type of the adopter is a possible contributing factor worthy of further investigation. DOI is a robust theoretical framework to investigate system characteristics, and SDT is a crucial measure of individual motivation. The theoretical integration resulted in a conceptual model from which to test hypotheses relating to system characteristics, adopter characteristics, and BI. Moreover, potential mediating effects were explicated to explore whether motivation mediates the system characteristics to influence BI to adopt the PRW. The next chapter describes methodology, methods, and measured designed to test the model and its hypotheses.

Chapter 6. Research Methodology and Methods

This chapter provides a methodological basis for this research, starting with a discussion of the research paradigm and method. Next is a description of the participants, both why and how they were selected. Following are details of the study measures, the rationale for choosing them, and how the questionnaire scales were tested and modified to fit the Australian healthcare context. The procedure undertaken to administer the survey is then presented, which includes details of the incentives used. The chapter finishes with a summary of participants' demographic profiles as a background to the statistical analysis that addresses the research questions.

6.1 Research Paradigm

Worldviews or beliefs represent the nature of knowledge, and such beliefs guide researchers' actions (Creswell, 2013). Worldviews, or research paradigms, set down the intent, motivation, and expectations for the research and provide the theoretical framework that influences the way knowledge is studied and interpreted by the researcher (Mackenzie & Knipe, 2006). Each paradigm is founded on basic beliefs relating to ontology, epistemology, and methodology (Antwi & Hamza, 2015; Vaishnavi & Kuechler, 2004).

Positivism and interpretivism are two of the most widely used paradigms by business researchers (Walliman, 2017). These paradigms have differences in their ontological, epistemological, and methodological applications. Ontology is described as the philosophy of reality (Gelo et al., 2008). Positivists believe that observation and reason are the best means for understanding human behaviour (Antwi & Hamza, 2015). By contrast, interpretivists understand human behaviour through interpretation, through meanings that people assign to them rather than as objective reality (Krauss, 2005).

Epistemology is the nature of knowing and what we can regard as acceptable knowledge in a discipline (Walliman, 2017). It questions the relationship between the researcher and what is known (Antwi & Hamza, 2015; Krauss, 2005). Positivists view knowledge as being discovered and confirmed through direct observation and measurement, unlike interpretivists who see knowledge as established through meaning attached to the phenomena (Krauss, 2005).

The methodological approach is how the researcher goes about finding what needs to be known, converting epistemological and ontological conventions into

procedures and practices that govern the research (Antwi & Hamza, 2015). There are two methods: Quantitative requires data that can be measured in some form of magnitude, and qualitative involves data that are descriptive in nature rather than an absolute value (Walliman, 2017). The positivist perspective requires an objective and detached design, commonly ascribed to the quantitative method (Antwi & Hamza, 2015; Bhattacherjee, 2012). However, the interpretivist goal is to obtain an insider's view of the group under study (Antwi & Hamza, 2015). Meaning is discovered through participants' experiences and interpretations, by the researcher lending analysis to the qualitative method (Krauss, 2005). Interpretivists seek to understand a particular phenomenon and, unlike positivists, do not generalise it to a population (Farzanfar et al., 2005). Their key characteristics are summarised in Table 6.1, together with related examples in the domain of PRW research.

Table 6.1

Research Paradigm Comparisons

Research paradigm	Key characteristics	Method	Example studies
Positivist	Knowledge can be measured using tools (Creswell, 2013) Ideas are reduced into small discrete sets to test (Walliman, 2017) Research is shaped by well-developed theories (Mackenzie & Knipe, 2006)	Quantitative	"Physician Choice Making and Characteristics Associated with Using Physician-Rating Websites: Cross-Sectional Study" (Emmert, Meir, et al., 2013)
Interpretive	Individuals construct subjective meaning of their experiences (Creswell, 2013) Knowledge of reality is developed as a result of social conditioning (Krauss, 2005) Meaning rather than measurement-oriented methodologies (Antwi & Hamza, 2015)	Qualitative	"Investigating the Potential Contribution of Patient Rating Sites to Hospital Supervision: Exploratory Results From an Interview Study in the Netherlands" (Kleefstra et al., 2016)

In the field of PRWs, of the 16 valid studies reviewed in the SLR described in Chapter 4, 12 have a positivist paradigm and use a quantitative content analysis method. Quantitative content analysis is a systematic research technique for making replicable and valid inferences from symbols of communication using statistical methods

(Krippendorff, 2004; Riffe et al., 2019). Content analysis of PRW sites identified HCP attitudes and adoption of PRWs and identified research areas of interest for further investigation.

There has been a descriptive focus on content analysis examining the use of PRWs by patients, practitioners, and institutions. In a recent literature review by Hong et al. (2019) examining PRWs, the authors called for studies that go beyond descriptive analysis and adopt more advanced empirical methods with a meaningful hypothesis and rigorous design.

To address the research questions for the present study, the ontological perspective taken by a positivist is that the meaning of a phenomenon (adoption of PRW) exists independently from the actors; it is a concrete structure, and it is the researcher's role to discover it (Holden & Karsh, 2010). In adopting this view, I drew on established theories to explain this behaviour. SDT provided one perspective on motivation of many, and E. M. Rogers' (2003) DOI theory was chosen to conceptualise the adoption of technology as it includes variables that may explain the adoption of PRWs. The use and testing of theory is the typical ontological approach used by positivists (Creswell, 2013) and bounds the research to the specific research aims. While both approaches have significant application in different settings, their application in the field of PRWs has been limited.

By contrast, the interpretive ontological approach aims to describe the subjective reasons and meanings that lie behind the adoption of PRWs (Antwi & Hamza, 2015). Ninety percent of allied health professional businesses are made up of independent operators (Richardson, 2019). Consequently, the qualitative approach is a valid approach to understand the meaning behind the adoption of a PRW. Interpretivists may build theory rather than use or test it; however, since this study aimed to test hypotheses, the logical approach is positivism. The constraints of this doctoral research and convenience focus prohibited investment in securing a representative sample of all allied health professionals.

The epistemological assumption under a positivist method of inquiry is that the goal is to develop the most objective means possible to reach an approximation of reality. The approaches developed in SDT and DOI theory have tested empirical methods both in the observation of phenomena and the interpretation of those observations. Following the process of the established theories, the data collected in this research are cross-sectional and were collected by a questionnaire administered and

completed online using the Qualtrics platform. This objective and independent data collection method was used to minimise researcher bias in terms of interpretation, as the theory and tools were objectively created independently of the researcher. As such, this epistemological approach is consistent with a positivist view. By contrast, with interpretivism, the researcher is part of the data collection process through direct interactions with the subjects of the research (Guba, 1981). The latter approach arguably provides little substantive data to answer the research questions.

Consistent with a positivist approach, the assumptions underpinning the research enquiry rely on knowledge in the domain being measured by instruments or tools. The methodology to inform the study design then match the phenomena of interest rather than being a commitment to a particular paradigm (Cavaye, 1996). As such, this research is quantitative and used a survey for collecting data on a priori confirmed constructs derived from established theoretically grounded scales.

The survey instrument meets the criteria identified by Vogt et al. (2012) in that data were best obtained directly from the subjects under investigation (HCPs) by responding to brief statements derived from theoretically constructed, valid, and reliable instruments. The research approach is reductionist in character by holding that less measurable sciences are reducible to more measurable ones (Walliman, 2017). HCPs' motivation was of interest and represents one characteristic of the decision-maker unit among many within the categories of characteristics detailed in E. M. Rogers' (2003) DOI theory.

6.2 Purpose of Quantitative Study

The purpose of this study was twofold: first to develop and test an empirically derived model that explored the role of HCPs' work motivations and their perceptions of the characteristics of a PRW on BI to adopt PRWs, and second, to compare the relative contribution of motivation and system-related constructs on participants' BI to adopt PRWs. Ethics approval was obtained from the Victoria University Human Research Ethics Committee approval number HRE17-125 (see Appendix C).

The research aim was to test the relationships between the constructs of motivation and PRW characteristics and evaluate their relative importance and unique contribution to BI. The quantitative method is an appropriate way to examine variables from sample subjects and to express those relationships between variables using statistics (Antwi & Hamza, 2015).

The survey type used was cross-sectional in design, seeking current reactions to PRWs among health professionals. Cross-sectional surveys are suitable for estimating the occurrence of a behaviour in a population at one point in time (Hall, 2008; Sedgwick, 2014; Setia, 2016). Longitudinal designs, however, are better suited where the researcher tests the effects on an intervention or for changes over a validated predefined time period (Spector, 2019). This study was not an intervention design study.

Cross-sectional survey approaches have strengths including cost-effectiveness, efficiency, and no follow-up loss with participants as would be experienced in a longitudinal survey (Sedgwick, 2014). The cross-sectional survey is recommended when covariation needs to be established, temporal precedence exists, and there is a need to rule out alternative explanations. It is not known if the PCIs of a PRW covary with motivation variables. This research examined whether this relationship occurred. The research is exploratory, as discussed in Chapter 5. It is unclear whether motivation influences the adoption of PRWs. PRWs are a relatively new innovation in health care; however, the five stages of the innovation decision process, used as a basis for the conceptual model, establishes temporal precedence in that adopter characteristics precede PCIs. Finally, there are many alternative explanations when considering the adoption of health innovations, as explored in a comprehensive literature review by Greenhalgh et al. (2008). Motivation is one factor that is worthy of many under consideration.

There are some limitations in using a cross-sectional survey that include being prone to nonresponse bias, representing only a snapshot in time, and inferring only association rather than causation, especially in fast-developing technology environments (Levin, 2006; Sedgwick, 2014). The challenge of inferring causation in a research project is not limited to cross-sectional design methods as using a longitudinal study method and separating the measurement of time may not produce different results (Spector, 2019). The cross-sectional survey approach was chosen for this research because it met the criteria outlined by (Spector, 2019); it fell outside the criteria of a longitudinal design as this research was not testing for effects of an intervention and there was no precedent as to what would constitute a suitable time period between the research time period points. Finally, given the constrained duration of this research, a longitudinal design was impractical.

The research question and subquestions for this study were as follows:

1. What influences health practitioners' intention to adopt a physician-rating website?

    a. What is the effect of different motivation types (intrinsic or extrinsic) on adopting physician-rating websites?

    b. How do the system characteristics influence the intention to adopt physician-rating websites?

    c. How does motivation type influence system characteristics individually and in combination affect the intention to adopt a physician-rating website?

6.3 Participant Selection

Australian allied health professionals in the field of speech pathology, psychology, and occupational therapy were initially considered as the targeted population for the study. These occupations were identified as representing allied health professions with a large number of workforce participants. The professions selected share a common characteristic that is relevant for online reviews. They are known to treat chronic illness (Cant & Foster, 2009), which is associated with more credence elements than other healthcare services (Saifee, 2020). In the context of online reviews, high credence services are difficult to evaluate by patients and one study reported that online reviews have been found to be unreliable indicators of clinical performance (Saifee., 2020).

The number of health professionals in each category is approximately 15,000 speech pathologists, 31,900 psychologists, and 18,500 occupational therapists, totalling 65,400 (National Skills Commission, 2021). The total number of allied health professionals in Australia is 195,000 (Allied Health Professions Australia, n.d.). The sample of interest therefore represents approximately 33% of the population of allied health professionals.

Recruitment occurred through two professional associations, approached directly, including Speech Pathology Australia and the Australian Psychological Society. These associations declined to support the research as the study did not originate from one of their current members. Occupational Therapy Australia (OTA) was also engaged and enabled the distribution of the questionnaire on payment of a fee. A display advertisement was broadcast through an email newsletter to OTA members in

November 2017. However, although the email reach was 5,953 members, the response rate was low, with only three valid responses being returned.

The initial strategy of leveraging HPAs to access the population proved difficult, with little support and low response rates. The response rate was consistent with research in the United States that found survey response rates among HCPs to be 0.53% (Cho et al., 2013). In one of the first attempts at seeking HCP attitudes towards PRWs, S. Patel et al. (2015) reported recruiting only six participants for a qualitative study using probability sampling and commented on the difficulties that other researchers also experienced in the same pursuit.

The recruitment of participants was extended to other health professionals following an amendment to ethics approval. The strategy was to broaden the scope of HCPs accessed and include an incentive directly to potential respondents (refer Section 6.7). The approach spanned four stages. In Stage 2, the Australian Physiotherapy Association (APA), with a population of ~30,000 members (Australian Physiotherapy Association, n.d.), authorised an email to be sent at no cost to their members encouraging their participation.

In Stage 3, an email list was purchased from an email list provider, List4sale.net. The service specialises in providing health professional email contacts by collecting them through publicly available websites (see Appendix D). This list was reviewed, and only email addresses pertaining to persons with a title of occupational therapist, speech pathologist, and psychologist were contacted. This ensured there would be no duplication with the previous approach to physiotherapists.

In the final Stage 4, a publicly available HCP directory with email addresses and provider professions was downloaded from the NDIA. To participate in the directory, providers are required to provide evidence of professional qualifications to the NDIA. The professions selected from the list included speech pathologists, psychologists, occupational therapists, dieticians, and physiotherapists. All email addresses on this list were examined, and duplicates with the List4sale.com list were removed to ensure unique responses.

Further, to ensure that no potential crossover occurred with the email distribution to members of the APA, responses from those classifying themselves as physiotherapists were examined, and where there were more than two responses with the same internet protocol (IP) address, one response was deleted. A total of 53 responses were received from physiotherapists; of those, only 21 were collected from

the email distribution using the NDIA list. None were found to have the same IP addresses as the respondents from the direct email to members of the APA.

Using an IP address is an important method of solving the problem of participants submitting survey forms several times (Granello & Wheaton, 2004). As IP addresses identify computers and not people, it is difficult to identify a person from an IP address, except in a closed environment where it is publicly known which person is allocated to a computer (Granello & Wheaton, 2004). While best endeavours were used to eliminate possible duplication of responses, privacy of participants was given a higher priority.

6.4 Measures

The MWMS was used to determine HCPs' motivations to work in health care. The MWMS was chosen as it was specifically developed to assess work motivation and addressed the shortcomings of other survey instruments that relate to motivation at the task level rather than at the domain level (Gagné et al., 2015). A number of other work-related motivation scales were considered; these included the Blais Inventory of Work Motivation (Briere & Vallerand, 1993), the Work Extrinsic and Intrinsic Motivation Scale (Tremblay et al., 2009), and the Motivation at Work Scale (Gagné et al., 2010). The MWMS (Gagné et al., 2015) was selected as it improved on the previous scales, by addressing the psychometric issues and including two subscales to distinguish between extrinsic regulation by accounting for differences between material and social rewards and removing integrated regulation as a result of overlap with intrinsic and identified regulation (Howard et al., 2017; Van den Broeck et al., 2020).

The MWMS contains 19 questions, consisting of seven factors and six subscales, to measure the spectrum of motivation types detailed in Chapter 2: amotivation, extrinsic motivation (social and material), introjected regulation, identified regulation, and intrinsic motivation. All scale items are detailed in Appendix E. An example of a subscale item for intrinsic motivation is "The work I do is interesting". The items in each subscale were evaluated on a seven-point Likert scale, where 1 = *not at all*, 2 = *very little*, 3 = *a little*, 4 = *moderately*, 5 = *strongly*, 6 = *very strongly*, and 7 = *completely agree*.

The MWMS instrument has cross-cultural validity across nine countries and in seven languages (Gagné et al., 2015). The statistical measures used in that study to measure content and discriminate validity include the comparative fit index (CFI) and

the root mean square error of approximation (RMSEA). The MWMS instrument cross-cultural validity study reported that the CFI result for the English version of the MWMS factors as 0.90, and the RMSEA as 0.068 (Gagné et al., 2015). A CFI score above 0.9 and an RMSEA score below 0.06 is considered a good fit (Hair et al., 2010). Smokrović et al.'s (2018) study found the instrument maintained its content validity when translated into the Croatian language, as it did when Neves and Coimbra (2018) validated the study in Portuguese and adapted it to an educational context.

Cronbach's alpha is one method for testing the reliability of scales. Cronbach's alpha is a measure of internal consistency reliability, whereby it measures consistency between different items on the same construct (Bhattacherjee, 2012). The Cronbach's alpha score for the MWMS instrument was a reliability alpha of 0.70 for the English version (Gagné et al., 2015). A Cronbach's alpha above .70 is deemed the lower limit of acceptable scores (Hair et al., 2010).

Measures of perceived characteristics of PRWs were collected using a survey instrument developed by G. C. Moore and Benbasat (1991). The PCI instrument has eight constructs and 40 items. This study tested three constructs theoretically identified from the literature review and therefore reduced the total number of items to 21 (see Appendix F). The PCI instrument has been used in adoption of electronic shopping (Verhoef & Langerak, 2001), of merchant payment systems (Plouffe et al., 2001), of environmentally friendly innovations (Kapoor et al., 2014), and of a salesforce visual aid (Dotter & Johnson, 2020).

Given the reported limitations of other PCI variables (Higgins et al., 2007), this research used the three most reliable scales within the model, being relative advantage, ease of use, and compatibility. In a review of the PCI instrument, Higgins et al. (2007) found only four studies had used the complete scale developed by G. C. Moore and Benbasat (1991); more than 178 studies had used a subset of the model, and the top three measures included relative advantage (n = 26), ease of use (n = 30), and compatibility (n = 23) subscales. The respective reliability scores as measured through Cronbach's alpha are .90, .86, and .84, respectively (G. C. Moore & Benbasat, 1991).

Exploratory factor analysis (EFA) is one method of determining item validity as it seeks to extract latent factors from the measured variables by examining the pairwise relationships between individual variables (Osborne, 2015). Using principal components analysis, the results of the original PCI study showed that no item loaded highly on more than one factor, and the lowest factor loading score was 0.45 (G. C.

Moore & Benbasat, 1991). In sum, the approach used in the current study was consistent with previously published empirical research.

The items for relative advantage include "Using a PRW improves/will improve my job performance", and the items for compatibility include "Using a PRW is or will be compatible (consistent) with aspects of my work". The items for ease of use include "Overall I believe that a PRW is or will be easy to use". All questions were answered using a seven-point Likert scale, where 1 = *strongly disagree*, 2 = *disagree*, 3 = *somewhat disagree*, 4 = *neither agree or disagree*, 5 = *agree*, 6 = *strongly agree*, and 7 = *strongly agree*.

Measures of BI to adopt a PRW were informed from a previously validated survey instrument consisting of three items developed and utilised by Venkatesh and Bala (2008), which was based on earlier work from Davis et al. (1989). BI was utilised as a measure of intention to perform a desired behaviour in the context of comparing TRA and TAM user acceptance of computer technology. The scale has a reliability value, a measure by Cronbach's alpha, of .7 and a convergent and discriminate validity score of .7 with no cross-loading of more than .3 (Venkatesh & Bala, 2008). The scale consists of three items, an example being "Assuming that I had access to a PRW, I intend to use it". All questions used a seven-point Likert scale, where 1 = *strongly disagree*, 2 = *disagree*, 3 = *somewhat disagree*, 4 = *neither agree or disagree*, 5 = *agree*, 6 = *strongly agree*, and 7 = *strongly agree*. Other applications of the instrument include that by Liébana-Cabanillas et al. (2014) in a study examining the antecedents of the adoption of a new mobile payments system and by Choi and Kim (2016) who examined the adoption of smartwatches.

All survey participants provided demographic questions on age, sex, geographic state (in Australia), and discipline as control variables given the past evidence for their effect on technology adoption (Gagnon et al., 2012; Venkatesh et al., 2012).

6.5 Questionnaire Development

A phased approach was used in the questionnaire development following recommendations from Burn et al., (2008). In Phase 1, the questionnaire was pretested for comprehension to evaluate whether respondents interpreted questions consistently (Burns et al., 2008). Pretesting provides insights into the quality of the questionnaire as it is often affected by factors such as language skills and culture (Burns et al., 2008).

Pretesting methods can include cognitive testing, expert review, response latency, behavioural coding, and the Questionnaire Appraisal System (Presser et al., 2004; Rothgeb et al., 2007; Yan et al., 2012). Considerations when deciding on the pretesting method are cost and time frame for completion (Yan et al., 2012). Based on the inconsistent empirical evidence about the effectiveness of different methods, it is unwise to rely on any one method (Presser et al., 2004). Yan et al. (2012) found that expert reviews were less expensive than cognitive testing. The approach chosen for the pretesting was to use a combination of an expert review panel and a predefined cognitive testing method. A convenience sample of five HCPs was identified and interviewed to evaluate the questionnaire for clarity.

Two experts, supervisors on this research project, reviewed the first draft of the questionnaire. Some initial changes were made to make the questionnaire flow better. In August 2017, the original design of the questionnaire started with the MWMS questions first followed by the PCI questions. It was decided to move the PCIs to the start of the multiple-choice section to facilitate a neutral tone to the start of the questionnaire, as amotivation in the MWMS questionnaire was perceived as a negative.

The convenience sample of five health professionals for cognitive interviews, which formed part of the cognitive testing method, comprised one occupational therapist, three speech pathologists, and one psychologist. Face-to-face interviews were conducted in August and October 2017, and the questionnaire was presented with the changes suggested by the expert reviewers. When questions were unclear or more understanding was required, the interviewee was asked to suggest how improvements could be made: to change the question and keep the meaning, to eliminate the question, or to write a new question (Burns et al., 2008). The cognitive interviews are detailed in Appendix G. The changes related to the explanation of a number of key terms as well as the presentation of the questions. Changes were made to the format of the survey and items clarified.

Following cognitive testing, pilot testing was completed with the same group. The purpose of pilot testing is to review the questionnaire for relevance, flow, and arrangement and presentation consistency across multiple device platforms (Burns et al., 2008; Dillman et al., 2014; Yaacob & Yusoff, 2014). During the pilot testing, some misinterpretation of the statements in the SDT questionnaire were identified, with the subjects needing to re-read the question stem in order to select the preferred scale for each statement. With the assistance of a member of the expert review panel, changes

were made to the validated SDT questionnaire to increase comprehension for the intended audience. The modified SDT questionnaire is in Appendix H with mark-ups to show how it differs from the original. This version was then emailed to Gagné, the author of the scale, who replied identifying that no significant alteration to the scale was apparent because of the changes. Gagné's reply is in Appendix I. The final questionnaire, which included SDT, PCIs, and BI, consisted of three scales and 43 questions.

6.6 Procedure

Participants accessed the survey through a link embedded in an email. The link directed to the Qualtrics platform, a specialised online questionnaire service, where the participant first consented to complete the survey. Survey questions included 11 multiple-choice questions and four open-ended questions. In this Phase 1 of data collection (commencing November 2017), an email with an embedded link was sent to OTA members and APA members who were encouraged to respond. No incentive was offered during this phase as it was still unclear as to what level of participation was likely and whether an incentive was in fact required. This initiative resulted in 36 responses.

Phase 2 of data collection was conducted in January 2019, whereby an email was distributed with a link to the survey using the Qualtrics platform to those allied health professionals identified in the list purchased from List4sale.com.au/Yell123. An incentive was offered during this phase to improve the response rates achieved in the last survey distribution. The incentive received ethics approval and provided a monetary incentive for the first five respondents to complete the questionnaire each day over the successive 3 days.

In Phase 3 of data collection, an email was sent to all HCPs identified in the email list sourced from the NDIA (February 2019). The same incentive strategy was used to recruit respondents. This strategy yielded 355 responses. After reviewing the total number of responses for completeness (391), 118 responses were removed as no attempt was made to answer any questions, leaving 273 valid responses.

6.7 Incentives

The use of an incentive to encourage participation was considered necessary after initial attempts through professional associations yielded poor response rates. The

incentive was a $20 gift card for those that responded. Without the incentive, it would have been difficult to recruit enough participants to enable sufficient statistical power (Dunn & Gordon, 2005; T. Phillips, 2011). Earlier research had also found that > 90% of those surveyed said financial compensation was the main motivation for participation (Bigorra & Banos, 1990; Van Gelderen et al., 1993).

Paying for participation in a research questionnaire is common as it is perceived as compensation for time and can also be regarded as a sign of respect towards the participant (T. Phillips, 2011; Zutlevics, 2016). A study of 84 research organisations in Australia by Fry et al. (2005) found that the ethics committee recommended an incentive in 24% of cases. In Moller et al.'s (2019) study examining U.S. doctors' motivation to use an SDT survey, the authors used a USD10 note in a survey mailout to participants as an incentive for participation. In the United Kingdom, an incentive was paid to each HCP participant to the value of GBP80 to provide their opinions on PRWs (S. Patel et al., 2015).

Proponents against using incentives argue that the quality of the sample is reduced as it induces only those from a lower socioeconomic background to participate (Zutlevics et al., 2016). However, most studies that have evaluated the influence of incentives on quality of response have found no such effects (Singer, 2013). The target respondents in this study originated from the same socioeconomic wage class and were all allied health professionals. Further, by incentivising health professionals, I encouraged those that had little or no interest in PRWs to participate. If the research had provided no incentive, the possibility of skewness may have increased as only those that had been affected by a bad review or had an interest in PRWs would most likely respond.

Further, those arguing against an incentive do so in a research context of experiments on human beings as it may cause harm to the participant (McNeill, 1997). The counterargument is that if the research does not cause harm to the participant, financial incentives are permissible (Zutlevics, 2016). This research was not an experiment on human beings where harm was a risk; the research had minimal physical or psychological risks for and effects on respondents, being a low-risk study.

6.8 Participant Demographic Profiles

A total of 273 valid and complete responses were collected from Australian health professionals. As shown in Table 6.2, most respondents were female with a value

of 76.9%. While gender varied by profession, on the whole, the population sample compared favourably with the population of allied health professionals, whereby female representation is 65.1% (AIHW, 2021).

Table 6.2

Participant Gender

Gender	Frequency	Percent	Cumulative percent
Male	62	22.7	22.7
Female	210	76.9	99.6
Other	1	.4	100
Total	273	100.0	

The population sample age profile in Table 6.3 shows that the majority of participants were aged between 35 and 44 (27.1%). This age frequency is an older representation than is found for the population of allied health professionals, where most health professionals (42%) are aged between 20 and 34 (AIHW, 2021).

Table 6.3

Participant Ages

Age	Frequency	Percent	Cumulative percent
18–24	2	.7	.8
25–34	54	19.8	21.5
35–44	74	27.1	50
45–54	53	19.4	70.4
55–64	64	23.4	95
65–74	10	3.7	98.8
75–84	3	1.1	100
Missing	13	4.8	
Total	273	100	

The distribution of health professionals in the sample population, as depicted in Table 6.4, is concentrated in the eastern states of Australia. Most respondents resided in New South Wales (31%), Victoria (27%), and Queensland (20%).

This ranking pattern resembles the population statistics, with New South Wales having the highest number of allied health professionals at 33%, followed by Victoria at 27% and Queensland with 18% (AIHW, 2021)

Table 6.4

Participant Geographic Location

Australian state/territory	Frequency	Percent	Cumulative percent
Australian Capital Territory	4	1.5	1.5
New South Wales	74	27.1	28.6
Northern Territory	1	.4	28.9
Queensland	70	25.6	54.6
South Australia	26	9.5	64.1
Tasmania	7	2.6	66.7
Victoria	74	27.1	93.8
Western Australia	17	6.2	100.0
Total	273	100.0	

The sample dataset does not approximate the allied health population in total. In the population sample data shown in Table 6.5, psychologists represent the greatest number of respondents at 42.5%, followed by physiotherapists (18.7%), and speech pathologists (15.0%). When compared to the proportion of like allied health professions in Australia, occupational therapists are underrepresented, and speech pathologists are overrepresented. In the population of all allied health professionals, psychologists represent 36%, physiotherapists 34%, occupational therapists 23%, and speech pathologists 7% (AIHW, 2021).

Table 6.5

Frequency of Profession

Allied health occupation	Frequency	Percent	Cumulative percent
Speech pathology	41	15.0	15.0
Occupational therapy	28	10.3	25.3
Psychology	116	42.5	67.8
Physiotherapy	51	18.7	86.4
Other	37	13.5	100.0
Total	273	100.0	

Table 6.6 shows most respondents had been practising in their profession for over 10 years (69%), and 97.8% of respondents were still practising. This population sample has a higher representation of allied health professionals working 10 years and above, compared to the population data for psychology, occupational therapy, and physiotherapy at 49.7% (Appendix J).

Table 6.6

Number of Years Participant Practising in Their Profession

Number of years practising	Frequency	Percent	Cumulative percent
Less than 1 year	1	.4	.4
1–3 years	20	7.3	7.7
3–5 years	15	5.6	13.3
5–10 years	48	17.6	31.0
10 years and above	187	68.5	100.0
Missing	2	.7	
Total	273	100.0	

In addition to demographic information, respondents were asked to provide some baseline information with regard to their usage of PRWs and usage of online rating websites for other products and services. The results are contained in Table 6.7. It is assumed that those who were adopters referred to their actual, rather than perceived, experiences when answering survey questions. The level of PRW usage was low among respondents, with only 44 indicating that they had used a PRW to rate another HCP.

Table 6.7

Respondent Usage of Physician-Rating Websites

Response	Frequency	Percent	Cumulative percent
Yes	44	16.1	16.1
No	224	82.05	98.16
Missing	5	1.84	100
Total	273	100.0	

The usage by respondents of other online sites to rate products or services was much higher (see Table 6.8). Almost 70% had used an online rating website to rate

either a product or service not related to health care. This high usage indicates that awareness of online review sites was high independent of usage related to different types of products or services.

Table 6.8

Respondent Usage of Online Rating Sites for Other Products and Services

Response	Frequency	Percent	Cumulative percent
Yes	189	69.23	69.23
No	77	28.2	97.43
Missing	5	2.57	100
Total	273	100.0	

6.9 Conclusion

The research methodology was grounded in a positivist approach supported by a quantitative method. The questionnaire employed was derived from DOI theory and SDT, tailored to suit the local healthcare context. The initial response rates were low but consistent with HCPs' responses to surveys worldwide. An incentive was used and proved to be effective, ensuring that both users and nonusers of PRWs were included in the study. The sample population broadly followed the demographic characteristics of the population of HCPs with respect to gender, age, and location. The roles with the highest representation in the population sample were psychologists, then physiotherapists, followed by speech pathologists, with the majority of participants practising for 10 years or greater. Of note in this research is that HCPs reported higher rates of adoption for online rating platforms servicing products other than health care with 69.23%, compared to PRWs with only 16.1%. The low adoption of PRWs compared to other online feedback platforms is confounding and requires further investigation.

Chapter 7. Results

This chapter presents the study results, beginning with a description and justification of the statistical method. Next, the data screening process is detailed to establish the data suitability for the chosen method. The conceptual model is then specified in statistical terms to extract the factors for further analysis. The validity of the measurement model is calculated and described prior to the results calculation and presentation. The chapter ends with a thematic analysis of the participants' responses to the open-ended survey questions.

7.1 Method

The method used for data analysis was SEM (structural equation modelling). SEM is a useful approach to evaluate the direct and indirect relationships between variables and to determine the compatibility of the research model in examining practitioner motivation adoption of PRWs. In comparison to regression analysis, SEM has the advantage of allowing more than one relationship to be explored within the model at one time (Bollen, 2014; Hair, 2010; Tabachnick et al., 2001). Furthermore, SEM considers measurement quality, as it makes allowance for measurement error in the observed data (Anderson & Gerbing, 1988; Fornell & Larcker, 1981). This statistical technique was an appropriate approach for addressing the types of research questions in this study. The technique can simultaneously estimate models that provide evidence of the role of predictors and mediators on outcome variables. Model fit to theory was assessed and hypothesis statements were tested using SEM based on the data collected through the survey scales.

SEM analysis is a set of statistical techniques that has been described by some authors as a five-step process (e.g., Crockett, 2012; Schumacker & Lomax, 2004; Thakkar, 2020). Hair et al. (2010) provided a six-stage process that more comprehensively captures some of the critical assumptions of SEM. These six stages are to define individual constructs, develop the measurement model, develop the model to produce empirical results, assess the measurement model validity, specify the structural model, and assess the structural model validity (Hair et al., 2010). In this study, the six-stage process was adopted, and prior to the first stage of SEM being applied, preliminary investigation of the data was undertaken, including data screening, error checking, and assessment of sample size (Crockett, 2012).

7.2 Data Screening

The survey data were extracted from the Qualtrics survey software and uploaded into SPSS, statistical analysis software (IBM, version 27) that was used throughout this study. The data were inspected to ensure that SPSS could process the results, which requires that each item in the questionnaire has a unique variable name (Pallant, 2016). Assigning names to variables followed the conventions detailed in Pallant (2016). Variables were classified according to the type of measurement: nominal, ordinal, and interval.

7.2.1 Merge Files

In Phase 1 of the data collection, no incentive was offered, and the only professions included for selection under Question 3 were speech pathology, occupational therapy, psychology, and other. In the following stages of data collection, after ethics approval, incentives were included, and two additional fields were added to Question 3 to include the categories of medical doctor and physiotherapy. To keep the data distinct, it was decided to collect the data with the additional categories in a separate questionnaire. The process for merging the data files followed the process detailed by Pallant (2016). Given that the data file with the additional categories was larger than the initial data collection file, it was decided to recode the first dataset into the second. The only recoding of variables that was necessary related to Question 3 in the survey that asked to which profession the participant belonged. Table 7.1 details how the identifiers changed from the first dataset (row one) to the second dataset (row two), specifying the count of the number of variables that were recoded to create a merged file.

Table 7.1

Merged File Summary

Datasets	Speech therapy	Occupational therapy	Psychology	Other: text	Other text: no description provided
Variable coding identifier in SPSS Dataset 1	1	2	3	4 (2 cases of physiotherapy)	3 (no description)
Variable coding identifier in SPSS Dataset 2	2	3	4	5	6
Total number of cases recoded	**5**	**3**	**6**	**2**	**4**

7.2.2 Reverse Coding Negatively Worded Scales

Some of the items in the subscales were negatively worded and were reverse coded for analysis. Subscales are reverse coded to help prevent response bias (Pallant, 2016). The questions related to the DOI scale, and the reversed items included the following:

- R4: The disadvantages of me using/potentially using a PRW far outweigh the advantages.
- EOU1: I believe that a PRW could be difficult to use.
- EOU3: My use of a PRW requires/will require a lot of mental effort.
- EOU4: A PRW is or will be often frustrating to use.

The reverse coding was consistent with the original scales (G. C. Moore & Benbasat, 1991). The process for reversing the negatively worded item was undertaken in SPSS, and new variables were created using the procedure detailed by Pallant (2016, p. 87). The new variables as well as those identified in Section 7.2 are recorded in the Codebook (see Appendix K). The reverse coded variables are represented in the last four rows of the codebook table.

7.2.3 Error Checking, Respondent Misconduct, and Outliers

One of the first steps recommended prior to analysing an SEM model is to examine data for errors, respondent misconduct, and outliers (Collier, 2020). Prior to examining the data, each case must be given a unique identifier (Collier, 2020). All 391 cases were given a sequential number identifier based on chronological order; that is, Case 1 was the first submitted completed case, Case 2 the second case, and so forth.

As noted in Section 6.6, the original number of submitted questionnaires was 391. The total number of completed questionnaires was 273. The sample of 273 responses (cases) was retained and 118 deleted as the respondents made no attempt to commence the survey, abandoning the questionnaire prior to answering the first question. These abandoned responses were deleted because of the excessive amount of missing data consistent with Collier's (2020) recommendations.

Error checking was undertaken to ensure that the response values did not fall outside the possible Likert-scale range of 1 to 7 (Pallant, 2016). No errors were found as all values were within the scale range. The responses were also examined for respondent misconduct, whereby the respondent selects the same value for every question (Collier, 2020). This step was investigated by calculating the standard deviation for each respondent's answers. According to Collier (2020), if any respondent has an answer with a standard deviation of below .25, the case should be deleted. The standard deviation was first calculated across all questions, and no misconduct was detected. However, given the number of questions, it was possible that respondent misconduct could occur within a bank of questions. The standard deviation was then calculated for the total bank of responses for SDT and PCI. The data were examined in Microsoft Excel, and the standard deviation was calculated and then sorted from lowest to highset. There were 12 cases with a response that had a calculated standard deviation of less than .25 for PCI and none for SDT. The following cases were removed: Cases 69, 84, 106, 113, 163, 178, 221, 230, 242, 252, 264, and 381.

A further test for respondent misconduct was investigated. The amotivation scale in SDT identifies a health professional who has no motivation to be in the profession. Amotivation was not considered part of the hypothesis testing; however, the questions relating to amotivation were retained in the questionnaire to remain consistent with SDT and the original scale. This approach is consistent with similar studies (van der Burgt et al., 2018) and provided a means to test for respondent misconduct. A Likert-scale rating

of 7, which represents no motivation to perform a role of a health professional, is not compatible with a Likert-scale rating of 7 for intrinsic motivation, which represents high motivation to be a health professional, and the reverse is true. After examining the data, three cases were found in this category: Cases 121, 235, and 356. The removal of these cases was further justified as they returned the same answer for all questions in the PCI scale even though four questions were reverse coded (detailed in Section 7.2.2). A further seven cases were removed when it was found that the respondents answered the same scale rating for negatively worded items as they did for those that were not; therefore, Cases 37, 40, 62, 85, 156, 307, and 313 were removed.

Linearity is a key assumption in SEM (Byrne, 2016) and was evaluated through SPSS. To examine linearity, QQ plots were constructed for all variables and examined. A reasonably straight line suggests a normal distribution (Oppong & Agbedra, 2016; Pallant, 2016). Using visual inspection of the QQ plots, all items appeared to have a linear relationship except for Question 1 through to Question 3 of the identified regulation scale. On closer inspection, it was found that two cases, 202 and 357, were three standard deviations from the mean. One respondent was a music therapist and counsellor; as no other person in the sample had that title, it was considered not representative of the sample, and it was decided to remove Case 202. After a closer examination of Case 357, it was found that this was not a valid case and was in fact a preview response, which was part of the survey testing, so this case was also removed. The QQ plots were re-examined with the remaining 249 cases presented in Appendix L. The QQ plots did not show any evidence of nonlinearity; therefore, the assumption of linearity was met.

Missing data in questionnaire responses are inevitable and need to be assessed as an indicator of questionnaire development concerns; they can create roadblocks when calculating indices or result in biased conclusions from empirical studies (Byrne, 2016; Horton & Kleinman, 2007). There are three different categories of missing data, each requiring a different remedial approach: missing completely at random (MCAR), missing at random (MAR), and nonignorable missing at random (NMAR). A summary of the differences is recorded in Table 7.2.

Table 7.2

Comparison of Missing Data Classifications

	MCAR	MAR	NMAR
Missing values independent of observed values of all other variables in the data	Yes	No	No
Missing values independent of unobserved values of all other variables in the data	Yes	Yes	No

Adapted from *Structural Equation Modeling With AMOS: Basic Concepts, Applications and Programming* (3rd ed., p. 394), by B. M. Byrne, 2016: Routledge. Copyright (2016) by Taylor & Francis. Reprinted with Permission (Appendix A).

Missing data analysis was reinvestigated for the 249 cases using the method identified by Pallant (2016), and the results are located in Appendix M. The number of cases with missing values was 10.04%; however, the percentage of missing values when compared to the total number of values was 0.953%. Closer examination of the missing values pattern showed that the missing values were independent of both observed and unobserved values of all other variables in the data and therefore were MCAR.

Addressing responses that are MCAR may include ad hoc approaches such as listwise and pairwise deletion and single imputation, or theory-based approaches such as model- or data-based solutions (Byrne, 2016). The full information maximum likelihood (FIML) has been identified in various studies to yield unbiased results and efficient parameter estimates when compared to the ad hoc approaches (Enders, 2008). Given the small number of missing data, the treatment of the MCAR for factor analysis was informed by Hair et al. (2010), whereby when the sample size is smaller than 250, the FIML approach can be adopted. Further, Byrne (2016) identified that Amos (IBM, version 27, used in this study) requires no further imputation of missing values as the program uses FIML for such missing data. The missing data were not coded with a marker number, as SPSS recognises blanks as missing data (Pallant, 2016).

7.2.4 Sample Size

SEM requires a relatively larger sample size than many other statistical methods (Collier, 2020). Consensus on what is deemed a sufficient sample size has changed significantly, and researchers hold diverse views on what is acceptable. Schumacker and Lomax (2004) identified that many studies used between 250 and 500 subjects. A minimum threshold discussed by Hair (2010) is to ensure there are at least five

observations per variable, while Kline (2005, p. 111) identified that the sample size be greater than 200 for SEM. Loehlin (1992) identified that a model with two to four latent factors needs at least 100 responses, but 200 would be better. Bentler and Chou (1987) recommended there should be five responses per parameter for normal distributions when the latent variables have multiple indicators. Tabachnick et al. (2007) recommended at least 10 respondents per estimated parameter. One view is that a sample of 100 is the minimum acceptable, and that it is now possible for SEM to run well on smaller samples (Byrne, 2016). The present study sample size was 249, which was adequate as it exceeded the more recent minimum sample sizes identified here and also met Hair's criterion of more than five cases per item.

7.3 Individual Constructs and Measurement Model Specification

The individual constructs of the study were based on established theories with previously validated scales, as discussed in Chapter 2. It is recommended that scales that have not been previously used on a specific population should be subject to validity tests (Hair et al., 2010). Validity and reliability are two fundamental elements in the evaluation of a measurement instrument (Tavakol & Dennick, 2011). Internal validity is concerned with the extent to which an instrument measures what it is intended to measure, and external validity refers to the degree to which findings can be generalised to the population (Williamson & Johanson, 2017). Reliability is whether an instrument measures indicators consistently (Dovey et al., 2017; Tavakol & Dennick, 2011; Williamson & Johanson, 2017).

Cronbach's alpha is one method for testing the reliability of the scale. A Cronbach's alpha coefficient for a scale is considered adequate when it is above .7 (DeVellis, 2016). The Cronbach's alpha score for the original MWMS instrument was a reliability alpha of .68 to .90 for all subscales (Howard et al., 2016). The results calculated in Table 7.3 for this research found a range from the lowest value alpha of .67 for ERM to the highest value alpha of .91 for identified regulation. Amotivation was removed from further analysis as it was not part of the hypothesised model; however, it served a role in detecting respondent misconduct. The results for the SDT scale are considered acceptable as the ERM scale, while being below the threshold of .70, is consistent with previous studies (Howard et al., 2016).

Table 7.3

Cronbach's Alpha Results

Variable	Cronbach's alpha	Cronbach's alpha in original studies	Source
Relative advantage	.93	.95	G. C. Moore & Benbasat (1991)
Compatibility	.92	.86	
Ease of use	.86	.81	
Intrinsic motivation	.86	.88–.90	Howard et al. (2016)
Identified regulation	.90	.67–.78	
Introjected regulation	.76	.69–.71	
External regulation—social	.83	.76–.78	
External regulation—material	.67	.60–.70	
Behavioural intention	.94	.90	Venkatesh & Bala (2008)

The Cronbach's alpha score for the PCI scale ranged from a low of .86 for ease of use and a high of .93 for relative advantage. This compares to a low score of .81 for ease of use and a high of .95 for relative advantage for the original scales (G. C. Moore & Benbasat, 1991). The BI to use Cronbach's alpha was calculated at .94 compared to .90 reported in other studies such as that conducted by Venkatesh and Bala (2008). The calculation of Cronbach's alpha can be found in Appendix N. The measurement scales for SDT, PCI, and BI were considered to have met the reliability test threshold of .70.

A measure for scale validity is EFA, which is used to investigate the underlying factor structure of assessment instruments such as questionnaires (Osborne & Fitzpatrick, 2012). This study used prevalidated scales that had already been subjected to EFA to define the underlying structure of the latent variables (Hair, 2010). EFA was performed on the current application of the instrument as the goal of EFA is to explore the factor structure of an instrument when used for a *specific* population (Osborne & Fitzpatrick, 2012).

The process for EFA is sequential, involving five steps (Williams et al., 2010):

1. Identify if the data are suitable for analysis.

2. Identify the factor extraction method.

3. Identify the criteria for the factor retention method.

4. Select the rotational method.

5. Interpret and label.

7.3.1 Suitability of Factor Analysis

The correlation matrix and sample size are important indicators of EFA suitability. Sample size was addressed in Section 7.2.4. The correlation matrix displays the relationship between individual variables (Williams et al., 2010). Correlation coefficients over .30 are deemed adequate (Hair et al., 2010). A correlation matrix for the PCI scale, as described by G. C. Moore and Benbasat (1991), returned more than 38% of the coefficient below .30. Given low scores, the short scales described by G. C. Moore and Benbasat were used to recalculate the coefficients, which were identified as not having a significant negative effect on content validity. The short scales required the removal of the following questions: for relative advantage, Questions 4, 5, 6, and 9; for compatibility, Question 2; and for ease of use, Questions 1 through to 5. The ease-of-use scale now consists of the following questions, "I believe that it is easy to get a PRW to do what I want it to do", "Overall I believe that a PRW is or will be easy to use", and "Learning to operate a PRW is or will be easy to use". The recalculation returned a majority (77%) of coefficients above .30.

A correlation matrix was calculated for the SDT and BI to adopt scales. The results for both scales returned correlation coefficients sufficiently above .30 for their respective scales. The detailed calculations of correlation matrices can be found in Appendix O.

The additional tests to assist in the determination of EFA suitability are the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity. The KMO measure has guidelines for interpretation; any item with a KMO score of .50 or below is unacceptable (Hair, 2010), and items above .6 are appropriate for factor analysis (Pallant, 2016). The KMO results for PCI, SDT, and BI were .91, .80, and .74, respectively, and therefore met the criterion.

The Bartlett's test of sphericity requires a result of ($p < .05$) for factor analysis to be suitable (Hair et al., 2010). The results for PCI, SDT, and BI returned results of $p < .05$. The modified data were suitable for EFA as they met the criteria for sampling adequacy, the correlation coefficient, the KMO, and Bartlett's test of sphericity.

7.3.2 Factor Extraction

One of the objectives of factor extraction is to reduce a large number of items or components into the least number of factors that can best account for covariation among the observed variables (Byrne, 2016; Pallant, 2016; Williams et al., 2010). There are a number of different techniques for factor extraction such as principal components analysis or maximum likelihood (ML; Pallant, 2016). ML is one of the most commonly used factor extraction methods as it has a number of advantages over principal components analysis, including providing more fit indices (Fabrigar et al., 1999). Once the factors have been extracted, a decision on which factors to retain is required. Hair et al. (2010) recommended using multiple criteria, such as

- Kaiser's criterion (Kaiser, 1960), where components that have an eigenvalue of 1 or more are retained,
- scree test (Cattell, 1966), where a change in the shape of the plot indicates components below the change should be disregarded as the components above the change contribute most to the explanation of the variance,
- parallel analysis (Horn, 1965), where factors are retained when they equal or exceed the eigenvalues obtained from randomly generated data for the same sample size (Pallant, 2016).

ML was the method employed to extract the remaining 16 items of the MWMS scale, 11 items of the modified PCI scale, and three items of the BI scale. Factor extraction was calculated on each of the three theories separately and then as a combined factor analysis.

7.3.2.1 Factor Retention SDT

The factor extraction for SDT using ML revealed the presence of four components with eigenvalues exceeding 1, explaining 26.83%, 23.78%, 10.42%, and 7.07% of the variance, respectively. According to SDT, the result based on the original scales (allowing for the deletion of amotivation) would have been a five-factor solution (Gagné et al., 2015). The presence of only four components can be explained by two that are closely related—namely, ERM and ERS. A study by Neves and Coimbra (2018) found that those two components also loaded onto the one factor. In their study, when

amotivation was removed, they also had a four-factor solution that explained 71.9% of the variance, a similar result to this study with 68.11% of the variance explained.

Using the Cattell (1966) scree test, a clear break was evident after the fourth component. Having met the criterion to retain four components under the Kaiser criterion and the scree test, a final analysis was completed. Parallel analysis, shown in Table 7.4, identifies that only three components would be retained. However, to remain consistent with the empirical findings of previous studies using the MWMS scale (Gagné et al., 2015; Neves & Coimbra, 2018), it was decided to retain five components (taking into account the previous deletion, amotivation) for further investigation.

Table 7.4

SDT Parallel Analysis Self Determination Theory

Component number	Actual eigenvalue	Criterion value from parallel analysis	Decision
1	4.29	1.46	Accept
2	3.80	1.37	Accept
3	1.66	1.28	Accept
4	1.13	1.22	Reject
5	0.91	1.16	Reject
6	0.88	1.10	Reject

Note. Extraction method: maximum likelihood.

To aid in the interpretation of the five-component solution, an oblimin rotation was performed. The rotation of the solution revealed a simple structure (Thurstone, 1947). The analysis in Table 7.5 illustrates that the majority of items presented with a factor loading of > 0.7. Introjected regulation, Item 2 (Introjected IJ2), loaded onto a theoretically unrelated scale, intrinsic motivation. On reviewing that item and inspecting the mean scores for the questions in introjected regulation, respondents may have misunderstood Question 2. In the introjected regulation scale, the mean score for Questions 1, 3, and 4 was a value of 3, whereas for Question 2 in that scale, the mean score was 5.4. Given the likely confusion caused, evidenced from the response pattern, Question 2 was removed from further analysis. This remove option is preferable to generating a reverse code. No precedent for reverse coding the item was evident in the extant literature.

A further review of the pattern matrix revealed that all variables substantially loaded onto only one component, except for intrinsic motivation Item 3, cross-loaded with the identified regulation item. The results were consistent with the scale as identified regulation, being the next motivation type adjacent to intrinsic motivation. Introjected regulation Item 1 also loaded onto the same factor as for the ERS and ERM. This is also consistent with the theoretical scales as ERM represents the continuum of motivation that follows from introjected regulation. To remain consistent with the original scale, five factors were retained.

Table 7.5

Rotated Four-Factor Solution: MWMS Scale

	Pattern matrix [a]			
	Factors			
Independent variables	1	2	3	4
Intrinsic IN1	−.819			
Intrinsic IN2	−.961			
Intrinsic IN3	−.420			.512
Identified ID1				0.866
Identified ID2				0.854
Identified ID3				0.903
External RS1		0.813		
External RS2		0.868		
External RS3		0.659		
External RM1		0.614		
External RM2		0.653		
External RM3			.340	
Introjected J1			.270	
Introjected J2				−.261
Introjected J3			.988	
Introjected J4			.953	

[a] The output of a pattern matrix shows factor loadings on each variable.

7.2.2.2 Factor Retention Perceived Characteristics of Innovation

ML analysis on the PCI scale revealed the presence of two components with eigenvalues exceeding 1, explaining 54.78% and 16.73% of the variance, respectively. An inspection of the scree plot revealed a clear break after the second component. Further analysis was completed using parallel analysis, which confirmed the retention of only two factors, as illustrated in Table 7.6. The original validated scales also found that relative advantage and compatibility loaded on the same factor (G. C. Moore & Benbasat, 1991).

Table 7.6

Parallel Analysis: PCI Scale

Component number	Actual eigenvalue	Criterion value from parallel analysis	Decision
1	6.00	1.46	Accept
2	1.84	1.37	Accept
3	0.64	1.28	Reject
4	0.61	1.22	Reject

Note. Extraction method: maximum likelihood.

Oblimin rotation was performed to aid in the interpretation of the two-component solution. The rotated solution revealed a simple structure as illustrated in Table 7.7, with all but two value not exceeding .7, although exceeding 0.45, which is still considered to be suitable (Hair et al., 2010).

Table 7.7

Rotated Two-Factor Solution: PCI Scale

Independent variables	Pattern matrix [a] Factor	
	1	2
Relative Advanatge1	0.56	
Relative Advantage 2	0.79	
Relative Advantage 3	0.85	
Relative Advantage 7	0.89	
Relative Advantage 8	0.90	
Compatibility 1	0.82	
Compatibility 3	0.84	
Compatibility 4	0.75	
Ease of Use 6		0.64
Ease of Use 7		0.88
Ease of Use 8		0.79

[a] The output of a pattern matrix shows factor loadings on each variable.

The items for the BI scale were subjected to ML analysis, which revealed the presence of one component with eigenvalue exceeding 1, explaining 89.72% and 7.86% of the variance, respectively. An inspection of the scree plot revealed a clear break after the first component. This result was expected given the size of the scale and the original findings in Venkatesh and Bala's (2008) study that examined user acceptance of computer technology and used BI as a measure of intention to perform a desired behaviour in that context.

7.2.2.3 All Factors Combined

To assess discriminant construct validity, ML analysis was completed on all the items across all three scales. The results are shown in Table 7.8. The results produced a six-factor solution. All items loaded consistent with previous individual scale analysis except for intrinsic motivation and identified regulation. The two motivation types appeared to load onto the same factor. This observation was expected as both types of

motivation are closely related. The results demonstrate both convergent (results of similar indicators show high intercorrelations) and discriminant (items from distinct constructs are not highly intercorrelated) validity (T. A. Brown, 2015).

Table 7.8

Rotated Factor Solution Across All Scales

	Pattern matrix [a]					
	Factor					
All variables	1	2	3	4	5	6
Relative Advantage 1	.49					
Relative Advantage 2	.81					
Relative Advantage 3	.88					
Relative Advantage 7	.87					
Relative Advantage 8	.91					
Compatibility 1	.72					
Compatibility 3	.68					
Compatibility 4	.56					
Identified Regulation 1		.87				
Identified Regulation 2		.86				
Identified Regulation 3		.88				
Intrinsic Motivation 1		.54				
Intrinsic Motivation 2		.55				
Intrinsic Motivation 3		.76				
External Regulation S1			.82			
External Regulation S2			.87			
External Regulation S3			.65			
External Regulation M1			.61			
External Regulation M2			.65			
External Regulation M3				.34		
Introjected Regulation 1				.27		
Introjected Regulation 3				.96		
Introjected Regulation 4				.96		
Ease of Use 6					.62	
Ease of Use 7					.83	
Ease of Use 8					.79	
Behavioural Intention 1						−.90
Behavioural Intention 2						−.94
Behavioural Intention 3						−.74

In summary, the scale validity resulted in the MWMS scale reducing to 15 items and five factors, the PCI scale to 11 items and two factors, and no change to BI.

7.4 Measurement Model Validity

Measurement model validity is dependent on establishing satisfactory goodness-of-fit measures and construct validity (Hair et al., 2010). A method to perform goodness of fit and identify construct validity is confirmatory factor analysis (CFA). CFA is a statistical method that analyses the interrelationships among a series of observed variables and their underlying factors (Shek & Yu, 2014). CFA determined whether the predefined factor models in the relevant theoretical frameworks of SDT, PCI, and BI fit the observed dataset (Shek & Yu, 2014) to provide evidence of construct validity. The steps in completing a CFA are data screening, model specification, calculation of estimates, model summary, model variables and parameters, and model evaluation (Byrne, 2016).

7.4.1 Data Screening

A CFA based on the 249 survey responses collected from HCPs was performed through Amos on 15 subtests of SDT, 11 of PCI, and three of BI. The method used to conduct the estimation was ML. ML estimation is suitable when the assumption of multivariate normality and sufficient sample size are met (T. A. Brown, 2015). ML estimation was suitable for use in this CFA analysis as both requirements were met, as discussed in Section 7.2.

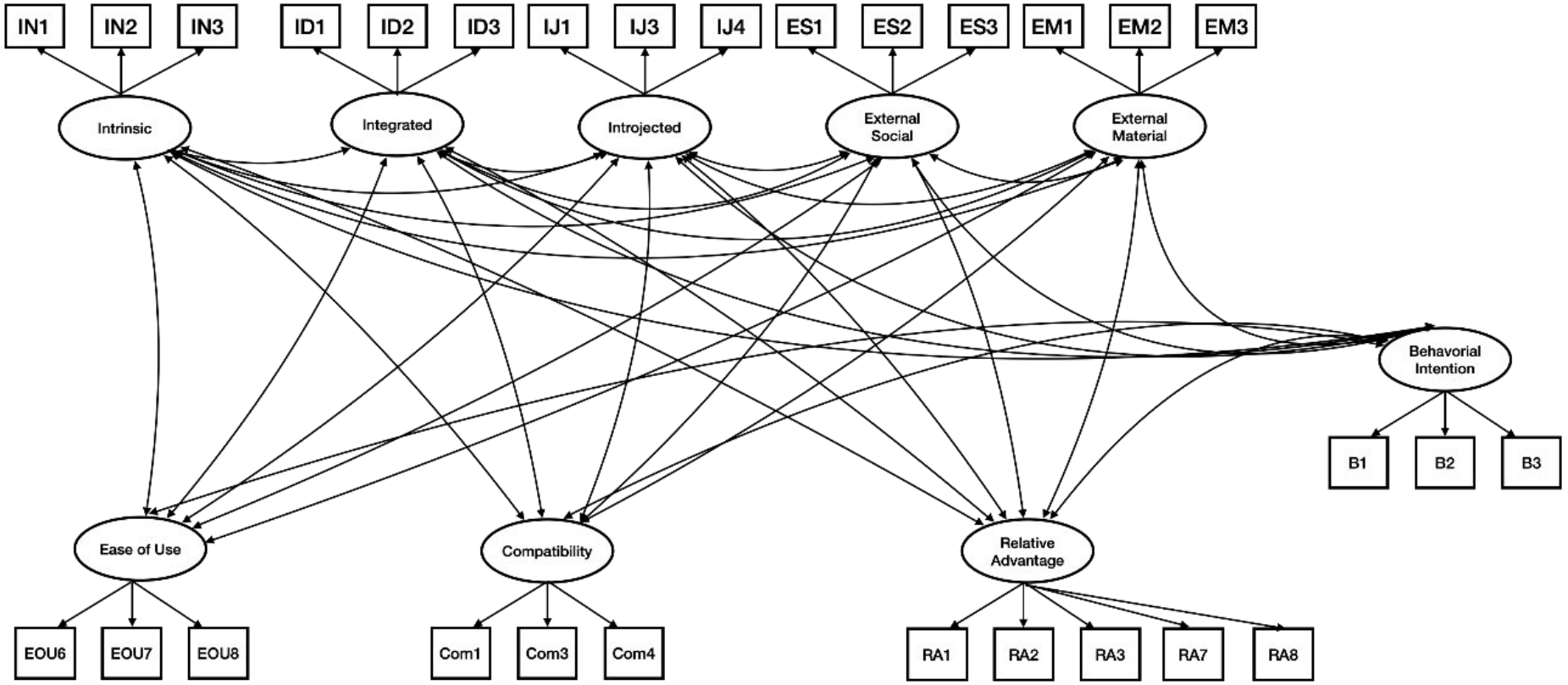
7.4.2 Model Specification

The hypothesised nine-factor measurement model, model one (M0), is presented in Figure 7.1. The measurement model specification is grounded in a priori theory discussed in the preceding chapters. Motivation was represented by SDT, and PCI was drawn from E. M. Rogers' (2003) DOI theory. Motivation was represented by five factors: intrinsic motivation, identified motivation, introjected regulation, ERS, and ERM. After allowing for the removal of amotivation, the five-factor model was consistent with the best fitting model in a study by Ju (2020). PCI was represented by three factors: relative advantage, ease of use, and compatibility. BI to adopt a PRW was represented by one factor, drawn from technology adoption studies validated by Venkatesh and Bala (2008). The measurement model depicted in Figure 7.1 shows the factors that covaried with each other. The circles represent latent variables, and

rectangles represent measured variables. Absence of a line connecting variables implies no hypothesised direct effect. As part of the SEM estimation process, unobserved variables must be assigned a metric that acts as a reference point for other indicators to be estimated (Collier, 2020). Amos automatically fixes the metric of the unobserved variables to the value of 1.

Figure 7.1

Measurement Model One (M0)



7.4.3 Model Evaluation

The evaluation of the CFA model is based on three criteria: overall goodness of fit, the presence or absence of ill fit, and the interpretability of the statistical significance of the model's estimates (T. A. Brown, 2015). Goodness of fit was evaluated by using a relative chi-square test, RSMEA, CFI, and the Tucker-Lewis Index (TLI). Acceptable model fit was guided by suggestions in Browne and Cudek (1993) and was defined as follows: RMSEA (≤ 0.08), CFI (≥ 0.90), TLI (≥ 0.90) and a result of less than 3 relative chi square (Kline, 2015). Various goodness-of-fit indices were used since they each provided different information about model fit; for example, chi squared provides absolute fit indices, RSMEA gives model parsimony, and CFI provides incremental fit indices (Thakkar, 2020). Taken together, these indices provide a more reliable evaluation of the solution (T. A. Brown, 2015). The results revealed that the hypothesised nine-factor model fit well with the data, and support was found for the hypothesised model, χ^2 (464, N = 123) = 341, p < .01, CFI .954, IFI .955, TLI .942, and the RMSEA of .051.

The goodness-of-fit statistics' usefulness is limited by the global view of the data in that a few poorly reproduced relationships will have less of an impact, even though they may be significant (T. A. Brown, 2015). A statistical technique that provides more granular-level detail in the measurement model is generically referred to as validity. Validity can be defined as the degree of accuracy inherent in the research (Hair, 2010). In the context of this research, construct validity is of interest and represents the extent to which a measured variable represents the theoretical factor construct it was designed to measure. There are two key elements that make up construct validity: convergent and discriminant validity. Convergent validity identifies that specific item constructs should converge or share a large portion of the variance in common (Byrne, 2016; Hair et al., 2010). Convergent validity is represented by two measures, the average variance extracted (AVE) and construct reliability (CR) (Hair et al., 2010). The acceptable threshold for the AVE measure is above .5 and for CR it is > .70 (Hu & Bentler, 1999). The AVE and CR were calculated using an Amos add-on developed by (Gaskin, n.d.), and results are presented in Figure 7.2. All AVE results identified above the .5 threshold except for ERM with a result of .48. All CR measures were above the .70 threshold.

Discriminant validity measures the extent to which two constructs are distinct and measure a different phenomenon (Hair et al., 2010). The acceptable thresholds for discriminant validity are when the maximum shared variance (MSV) < AVE and the square root of AVE are greater than interconstruct correlations. All factors met the threshold limits except for relative advantage, compatibility, and ERM. The results, shown in Figure 7.3, found the square root of the AVE for relative advantage to be less than its correlation with compatibility, and conversely, the square root of the AVE for compatibility was less than its correlation with relative advantage. It appears that both items measured the same factor. This is consistent with the EFA results and the finding in the original study by G. C. Moore and Benbasat (1991). Further, the results in a study by Alkhateeb and Doucette (2009) found the similarities in the two constructs apparent; some items in relative advantage captured elements of those in compatibility. To reduce any possible confounding results, due to convergent and discriminant validity, it was decided to remove compatibility from the analysis and results. As discussed in Section 2.2, relative advantage is considered a broad category of different factors, and the validity tests may in fact have identified compatibility factors that were already captured in relative advantage.

Figure 7.2

Test for Convergent and Discriminant Validity

	CR	AVE	MSV	MaxR(H)	External Material	External Social	Introjected	Identified	Intrinsic	Relative Advantage	Complexity (Ease of Use	Behavioral Intention	Compatibility
External Regulation - Material	0.716	0.482	0.481	0.822	0.694								
External Regulation - Social	0.833	0.628	0.481	0.866	0.694***	0.792							
Introjected Regulation	0.818	0.629	0.107	0.952	0.327***	0.318***	0.793						
Identified Regulation	0.9	0.749	0.388	0.903	0.05	0.019	0.133†	0.866					
Intrinsic Motivation	0.869	0.689	0.388	0.878	0.024	-0.084	-0.004	0.623***	0.83				
Relative Advantage	0.91	0.672	0.743	0.929	0.077	-0.002	-0.081	-0.136†	-0.008	0.82			
Ease of Use	0.832	0.624	0.189	0.853	0.064	0.051	-0.103	0.118	0.303***	0.387***	0.79		
Behavioural Intention to Use	0.945	0.852	0.586	0.965	0.081	-0.091	-0.096	-0.034	0.127†	0.734***	0.434***	0.923	
Compatibility	0.895	0.739	0.743	0.91	0.094	-0.016	-0.037	-0.150*	-0.044	0.862***	0.363***	0.765***	0.86

Note. CR = construct validity; AVE = average variance extracted; MSV = maximum shared variance; MaxR(H) = maximum reliability; significance of correlations: † $p < 0.100$, * $p < 0.050$, ** $p < 0.010$, *** $p < 0.001$.

In removing the compatibility factor, discriminant and convergent validity were improved for the model. There was no longer any crossover between relative advantage and compatibility. For the purposes of model identification, it was decided to remove Question 3 from ERM as, consistent with the EFA analysis, it overlapped with introjected regulation. The impact of removing an indicator has been investigated in the literature. The number of indicators per factor is recommended to be between three and five; however, for CFA models with multiple indicators, the minimum is two (Kline, 2015). The estimates were recalculated, and results are detailed in Figure 7.3. All the measures in the modified structural model display convergent and discriminant validity.

Figure 7.3

Re-Test for Convergent and Discriminant Validity

	CR	AVE	MSV	MaxR(H)	External Material	External Social	Introjected	Identified	Intrinsic	Relative Advantage	Complexity (Ease of Use)	Behavioural Intention
External Regulation - Material	0.791	0.656	0.489	0.812	**0.81**							
External Regulation - Social	0.833	0.627	0.489	0.868	0.699***	**0.792**						
Introjected Regulation	0.818	0.63	0.099	0.963	0.296**	0.315***	**0.794**					
Identified Regulation	0.9	0.749	0.385	0.904	0.046	0.02	0.133†	**0.866**				
Intrinsic Motivation	0.869	0.689	0.385	0.878	0.023	-0.084	0.001	0.621***	**0.83**			
Relative Advantage	0.909	0.671	0.537	0.93	0.094	-0.003	-0.079	-0.136†	-0.008	**0.819**		
Ease of Use	0.832	0.624	0.189	0.853	0.066	0.051	-0.105	0.119	0.303***	0.387***	**0.79**	
Behavioural Intention to Use	0.945	0.852	0.537	0.965	0.094	-0.092	-0.094	-0.034	0.127†	0.733***	0.434***	**0.923**

Note. CR = construct validity; AVE = average variance extracted; MSV = maximum shared variance; MaxR(H) = maximum reliability; significance of correlations: † $p < 0.100$, * $p < 0.050$, ** $p < 0.010$, *** $p < 0.001$.

The measurement model is said to have achieved model parsimony when the smallest number of indicators adequately represents a construct (Hair, 2010). In Section 7.3.2, construct validity identified modifications to the model to produce a more parsimonious model. Given the EFA results, and modification made to the measurement model, additional measurement models were tested. Table 7.9 presents the results of the comparisons of the different measurement models. A six-factor model, M3, consistent with the factors extracted from the EFA in Section 7.3.2, was examined. This required the items of intrinsic motivation and identified regulation to load onto one factor, the items of relative advantage and compatibility to load onto one factor, and the items for ERS and ERM to load onto one factor. The results of this model did not meet the statistical threshold of goodness of fit, falling below the cut-off of .90 for IFI, TLI, and CFI.

It was decided to test a higher order factor model, M4, which was consistent with the EFA, but rather than combine the items to load onto one factor, they retained their factor structure and then loaded onto a higher order factor. Intrinsic motivation and identified regulation loaded onto a new single factor, and ERM and ERS loaded onto another. The measurement model M4 did not produce results as the model was unable to be identified. These results are consistent with recent SDT research published by Howard, Gagné, et al. (2020) who found that the higher order factoring for SDT did not account for the unique characteristics of the regulation subscales. Further, as SDT posits that motivation is a continuum, it is theoretically inconsistent to combine subscales into a higher order model (Howard, Gagné, et al., 2020). The subscale approach adopted allowed all constructs' relevant information to be comprehensively modelled.

Two other measurement models were assessed based on the outcomes of the convergent and discriminant validity results. Measurement model M1 was tested without compatibility, and measurement model M2 also removed compatibility as a factor, as well as Item 3 from the ERM factor. While three measurement models M0 to M2 fitted the data within the acceptable statistical thresholds, measurement model M2 produced the strongest fit results. The criteria for selecting the models to test in the path analysis were the measurement models that met the statistical thresholds and that were theoretically consistent—namely, M0 and M1. The effect of the removal of

compatibility as a factor diminished the examination of the potential effects of the PCI; however, the overlap with relative advantage would confound the results if included.

Table 7.9

Confirmatory Factor Analysis: Measurement Models—Fit Indices

Description	Chi squared	*df*	CMIN/ *df*	IFI	TLI	CFI	RMSEA
M0: Hypothesised nine-factor model	464	341	1.65	.955	.942	.954	.051 (.045–.059 PCCLOSE .382)
M1: Respecified model—no compatibility	434.2	271	1.602	.961	.948	.960	.049 (.041–.058 PCCLOSE .545)
M2: Respecified model—no compatibility or ERM Q3	388.9	247	1.575	.966	.954	.965	.049 (.039–.057) PCCLOSE .623
M3: Six-factor model (per EFA)	464	362	2.561	.885	.860	.883	.079 (.073–.086) PCCLOSE .000
M4: Six-factor model—higher order	Unable to be identified						

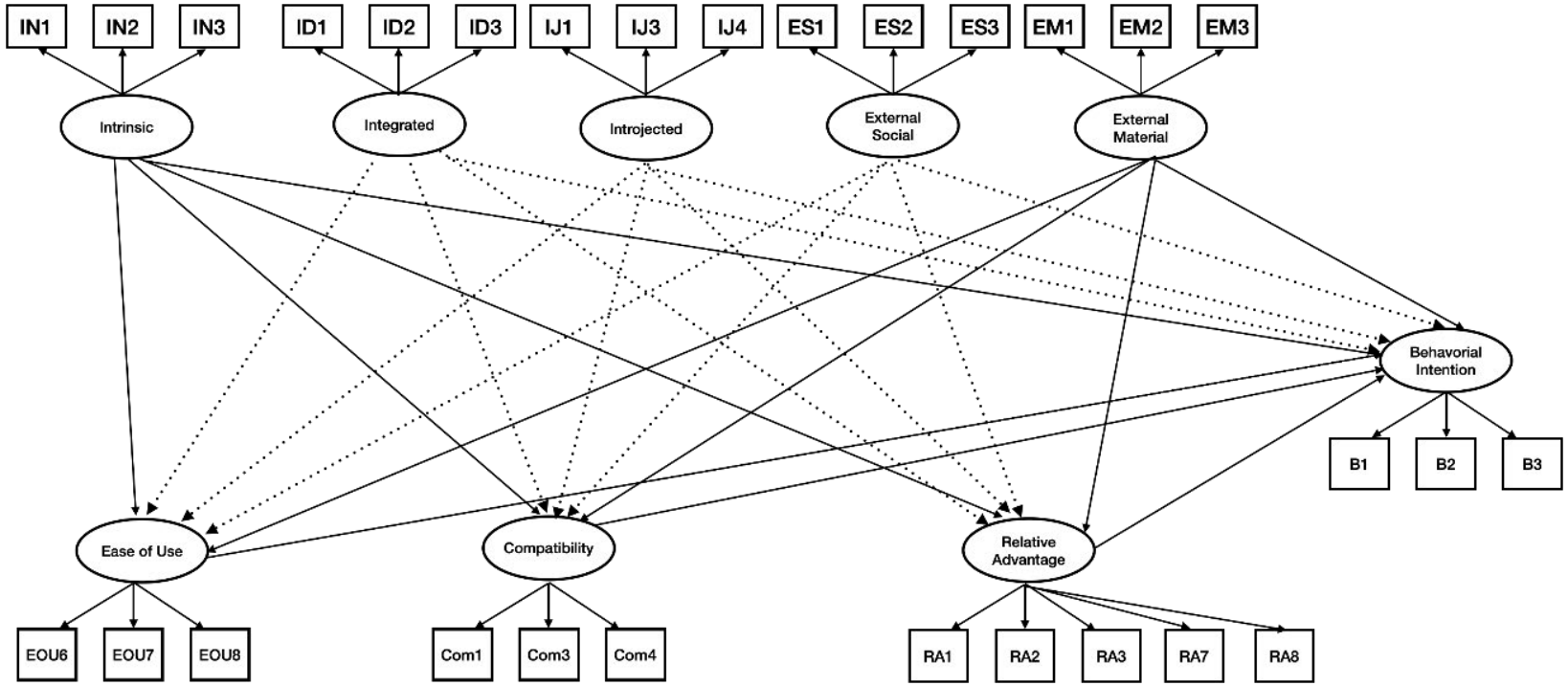
Note. *df* = degrees of freedom; CMIN/*df* = chi-square value/degrees of freedom; IFI = incremental fit index; TLI = Tucker-Lewis Index; RMSEA = root mean square error of approximation; ERM = external regulation—material; EFA = exploratory factor analysis.

7.4.4 Structural Equation Modelling Model Specification and Evaluation

The hypothesised model is represented in Figure 7.4. Circles represent latent variables; rectangles represent measured variables. Solid black lines represent an estimated positive effect and a dotted line an estimated negative effect.

Figure 7.4

Hypothesised Model M0



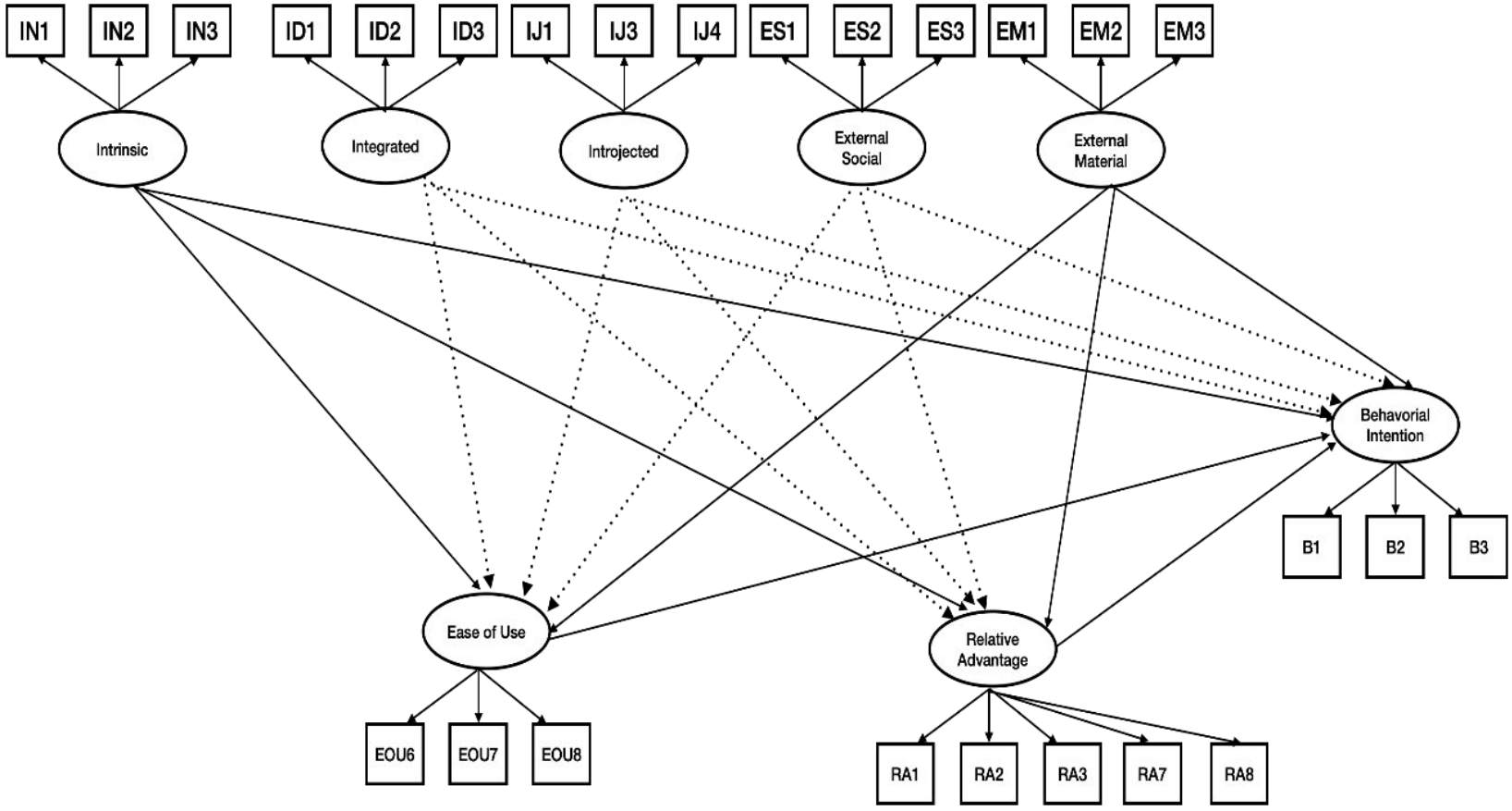
The hypothesised model M0 examined the predictors of BI to adopt a PRW. Motivation type was represented by five latent variables: ERM, ERS, introjected regulation, identified regulation, and intrinsic motivation. PCIs were represented by three latent variables: relative advantage, compatibility, and ease of use. It was hypothesised that motivation type would directly and indirectly predict BI to adopt a PRW. Further PCIs would directly predict BI to adopt a PRW. It was also hypothesised that the motivation type would predict PCIs.

The assumptions were evaluated through SPSS and Amos. The dataset contains responses from 249 HCPs. There were complete data for 219 participants for all 29 variables of interest. As discussed in Section 7.1.3, the missing data were MCAR and represented less than 1% of the total responses. The model was estimated with the ML method. The model was unable to be identified in Amos after the maximum permissible iteration limit of 50 was reached.

Post-hoc model modifications were performed based on results from the CFA in Section 7.3.3. The model was respecified in Figure 7.5 to reflect M1 from Section 7.3.3, having removed compatibility as a latent variable. Strong support was found for the revised hypothesised model χ^2 (377, N = 105) = 272, p < .01, CFI .953, IFI .954, TLI .939, and the RMSEA of .053(.045–0.062) PCLOSE .243.

Figure 7.5

Hypothesised Model M1



The hypothesised model was subjected to further analysis of fit and assumptions of normality. Multivariate normality is a critical assumption in conducting SEM analyses, in particular when using Amos (Byrne, 2016). Univariate normality is a precondition for multivariate normality (Byrne, 2016; Oppong & Agbedra, 2016). Univariate normality was discussed and confirmed in Section 7.2 through the observation of QQ plots. A further analysis of univariate normality was completed in Amos. To perform univariate and multivariate analyses in Amos, there must be no missing values. There were 26 cases with missing values, and they were deleted to run the comparative analysis in Amos. Univariate normality is achieved when the skew values range between −2 and +2 and kurtosis between −10 and +10 (Collier, 2020). All univariate values for skewness and kurtosis ranged between the permissible parameters (6.6.1 multivariate normality 219 sample size). Multivariate kurtosis was also assessed, using normalised estimates of kurtosis and its critical values. The critical value represents Mardia's normalised estimate of multivariate kurtosis (Byrne, 2016). Estimates of the critical value of > 5 indicate non-normally distributed data (Bentler & Wu, 2005). The kurtosis critical value was 18.778, indicating that the multivariate normality assumption was not met.

Byrne (2016) identified that multivariate kurtosis may be problematic when using FIML alone and suggested alternative methods of model estimation. One method available within Amos requires using the FIML method with bootstrapping (Kline, 2011). The bootstrapping process in Amos also requires that there be no missing data. The bootstrapping process described by Byrne (2016) identified that a covariance matrixs from the original data sources could be used as a data input source for hypothesised model estimation when there are missing data. To enable a better understanding of the impact of missing data and a breach of the assumption of nonmultivariate normality on the goodness-of-fit data, a series of comparison results are presented in Tables 7.10 and 7.11. The CFI and TLI results reported no meaningful differences (less than 0.1) between the three methods employed for the eight-factor hypothesised model (Byrne, 2016). The model chosen for the final analysis was M1:no comp.

Table 7.10

Structural Model Comparative Fit

Description	Chi squared	*df*	CMIN/ *df*	IFI	TLI	CFI	RMSEA
M0: original model no AM	No result achievable max iteration achieved						
M1: no comp (FIML *n* = 249)	467.100	272	1.717	.953	.938	.952	.054 (.046–.062) (.198)
M1: no comp (FIML, *n* = 219)	450.459	272	1.656	.954	.944	.953	.055 (.046–.064 PCCLOSE .184)
M1: no comp (FIML, *n* = 249 bootstrap)	465.955	272	1.713	.954	.944	.953	.054 (.045–.062 PCCLOSE .219)

Note. *df* = degrees of freedom; CMIN/*df* = chi-square value/degrees of freedom; IFI = incremental fit index; TLI = Tucker-Lewis Index; CFI = comparative fit index; RMSEA = root mean square error of approximation; AM = amotivation; FIML = full information maximum. likelihood.

Table 7.11

Significant Unstandardised Estimates SEM Eight-Factor Model Comparison

Path	FIML (*n* = 249)	FIML (*n* = 219)	FIML with bootstrapping (*n* = 219)
Relative advantage > behavioural intention	.890**	.892**	.892*
Ease of use > behavioural intention	.249**	.267**	.267*
External regulation—social > behavioural intention	−.201*	−.229*	−.229*
Intrinsic motivation > ease of use	.375**	.394**	.394*
Identified regulation > relative advantage	−.383*	−.408*	−.408*

Note. FIML = full information maximum likelihood.

* $p < 0.050$, ** $p < 0.010$, *** $p < 0.001$.

A further test was completed to address potential concerns when calculating model estimates, using Amos with missing values and without multiple imputation and multivariate non-normality. Mplus (Muthén & Muthén, 2017) provides a robust option

for non-normal and FIML for missing data (Lei & Wu, 2007). The statistically significant results are presented in Table 7.12. No meaningful variation was found with regard to the statistically significant relationships between Amos and Mplus. The only small differences occur in the effect size, the Amos model being more conservative in most estimations but all consistent in terms of direction. The estimates calculated using Amos are not significantly different from the Mplus calculation and is discussed in the next section.

Table 7.12

Mplus Significant Unstandardised Estimates SEM Eight-Factor Model Comparison

Path	FIML (n = 249)	Mplus *(n = 249)*
Relative advantage > behavioural intention	.890**	1.135*
Ease of use > behavioural intention	.249**	.317**
External motivation—social > behavioural intention	−.201*	−.276**
Intrinsic motivation > ease of use	.375**	.366**
Identified regulation > relative advantage	−.383*	−.343**

Note. FIML = full information maximum likelihood.

* $p < 0.050$, ** $p < 0.010$, *** $p < 0.001$.

7.5 Model Estimates

7.5.1 Motivation Type and Behavioural Intention

In the structural model, the hypothesised relationships were tested using SEM, and the supported hypotheses results are illustrated in Figure 7.6. A table summary of the results is presented in Table 7.13. The results did not support Hypothesis H1a that HCPs who identify as the motivation type ERM have a BI to adopt a PRW. While the size effect estimate of 0.161 was not statistically significant at $p < .053$, the direction of the relationship was positive. Support was found for Hypothesis H1b, indicating that a decreased BI to adopt a PRW by a HCP was predicted by those who identified with the motivation type ERS. The effect size was an unstandardised coefficient of −.216, $p < .013$.

Figure 7.6

Eight Factor Structural Model

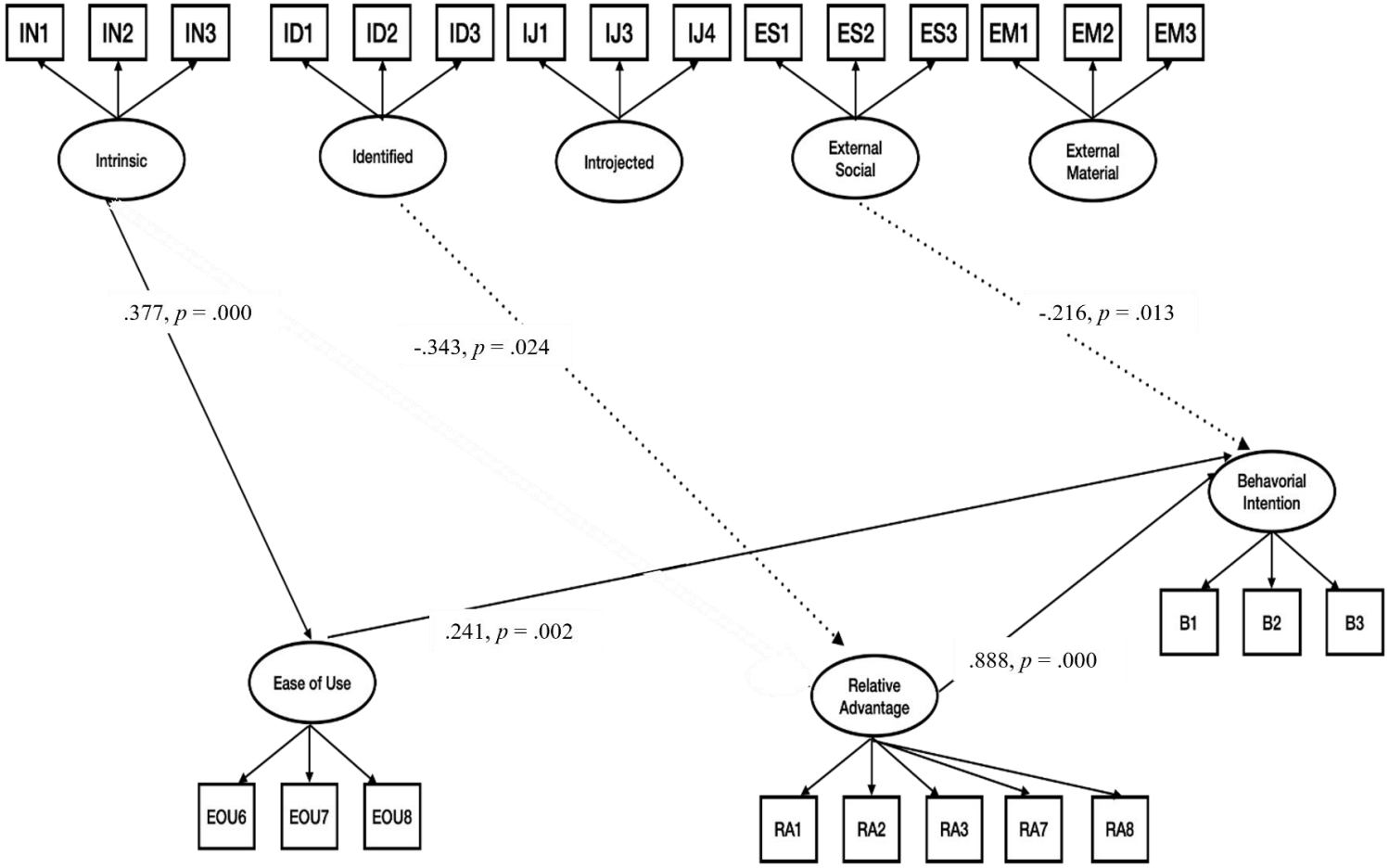


Table 7.13

Summary of results Motivation type and BI

Hypothesis	Direct effect	Coefficient estimate	*p* value	Result
H1a	ERM to BI	.161	.053	Not supported
H1b	ERS to BI	−.216	.013	Hypothesis supported
H1c	INJ to BI	−.021	.831	Not supported
H1d	ID to BI	−.013	.929	Not supported
H1e	IN to BI	.086	.384	Not supported

Note. ERM = external regulation—material; BI = behavioural intention; ERS = external regulation—social; INJ = introjected regulation; ID = identified regulation.

Hypotheses that were not supported were H1c and H1d that introjected regulation and identified regulation negatively influence a HCP's BI to adopt a PRW. While not statistically significant at $p > .05$, the direction of the relationship was negative. Hypothesis H1e that intrinsic motivation positively influences a HCP's BI to adopt a PRW was not supported. While not statistically significant at $p < .161$, the direction of the relationship was positive.

7.5.2 Perceived Characteristics of a Physician-Rating Website and Behavioural Intention

The results supported Hypotheses H2a and H2c that relative advantage and ease of use positively influence a HCP's BI to adopt a PRW. The results are presented in Table 7.14. The direct effect was 0.88, $p < .01$ for relative advantage and 0.24, $p < .002$ for ease of use.

Table 7.14

Summary of Results Motivation Type and Behavioural Intention

Hypothesis	Direct effect	Coefficient estimate	*p* value	Result
H2a	RA to BI	.888	***	Hypothesis supported
H2b	Comp to BI	Not estimated		Not supported
H2c	EOU to BI	.241	.002	Hypothesis supported

Note. RA = relative advantage; BI = behavioural intention; EOU = ease of use; comp = compatibility.

*** $p < 0.001$.

Hypothesis H2b, that compatibility negatively influences the BI to adopt a PRW, was not supported. This was unproven as compatibility was unable to be tested in the full path model as it was removed from the analysis after the items were found to be loading on to relative advantage.

7.5.3 Motivation Type and Perceived Characteristics of Physician-Rating Websites

The direct effects of motivation type on PCIs returned two statistically significant results, one with relative advantage and the other with ease of use, illustrated in Table 7.15. Hypothesis H3a, that HCPs who are motivation type ERM positively influence the perceived characteristic of relative advantage, was not supported. Hypotheses H3b and H3c, that HCPs with the motivation type ERS and introjected regulation negatively influence relative advantage, was not supported. The results show that Hypothesis H3d, that HCPs with a motivation type of identified regulation will have a negative perception of relative advantage for PRWs, was supported, returning a coefficient of −0.343 and $p < 0.02$. Hypothesis H3e, that HCPs who are intrinsically motivated perceive a higher value for relative advantage of a PRW, was not supported.

Table 7.15

Summary of results Motivation type and PCI

Hypothesis	Direct effect	Coefficient estimate	*p* value	Result
H3a	ERM to RA	.125	.155	Not supported
H3b	ERS to RA	−.057	.535	Not supported
H3c	INJ to RA	−.121	.254	Not supported
H3d	ID to RA	−.343	.024	Hypothesis supported
H3e	IN to RA	.140	.161	Not supported
H4a	ERM to Comp	Not estimated		
H4b	ERS to Comp	Not estimated		
H4c	INJ to Comp	Not estimated		
H4d	ID to Comp	Not estimated		
H4e	IN to Comp	Not estimated		
H5a	ERM to EOU	.041	.629	Not supported
H5b	ERS to EOU	.066	.461	Not supported
H5c	INJ to EOU	−.187	.079	Not supported
H5d	ID to EOU	−.173	.236	Not supported
H5e	IN to EOU	.377	***	Hypothesis supported

Note. ERM = external regulation—material; RA = relative advantage; INJ = introjected regulation; ID = identified regulation; IN = intrinsic motivation; ERS = externally regulated—social; EOU = ease of use.

*** $p < 0.001$.

Compatibility was unable to be validated in this test as it was removed from the model; consequently, Hypotheses H4a to H4e were not tested.

The motivation type of intrinsic motivation was the only one to show a direct effect on ease of use, supporting Hypothesis 5e, Hypotheses 5a to 5d, that motivation has a direct effect on ease of use, was not supported.

7.5.4 Test for Mediation

The direct effect of the independent variables (SDT and PCI) on the dependent variable (BI) was examined above. The analysis next examines indirect effects through a test for mediation. Indirect effects are the relationships that flow from the independent variable (motivation type) to the mediator (PCI) and then onto the dependent variable (BI) (Collier, 2020). A mediator is a process or intervening variable that, through mediation analysis, helps understand whether that mediator variable affects the dependent variable. In this study, a hypothetical causal sequence was proposed, whereby PCIs are said to intervene on the influence between motivation type and BI. PCIs, the middle variables, are termed the mediator variables (Tabachnick & Fidell, 2014). There are four types of mediation that can occur: full, partial, complementary, or competitive mediation (Collier, 2020). The first two are discussed as they are relevant to this study. Full mediation is when there is a nonsignificant relationship between the independent variables (motivation type) and the dependent variable (BI to adopt a PRW), but there is a significant relationship between the independent variables and the mediators, and between the mediator variables and the dependent variable (Tabachnick & Fidell, 2014). Partial mediation occurs when there is a significant effect as per full mediation, but there is also a significant effect between the independent variable and the dependent variable motivation type and BI (Collier, 2020).

Mediation analysis has progressed from the Baron and Kenny (1986) method of finding the unstandardised coefficients for each relationship and then using a Sobel test to determine significance (Hayes, 2017). Modern methods are concerned with assessing the indirect effect by examining the product of path x and path y while controlling for the direct effect of path z (Collier, 2020). The significance of the mediation is determined by a bootstrap method in Amos. As two PCIs are possible mediators, the multiple mediation process detailed in Collier (2020) was followed. As there are multiple mediators in the model, this process required using the Amos function called estimand that allows the user to examine individual mediation relationships in such a multiple mediation model. The bootstrap function in Amos requires complete data; as the raw data contained some missing values, the process specified by Collier (2020) was used. It required the correlation or covariance matrix from the original 249 respondents as the data source for the structural model and required the Monte Carlo (parametric)

bootstrap option to be selected in Amos. The number of bootstrap samples requires no more than 10,000, the principle being more is better (Hayes, 2017). The following mediation hypothesis was tested using the bootstrap function, with 10,000 bootstrap samples at a 95% confidence interval:

H6a: The perceived characteristics of innovation, being relative advantage, will mediate the relationship between health practitioners' motivation type and behavioural intention to adopt the PRW with the same directional influences proposed in hypotheses H3a-H3e.

H6b: The perceived characteristics of innovation, being compatibility, would mediate the relationship between HCPs' motivation type and behavioural intention to adopt the PRW with the same directional influences proposed in hypotheses H3a-H3e.

H6c: The perceived characteristics of innovation, being ease of use, would mediate the relationship between HCPs' motivation type and behavioural intention to adopt the PRW with the same directional influences proposed in hypotheses H3a-H3e.

The path diagram representing the statistically significant results are presented in Table 7.7. A table summary of the results and the statistical significance is presented in Table 7.16. For the full results of mediation see Appendix P.

Figure 7.7

Test for Mediation Using Bootstrap Analysis With a 95% Confidence Interval

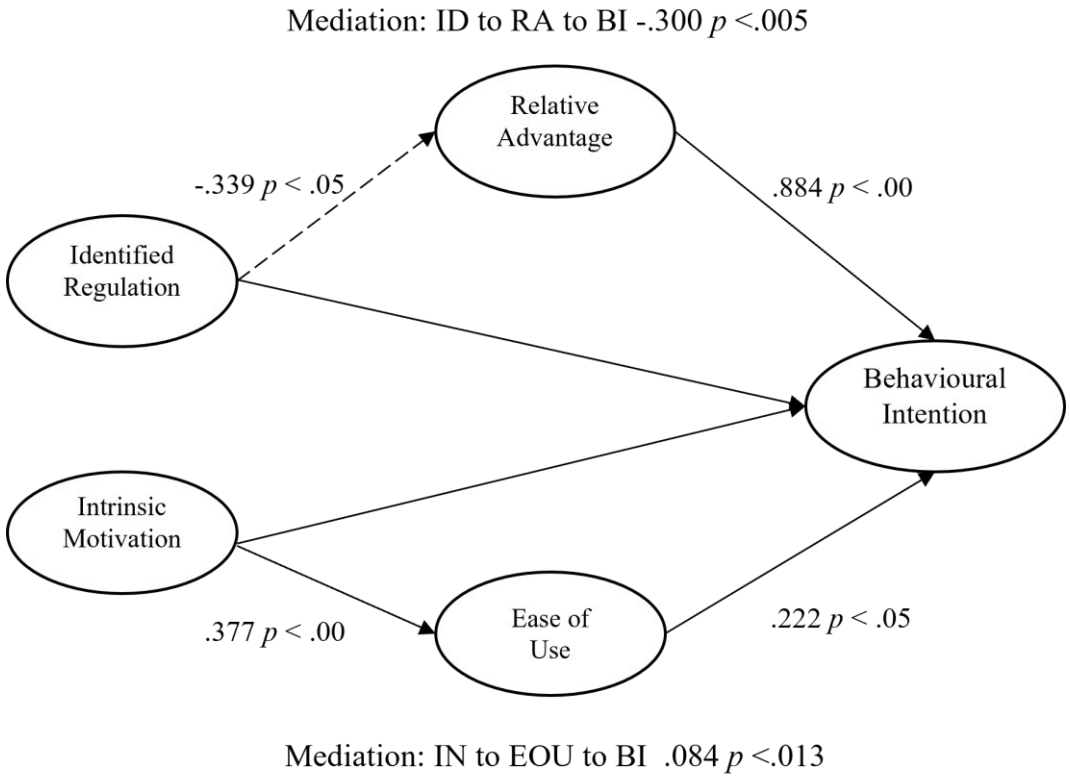


Table 7.16

Test for Mediation Using Bootstrap Analysis With a 95% Confidence Interval

Relationships	Direct effect	Indirect effect	Confidence interval		*p* value	Conclusion
			Low	High		
Intrinsic motivation > Ease of use > Behavioural intention	.377 .222	.084	.018	.231	< .013	Full mediation
Identified regulation > **Relative advantage > Behavioural Intention**	(.339) .884	(.300)	(.680)	(.000)	< .05	Full mediation

Hypothesis H6a, that relative advantage would mediate the relationship between motivation types and BI to adopt a PRW was only supported for identified regulation. Identified regulation yielded an indirect effect of −.300, $p < .05$. A HCP who differs by one unit in their identified regulation are reported to differ by −.300 less in their BI to adopt a PRW. HCPs with more identified regulation see less of a relative advantage by = −.300, which consequently reduced their BI to adopt a PRW by −.300 units.

Hypothesis H6b that compatibility, would mediate the relationship between HCPs' motivation type and behavioural intention to adopt the PRW was not supported as it was removed from the statistical model.

Hypothesis H6c that ease of use would mediate the relationship between motivation type and BI to adopt a PRW was only supported for intrinsic motivation. The indirect effect result was .084, $p < .013$. Stated differently, two HCPs who differ by one unit in their intrinsic motivation are reported to differ by .084 units in their BI to adopt a PRW due to the tendency for those with higher intrinsic motivation to perceive a greater ease of use, which in turn translates to a greater BI to adopt a PRW.

7.6 Qualitative Comments

A directed content analysis approach was adopted to analyse the three open-ended questions which were asked at the completion of the questionnaire. Directed content analysis is an analytic approach commonly used for open-ended survey questions and is used to assist in the validation and extension of existing theories or frameworks (Hsieh & Shannon, 2005). This approach requires key concepts to be

identified as an initial coding strategy, which is supplemented by giving new codes to text that are not suitable for the initial concept categories. The key coding concepts reflect the intent of the questions, which aim to increase the understanding of the quantitative data.

The open-ended questions with a description of the coding were as follows:

1. *Please describe your experience in receiving feedback or giving feedback to other health professionals.* The key concept for this question was whether it was a positive or negative experience.

2. *Whether or not you have used a PRW, what advice would you offer others in your profession about the use of such online customer feedback tools, at this time or even into the future?* The key concept for this question was whether HCP would use or avoid using a PRW, and how HCPs should use PRWs, now and into the future.

3. *What is your opinion on the importance of PRWs now, and how might that view change in 5 years from now?* The key concept in the question is the level of importance and how it could potentially change over time.

A summary of the open-ended survey responses by profession are detailed in Table 7.17. Participation in the comments section was high, with 88% of respondents providing a comment for Question 1, 83% for Question 2, and 81% for Question 3. The participation varied between professions, with occupational therapists having the lowest participation rate for Question 3, and the Other category having the highest participation rate with 97% for Question 1.

Table 7.17

Participation in Comments

Profession	Q1	% of total therapist	Q2	% of total therapist	Q3	% of total therapist
Occupational therapists	21	81%	19	73%	18	69%
Other	29	97%	28	93%	27	90%
Physiotherapists	40	85%	36	77%	36	77%
Psychologists	100	92%	98	90%	93	85%
Speech pathologists	31	82%	27	71%	28	74%
Total	221		208		202	

In answering Question 1, the coding concept was to understand general attitudes to feedback, independent of source, from either a positive or negative perspective. For the text that was difficult to categorise into negative or positive, the response was marked as neutral. A summary of results is presented in Table 7.18. The percentage of positive attitudes towards feedback was 48% (n = 107), and neutral responses numbered 33%. The total number of negative comments numbered 17% (n = 36), and an additional 2% were negative as they stated their professional association would not allow them to respond to feedback. Further analysis of the negative comments related to PRWs specifically rather than feedback in general.

The positive comments identified feedback as an important source for self-improvements—for example, “Helpful in determining areas of service that I can improve—sometimes I have not been as fully aware of areas of improvement without feedback from the clients” (Case 234).

A neutral comment was “Feedback received in my organisation is often anonymous and negatively charged. I prefer to give and receive feedback that is open, transparent and constructive” (Case 165).

A negative insightful comment included,

> With mixed feelings I once gave a professional a 5-star rating. I don’t think I’ll ever write a review again though. I also looked up reviews when I had to visit a medical specialist as I was extremely anxious and needed someone sensitive and thought and it is [*sic*] difficult to figure this out from just a name and list of qualifications. I think this anxiety is an unavoidable reality when seeing a health professional for the first time

> though. Reviews may provide the illusion of certainty of professional and caring treatment that can really only be assessed once you meet the person. Generally, I don't think they are helpful. They fit more with a goods and services model, not so much with the helping profession. (Case 102)

The feedback from Question 1 indicates that the attitude towards PRWs was generally positive, and respondents were able to identify benefits, which is consistent with the statistical analysis that showed relative advantage positively influenced BI to use a PRW. Of the negative responses, the comments indicated cognitive factors played a role; for example, anxiety was mentioned in their previous paragraph and that they were often used to vent or provide negative comments: "I believe that people are more likely to complain as a way of 'venting', with no intention to resolve the issues. I prefer to reflect upon my work with my clients at every session" (Case 161). Furthermore, comments indicated that patients were perceived as not being able to judge HCP quality, for example: "Giving feedback to to [*sic*] health professionals is complex unless you know the professional well as it is difficult and dangerout [*sic*] to accurately assess someones [*sic*] practice without being well informed" (Case 105).

Other negative comments included the aspect of care related to treating patients with mental health issues, for example, "I work with clients with asd[autism spectrum disorder]—they can become fixated on things. One past client has become fixated with reviewing people and has completed an inaccurate review twice and once was extreme bullying which google removed" (Case 211) and "Don't [use it]—the nature of our work [psychology] indicates that clients may be emotionally vulnerable and therefore may be prone to inaccurate feedback" (Case 226).

Table 7.18

Question 1: Key Concepts

Category	Total	Percentage
Negative	36	17%
Negative: professional association	5	2%
Neutral	73	33%
Positive	107	48%
	221	

The responses to Question 2 are summarised in Table 7.19 The objective of this question was to understand the attitudes of HCPs' actual or intended use of PRWs. The analysis indicates that over 56.5% were in favour of using a PRW, albeit 21.5% commented that they should be used with caution. Those who were unsure had not used one prior to the survey. There was some confusion within the industry as to whether a HCP was able to respond to such sites, as 10% identified that they thought they were unable to respond because of ethics or legal requirements imposed by the health regulator AHPRA. Of those that responded positively to receiving feedback in Question 1, only 16% (17) said that they would avoid using PRWs for themselves or their colleagues. Of those that responded negatively to receiving feedback in Question 1, 44% still said that they would use a PRW. Some of the comments for those who would avoid using a PRW included,

> I suspect this will happen more as more people become accustomed to using one. I love the concept when I travel but I would not be interested in other people's feedback about a health service because I don't think most people have the ability to judge. (Case 212)

The comments highlighted the confusion with the regulators:

> There are very strict rules for some health professions regarding feedback and testimonials from clients. It can pose ethical and professional violations and needs to be handled extremely carefully if used. (Case 100)

> Check with AHPRA. Reviews are tricky ground. The rules and legislation have not caught up to what is happening in the real (virtual) world. (Case 353)

One of the examples that supported using a PRW included "I guess it's an easy way for clients to leave anonymous(?)feedback where otherwise they might not give honest feedback (e.g., if you gave them a form in the clinic, they're likely to only give you positive feedback)" (Case 270).

Table 7.19

Question 2: Key Concepts

	Number	Percentage
Avoid using it	45	21.5%
Not sure I can use it because of ethics or AHPRA	21	10%
Unsure	25	12%
Use it with caution	45	21.5%
Use it: how to use it	72	35%
Total	208	100%

There appeared to be some apprehension with using a PRW; 35% would use it, 21.5% would use it with caution, and 31.5% would not use it at all. The comments related to uncertainty about legal and ethical obligations as patients/clients were unable to assess their skills and there were better forms of receiving patient feedback. Of note are the comments from Case 100 who recommended to avoid using PRWs as they had their own internal feedback system, which contradicted Case 270 who preferred PRW feedback to in-clinic feedback as it was more likely to be truthful.

The final open-ended question sought to explore whether HCPs held the view that PRWs were going to be commonplace and whether their attitudes towards PRWs may change. To capture the concept, "importance" combined with "attitude" was used as a classification. A summary of the responses is provided in Table 7.20. The classifications included the following:

- “low/no importance” where the respondent answered with the words “no or low importance”,
- “low/no importance: regulations” where the response included no and low and mentioned the word regulations,
- “unsure” where the response was unsure or not clearly stated,
- “important negative” where the response identified the importance of a PRW but had negative comments; for example, Case 55 (physiotherapist) stated, “Now—they are important, but I don’t like them. Perhaps, as PRWs become more common—as they no doubt will—there will be a way they can become a more respectful way of providing feedback”,
- “important neutral” where the respondent identified the significance of a PRW but had mixed feelings; for example, Case number 66 (speech pathologist) commented, “I am in two minds about them .... people are inherently negative and focus on their own needs and if those needs were met. In providing health services, it is difficult for clients to review that comprehensively. I think the experienced practitioners are having with case workers determining service availabilities via the NDIS shows this—generically skilled people can not accurately determine appropriate service provision outside of their own expertise. A PRW is similar to this—asking people to provide open feedback on their own perceptions (outside of their expertise)”,
- “important positive” where the response identified PRW as important and expressed a positive attitude.

Table 7.20

Question 3: Key Concepts

Category	Total	Percentage
Low/no importance	43	22%
Low/no importance: regulations	4	2%
Unsure	33	16%
Important negative	25	12%
Important neutral	55	27%
Important positive	42	21%

Most comments were classified as important, and 60% of respondents regarded them as being important in the future, indicating a notable impact on their perceptions on future use. A small percentage (12%) who regarded PRWs as important did not have a positive attitude towards them. Of interest is that at both ends of relative importance, the outcome was similar; that is, 22% did not think that PRWs would be important in the future, and 21% they were important and positive. The text comments that indicated negative attitudes reflected similar themes to S. Patel et al.'s (2015) thematic analysis, which showed that no one theme stood out consistently, including risk of false allegations (n = 5), negative impact on their practice (n = 5), patients cannot judge professional competency (n = 5), and anonymity and its impact on validity (n = 7).

7.7 Conclusion

Motivation type ERS and the PCIs of relative advantage and ease of use had a direct influence on HCPs' BI to adopt a PRW. PCIs were also found to mediate the relationship between motivation type and BI to adopt a PRW. The estimates were developed through the translation of the conceptual model in Chapter 5 into a validated measurement model, which facilitated the calculation of estimates in the structural model. The directed content analysis of the open-ended questions provided support for the PRW PCIs in that the comments reflected positive feedback aligned with relative advantage. The comments did not reflect a clear position from all respondent HCPs, and results were mixed.

Chapter 8. Discussion

This chapter discusses the research findings with reference to the literature and addresses the research questions that underpin this thesis. The results are discussed in relation to the theories, the study questions and hypotheses generated in Chapter 5.

8.1 Summary of Research Approach

The purpose of this study was to determine the factors influencing Australian HCPs' behavioural intention to adopt PRWs by analysing their motivation type and system perceptions, through a theory driven, positivist methodology. By integrating SDT and DOI, an interdisciplinary conceptual model was developed. The framework of the conceptual model was adapted from E. M. Roger's (2003) five stages of the innovation decision process, specifically the characteristics of the adopting entity and the PCIs (which relate to the persuasion stage of that process). SDT was used to investigate a characteristic that is crucial to HCP adoption, motivation, and PCIs were used to investigate system characteristics. Using a cross-sectional design, discussed in Section 6.2, this study explored the influence of HCPs' extrinsic and intrinsic motivations and PRWs' PCIs of relative advantage, compatibility and ease of use as independent variables to assess the influence on the dependent variable, behavioural intention to adopt a PRW. The role of PCIs was examined also as a mediator of the relationship between motivation type and behavioural intention.

This study sought to answer the following four research questions:

1. What influences healthcare practitioners' intention to adopt a physician-rating website?
    a. What is the effect of different motivation types (intrinsic or extrinsic) on adopting physician-rating websites?
    b. How do the system characteristics influence the intention to adopt physician-rating websites?
    c. How does motivation type influence system characteristics individually and in combination affect the intention to adopt a physician-rating website?

8.2 Discussion of Findings

8.2.1 Research Question 1: What Influences Healthcare Practitioners' Intention to Adopt a Physician-Rating Website?

The key findings of this study show three possible direct influences on a HCP's behavioural intention to adopt a PRW: first, motivation type external regulation—social, and second, two forms of PCIs, relative advantage and ease of use. The findings for relative advantage and ease of use are consistent with other empirical investigations into the positive influence of PCIs on behavioural intention to adopt technology (Gagnon et al., 2012; Higgins et al., 2007). The finding that the work motivation type external regulation—social negatively influenced behavioural intention to adopt a PRW is a new finding in terms of the literature reviewed to date. Each of the three influences is discussed in turn.

8.2.2 Research Question 1a: What is the Effect of Different Motivation Types (Intrinsic or Extrinsic) on Adopting Physician-Rating Websites?

The difference in motivation types is significant in that each type of motivation can predict the likelihood and sustainability of the action or behaviour (Deci & Ryan, 2000). In the context of this study, SDT posits that different motivation types will result in different behavioural intentions to adopt a PRW. The results are presented as follows. First is an overall discussion of the significant external regulation—social results, then the motivation types with positive nonsignificant results, and finally, motivation types that showed negative nonsignificant findings.

Hypothesis H2a, which proposed that external regulation—social has a negative influence on the behavioural intention to adopt a PRW, was supported. External regulation—social was the motivation type found to have a significant negative influence on HCPs' behavioural intention to adopt a PRW. External regulation—social is a work motivation characterised by actions, whereby a person seeks reward or avoids punishment from others such as managers, clients, or their peers (Gagné et al., 2015; Howard et al., 2017; Van den Broeck et al., 2021). The behaviour under external regulation—social is controlled by specific external contingencies (Deci & Ryan, 2000), which in the case of PRWs, relate to patient ratings or comments about service delivery. Actions under external regulation—social motivation are not internalised by the

individual as the action does not meet any of the innate psychological needs of autonomy, competence, or relatedness (Howard et al., 2017). Drawing on SDT, the study formulated that external regulation—social negatively influenced behavioural intention to adopt a PRW; that is, a HCP with external regulation—social would be less likely to adopt a PRW.

PRWs are perceived as criticism or punishment by some HCPs, even though empirical findings identify that most ratings are positive (Lagu, Haskell, et al., 2019). A cohort of HCPs and their professional bodies held a consistent attitude towards PRWs. They stated that reviews were an outlet for patient dissatisfaction (Atherton et al., 2019; Zaki et al., 2020a), were sceptical about the efficacy of the reviews given the expertise gap between patient and health professional (Gross et al., 2020; S. Patel et al., 2015; Rothenfluh & Schulz, 2017; Turk et al., 2020; Zaki et al., 2020b), considered PRWs were inaccurate and unreliable (Lagu et al., 2018; Menon, 2017), and led to increased job stress (Holliday et al., 2017; S. Patel et al., 2015). Not only was the significant statistical relationship established between external regulation—social and intention to use a PRW, but also these perceptions were reflected in the qualitative comments. In sum, respondents referred to PRWs as a means for patients to vent and focus on the negative aspects of their care experience. PRWs appeared to be the opposite to what HCPs with ERS sought. Recognition by the community and employers was found to be a valued social reward that motivated HCPs (Malik et al., 2010). Samora et al. (2016) found that 90% of health professionals did not make any changes to their practice because of online reviews, and 65% of respondents had a slightly or highly unfavourable impression of PRWs. The empirical evidence and research findings are consistent with expected outcomes for external regulation—social within SDT: that HCPs with external regulation—social intend to use a PRW less than others to avoid the criticism in the social domain that PRWs may convey. Rather than an innovation HCPs perceive PRWs as a source of external criticism.

HCPs identified that patients are unable to assess clinical skills (Gross et al., 2021; Rothenfluh & Schulz, 2017). Research indicates that online reviews are heavily weighted towards nonclinical outcomes such as wait times (Arthur et al., 2019; Syed et al., 2019; Trehan et al., 2016; Velasco et al., 2019; Vu et al., 2017), bedside manner (Asanad et al., 2018; Brookes & Baker, 2017; Obele et al., 2017; Smith & Lipoff, 2016;

Tymiński et al., 2015; Velasco et al., 2019), and meaningful relationships with their health professional (Moradzadeh et al., 2018). In a study investigating whether online reviews reflected the quality of medical outcomes, measured by mortality rates, Okike et al. (2016) reported no correlation between online ratings and risk-adjusted mortality rates. Evidence from the qualitative findings reinforce this position; respondents identified that it would be difficult for patients to distinguish the ratings between clinical and administration aspects. Psychologist respondents noted the limited ability of their clients with mental health issues to make a judgement, and another respondent commented that it was difficult and dangerous for a person without the skill to assess someone's practice. The empirical evidence, discussed in Chapter 4, also supports the perception held by HCPs that online reviews are not necessarily a measure of medical outcomes but more likely a measure of patient satisfaction. HCPs with the motivation type external regulation—social may not have unmet needs for the outcomes delivered by PRWs and therefore do not consider PRWs an innovation valuable to adopt.

Hypothesis H1e stated that intrinsic motivation positively influences a HCP's behavioural intention to adopt a PRW and was not confirmed. However, the direction of the finding was positive though not reaching significance. The result suggests that intrinsic motivation could positively influence a HCP's behavioural intention to adopt a PRW with a larger sample size. The innovation may fulfil HCPs' innate psychological need for competency, which has been found to be one of the three most important determinants of intrinsic motivation (Deci & Ryan, 2000). The positive association is consistent with research that found positive feedback fostered perceived competence and enhanced intrinsic motivation (Deci & Ryan, 2000). This result is consistent with the finding that HCPs with intrinsic motivation would be willing to engage in feedback to build on their need for competency, given that most PRW reviews are positive (Daskivich et al., 2018; Ellimoottil et al., 2013; Emmert & Meier, 2013; Goshtasbi et al., 2019; Sobin & Goyal, 2014; Syed et al., 2019). Arguably, most intrinsically motivated HCPs typically seek to continuously improve the patient experience. The qualitative comments from those who had a positive attitude towards PRWs were supportive of feedback. A study evaluating online reviews of dermatology practices recommended that HCPs should take advantage of the feedback on PRWs to learn about patient experience and improve PCC (Smith & Lipoff, 2016).

This nonsignificant result for intrinsic motivation could be reflected in comments captured at the end of the survey. Some participants indicated that they embraced feedback from any source and others welcomed feedback only from qualified persons. Approximately 50% of comments from HCPs identified that they sought feedback; however, they were less likely to seek feedback from sources such as third-party websites.

This study advances the proposition that intrinsic and extrinsic motivation have a different effect on behavioural intention to adopt PRWs. The tendency towards negative influence from external regulation—social and positive influence from intrinsic motivation towards PRW adoption is consistent with a study of motivators towards e-learning by S. J. Yoo et al., (2012). The latter authors found that intrinsic motivation positively affected behavioural intention, and extrinsic motivation, negatively affected e-learning adoption although the result did not reach the cut-off for significance.

Hypothesis H1a, which proposed that external regulation—material would have a positive influence on HCPs' behavioural intention to adopt a PRW, was not supported. Although nonsignificant, the positive association of external regulation—material with behavioural intention suggests the finding is consistent with SDT. SDT posits that individuals who, influenced by external regulation—material, carry out an action or behaviour at work is contingent on some form of tangible reward (Ferraro et al., 2020; Gagné & Deci, 2005). The empirical evidence supports the proposition that PRWs ratings are influential when selecting a HCP; a study reported 65.35% (249 of 381) of German users of a PRW consulted a HCP based on PRW ratings (Emmert, Meier, et al., 2013). Further, active participation in a PRW by a HCP has been shown to influence ratings. An investigation of negative reviews found that HCP posting responses to negative reviews had a more significant association with higher ratings for those HCPs than those who did not respond to PRWs (Skrypczak et al., 2020). The qualitative comments support this perception that online reviews may replace word of mouth referrals.

PRWs also provide other financial advantages, such as economical and real-time feedback to capture service quality concerns not provided by traditional patient surveys (Detz et al., 2013; Lockie et al., 2015). Patient perceptions of a HCP adopting a PRW

can influence HCP choice; for example, Chinese patients are more likely to select a HCP who used a PRW as they were perceived as harder working (Wu & Deng, 2019).

The SLR in Chapter 4 revealed that some HCPs adopted PRWs to review what had been said about them. Doing so helped them identify potential negative effects on their ratings and reputation and likely affected their referral business. The possible consequence on a HCP's business can be illustrated by a recent litigation example. A HCP was awarded AUD170,000 in aggravated damages and all legal costs as a result of an unjustified one-star review, (Cowie, 2021), and internationally, defamation cases related to online reviews are finding in favour of plaintiffs (Freckelton, (2020). In sum, the extant evidence supported by this research is that HCPs with external regulation—material are likely to adopt PRWs because it will lead to more referral business, which will lead to a material gain or mitigate potential losses.

Hypothesis 1c, stated that introjected regulation will have a negative effect on a HCP's behavioural intention to adopt a PRW, and was not supported. PRW feedback was perceived as criticism or punishment by some HCPs, even though empirical findings identify that most ratings are positive (Lagu, Norton, et al., 2019). This finding suggests the likelihood of a negative behavioural intention to adopt a PRW by HCPs with introjected regulation. This finding is relevant given that behavioural intention to adopt a PRW will be diminished or thwarted for an activity that will degrade innate psychological needs of competency, relatedness, and autonomy (Gagné & Deci, 2005). A cross-sectional study investigating both physician and patient views of PRWs reported that 78% of HCPs stated that online poor reviews increased job stress, most likely through perceived incompetence. A further 48% of HCPs reported PRWs would diminish the relationship with the patient, thereby potentially reducing relatedness (Holliday et al., 2017).

Hypothesis 1d, proposed that identified regulation would be negatively related to HCPs' behavioural intention to adopt a PRW was not supported. This relationship was found to have a negative direction but did not attain significance. This result is consistent with a meta-analysis of SDT's multidimensional conceptualisation of work, reported by Van den Broeck et al. (2021), who reported identified regulation and intrinsic motivation resulted in different work outcomes. The meta-analysis found that identified regulation was a stronger predictor of performance outcomes than intrinsic

motivation. In the context of the current study, a HCP with identified regulation was driven by perceived personal meaningfulness and importance in their work as it corresponded to their values or goals. PRWs are largely viewed as unfavourable (Samora et al., 2016; Syed et al., 2019) and HCPs note they do not measure quality (Gross et al., 2021). Consistent with the theoretical proposition of SDT, a HCP is less likely to adopt a PRW if not aligned with their values.

8.2.3 Research Question 1b: How Do the System Characteristics Influence the Intention to Adopt Physician-Rating Websites?

Hypotheses H2a and H2c, suggesting that relative advantage and ease of use have a positive influence on the behavioural intention to adopt a PRW, were supported. No result could be calculated for Hypothesis 2b, compatibility and behavioural intention to adopt a PRW because the compatibility construct could not be reliably estimated in the SEM. In other studies, relative advantage is one of the PCIs empirically found to influence behavioural intention to adopt innovations. Relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes (E. M. Rogers, 2003). PRWs have numerous advantages for HCPs, including timely insights into shortcomings of care (Rothenfluh & Schulz, 2018), aiding the improvement of the doctor–patient relationship (Holliday et al., 2017), providing real-time information not available through traditional systems (Kilaru et al., 2016), being a cost-effective way of tracking patient concerns (Alemi et al., 2012), and providing the ability for HCPs to correct publicly available information that is out of their traditional control (Mostaghimi et al., 2010). Further, Emmert et al.'s (2016) study of HCPs' use of PRWs in Germany found that over half of HCPs read comments from online reviews and implemented quality measures to improve patients' care. Most reviews pertained to improvements in nonclinical matters such as communication with patients and appointment scheduling.

The results demonstrated that the ease of use positively influenced HCPs' behavioural intention to adopt a PRW. This finding is consistent with E. M. Rogers' (2003) DOI theory that posits ease of use, the degree to which an innovation is easy to use (Plouffe et al., 2001; Rogers, 2003), influences an individual's intention to adopt an innovation. In the context of PRWs, the following ease of use considerations are likely: understanding the regulatory implications, access to a PRW, and the skill and knowledge to respond to comments or leverage the feedback. Ease of use had a positive

influence on HCPs' intention to adopt innovative new technology (Hsu et al., 2013; Karahoca et al., 2017; Matthews et al., 2016). In sum the result of H2a and H2c indicates that the perceived relative advantage and ease of use positively influenced HCP adoption of a PRW.

The study could not test Hypothesis H2b due to the statistical limitations identified in the measurement and structural model reported in Chapter 7. This study found that the compatibility factor lacked both convergent and discriminant validity during CFA. Further, the SEM model including compatibility was unable to be reliably estimated. Alkhateeb and Doucette (2009) found that compatibility had similarities with relative advantage. It is reasonable to assume that the overlap in factor analysis between relative advantage and compatibility could indicate the items in compatibility were captured by relative advantage and did not measure a different phenomenon, thereby making the construct redundant.

8.2.4 Research Question 1c: How Does Motivation Type Influence System Characteristics Individually and in Combination Affect the Intention to Adopt a Physician-Rating Website?

This section discusses the direct effects of motivation type on PCIs and the total indirect effects of PCIs on motivation type or behavioural intention to adopt a PRW.

8.2.4.1 Direct Effects of Motivation Type and Perceived Characteristics of Innovation

Different motivation types were found to have different effects on PCIs. Identified regulation had a negative effect on relative advantage. Intrinsic motivation had a positive influence on ease of use. The size effects were small but statistically significant and important as the direction of the relationship was consistent with the hypotheses. The study results found a statistically significant negative association between identified regulation and relative advantage, and a statistically significant positive association between intrinsic motivation and ease of use. These results are discussed in turn.

Hypothesis H3d which proposed that identified regulation will have a negative influence on the perceived characteristics of an innovation of relative advantage was supported. Identified regulation occurs when a HCP's motivation is experienced as having greater freedom to engage in a behaviour (Gagné & Deci, 2005), and the

behaviour is perceived to have personal meaning and importance (Van den Broeck et al., 2021). The regulation of behaviour remains; however, the value and importance of such behaviour is internalised and accepted as a person's own (Deci & Ryan, 2000). HCPs with identified regulation may not be compelled to act through external forces and so decides more objectively that there is little relative advantage in adopting a PRW. PRW adoption does not contribute to their needs of relatedness, competence, and autonomy. In a meta-analysis of intrinsic and extrinsic motivation, identified regulation correlated with undesirable outcomes such as job stress and burnout (Van den Broeck et al., 2021). The SLR in this thesis found that HCPs considered that PRWs may cause job stress and burnout (Gross et al., 2021; Holliday et al., 2017; Zwier, 2019).

Hypothesis H5e stated that intrinsic motivation will have a positive influence on the perceived characteristics of an innovation of ease of use, and was supported. SDT posits that behaviour enacted through an individual's inherent satisfaction would be considered intrinsic motivation (Deci & Ryan, 2000). The innate psychological needs of autonomy and competency are the most powerful influences on intrinsic motivation (Deci & Ryan, 2000). A possible explanation for the positive association between intrinsic motivation and ease of use is that intrinsically motivated HCPs perceived PRWs as a source of feedback to enhance an occupation they innately enjoyed. In contrast to external regulation—material, feedback was not perceived in the context of material gain but rather enhanced the work that they performed. In the SLR, a survey of German HCPs reported that 36% of respondents used PRWs to read comments to understand which measures might improve patient care. Further, a study of patient and HCP attitudes to PRWs in the United States reported 25% of HCPs stated PRWs would improve the practitioner–patient relationship (Holliday et al., 2017). Unlike external regulation—social, and introjected and identified regulation, HCPs view themselves as competent and autonomous in their work and PRWs would not diminish those needs. Removing those consequences from PRWs potentially made the adoption decision cognitively simpler and ease of use regarded as positive for such sites.

8.2.4.2 The role of Motivation Type and Perceived Characteristics of Innovation on Behavioural Intention.

The section discussed the mediation testing. The mediation testing identified two PCIs that mediated two motivation types on behavioural intention. The hypothesis

relating to compatibility was not tested as it was removed from the statistical model. The statistically significant results are discussed next.

Hypothesis H6a which stated that the perceived characteristics of innovation of relative advantage will mediate the relationship between health practitioners' motivation type and behavioural intention to adopt the PRW was supported for motivation type identified regulation. The indirect effect of identified regulation and behavioural intention mediated through relative advantage was negative and significant, meaning HCPs with identified regulation motivation perceived lower relative advantage of a PRW, which in turn was associated with lower behavioural intention to adopt a PRW. This finding is consistent with the direct Hypothesis H3d that individuals with the motivation type identified regulation would not perceive a positive relative advantage to adopt a PRW and would have a lower behavioural intention to adopt the innovation (the PRW). The significance of this finding is that it reinforces the discussion on the influence of identified regulation and the perception of relative advantage in Section 8.2.4.1. above.

HCPs with more identified regulation perceive less relative advantage of PRWs which reduces their behavioural intention to adopt a PRW. Among the possible explanations are that individuals with identified regulation engage in their profession because of the personal importance and meaning (Van den Broeck et al., 2021). PRWs may publish ratings on a HCPs' perceived service quality (Haskins et al., 2017), by being a platform for a patient voice that is consistent with PCC principles. HCP with identified regulation may express their commitment to PCC by delivering clinically correct outcomes independent of patients' input. The SLR results illustrate that, in most studies, less than 12% of HCPs made changes to the way they practised following of online reviews of their service (Atherton et al., 2019; Samora et al., 2016; Syed et al., 2019).

PRWs may also reduce the personal importance of their role. In the systematic review of data quality issues with PRWs, positive ratings represented administrative factors such as short wait times and ease of getting an appointment rather than HCP quality (Mulgund et al., 2020). The administrative dimensions are somewhat remote from enhancing the competence and autonomy of a HCP, being more consistent with business service ratings in other industries. Whether healthcare is the same as a business

service has been subject to longstanding debate. Nonetheless, with the emergence of PRWs, healthcare services are being rated along similar lines as other services, so taking notice of this trend is timely.

Hypothesis H6b that the perceived characteristics of innovation, being ease of use, would mediate the relationship between HCPs' motivation type and behavioural intention to adopt the PRW was supported for motivation type intrinsic motivation. The indirect effect of intrinsic motivation and behavioural intention mediated by ease of use was positive and significant, meaning that greater intrinsic motivation was associated with an increased higher perception in ease of use, which in turn was associated with higher behavioural intention to adopt a PRW. This finding is consistent with the mediation hypothesis and the direct effect of Hypotheses 3e. Otherwise stated as people with intrinsic motivation will rate perceived ease of use of a PRW higher which together resulted in a positive effect on behavioural intention to adopt the innovation.

Individuals with intrinsic motivation are likely to be working in their chosen profession because of the inherent interest or pleasure. Goel et al.'s (2018) SLR study examining student motivation in selecting medicine degrees reported that an interest in science/medicine and social interest as two of the motivating factors in developed countries. A HCP with intrinsic motivation would inherently enjoy the task at hand; the subtle difference between intrinsic motivation and identified regulation is that with the latter, HCPs may find meaning and importance but do not enjoy the work. HCPs with intrinsic motivation would place less significance on some of the system characteristics of PRWs such as ease of use in using a PRW. HCPs may not be concerned with whether PRWs measure quality or are biased. Their interest may be in helping people and therefore would welcome feedback that could improve the patient experience and increase their job satisfaction. Arguably motivation types do have an influence on how ease of use is perceived for PRWs, with the qualitative comments identifying only 10% who would not adopt a PRW because of the regulatory confusion.

8.3 Conclusion

This study proposed an interdisciplinary conceptual model derived from SDT and DOI theory to empirically examine the relationship between motivation, PCI, and behavioural intention to adopt a PRW. The results found three direct influences on a HCP's behavioural intention to adopt a PRW. Motivation type external regulation—

social had a negative influence, and the two PCIs of relative advantage and ease of use had a positive influence, which is consistent with the hypotheses and theoretical predictions. Further, the two PCIs were found to have a mediating role on the relationship between motivation type (intrinsic motivation and identified regulation) on the adoption of PRWs. In sum, motivation influences innovation adoption and specifically the behavioural intention to adopt a PRW either directly or mediated through PCIs. PCIs have a direct and mediating role in a HCP's behavioural intention to adopt a PRW.

Chapter 9. Conclusion

Discussed in this chapter are theoretical and practical contributions and limitations of the study. The possible future directions for further research emerging from the findings are explored, and finally, the chapter summarises the central idea of the thesis.

9.1 Introduction

Healthcare services can be inefficient according to a range of authors, from policy to practice (Breitenbach et al., 2021; Productivity Commission, 2015; Roseleur et al., 2020). The steady transformation of health care seeks to achieve transparency, accountability, efficiency, and quality care that is ideally codesigned by providers, funders, and users (Federica & Kumar, 2016; Vickers et al., 2017; WHO, 2018). Online patient feedback, such as offered in PRWs, could contribute to service improvement (Turk et al., 2020). PRWs could enable information symmetry and assist healthcare service users to make informed choices (McLennan, 2019). Public reviews could also assist in identifying both high- and low-performing HCPs (Kleefstra et al., 2016). PRWs also offer some users the means to share their voice on episodes of healthcare experiences (Hao et al., 2017). Many healthcare organisations are adding PCC to their strategic mission and values (Rathert et al., 2012), and arguably, PRWs could demonstrate such a focus. Healthcare consumers are increasingly using PRWs to rate healthcare services (Placona & Rathert, 2021). By contrast, PRWs are not commonly embraced by HCPs, and this research sought to explore reasons for this limited uptake.

In a competitive environment, HCPs who attend to what clients publicly communicate about their services can demonstrate PCC. The question of what type of work motivation would be associated with the adoption of an innovation such as a PRW was the main aim of this study. A conceptual model to explain the relationship between motivation, perceived PRW characteristics, and BI to adopt PRWs was tested in a cross-sectional study. Participants were Australian healthcare professionals who were surveyed using validated scales. SEM was used to estimate the model and reveal the relative contribution of motivation and system characteristics on the adoption of PRWs.

This study is the first study at the time of writing to report the significant influence of motivation type on technology adoption and the mediating effect of PCIs

on motivation type. This discovery has ramifications for HCP training, patient safety, and health care service delivery.

9.2 Theoretical Contribution

The research makes several theoretical contributions, the first of which is the integration of DOI and SDT to develop a conceptual model for innovation adoption, extending Kemp's (2020) study to include intrinsic motivation. The research also used the MWMS questionnaire in a novel way with a unique sample. Finally, empirical evidence was found for the role of perceived characteristics of an innovation, specifically, relative advantage and ease of use in PRW adoption (E. M Rogers, 2003). The study also advances the methodological rigour of studies relating to PRW adoption by healthcare practitioners. These contributions are discussed in turn.

This thesis contributes to technology adoption literature by examining the relationships between SDT and PCI variables from DOI in the same model. The study integrated SDT (Deci & Ryan, 1985) to explain one of many adopter characteristics in the persuasion stage of the DOI model (E. M Rogers, 2003) of the five stages of the innovation decision process. This study used the PCI short scales for relative advantage, ease of use, and compatibility and confirmed convergent and discriminant validity concerns associated with the compatibility factor reported by G. C. Moore and Benbasat (1991).

The SLR identified one (Kemp et al., 2020) of 16 studies in the area of PRWs that had applied a theoretical model. This study establishes new ground by using a theoretical framework to explain HCPs' adoption of PRWs. In an adjacent field, a systematic review of patient feedback to improve PCC also identified a lack of theoretical reasoning and recommended exploring the use of theory to enable comparison across settings to form a replicable evidence base (Wong et al., 2020).

The results of the study revealed how motivation types differentially affect outcomes, the evidence for which is deemed scattered and scarce (Van De Broeck et al., 2021). SDT posits that different forms of motivation have differential effects on a range of outcomes (Ryan & Deci, 2017). This study provides additional empirical evidence for SDT by distinguishing between extrinsic and intrinsic motivation subtypes and supporting the proposition that motivation is a multidimensional concept (Ryan & Deci, 2017). This study used the MWMS questionnaire in a novel way to understand how

work motivation among allied healthcare professionals in Australia affects their use of rating websites.

Prior studies of PRWs have limited methodological rigour given that most research designs are observational or qualitative. While these methodologies are suitable for discovering types of phenomena at an early stage and report associations, they cannot explain causation. This study answered the call by Hong et al. (2019) for studies that go beyond descriptive analysis to adopt more advanced empirical methods with a theory driven hypothesis and rigorous design. The study used SEM to approximate causation and effect size, providing the opportunity for future comparison and extension studies. The study also contributes to extant empirical evidence that shows the PCIs of relative advantage and ease of use contribute to innovation adoption.

9.3 Practical Contribution

The results could inform practical educational or professional development interventions for HCPs, HPAs, and health regulators in relation to the value of PRWs for service improvement. Adoption of PRWs by patients is growing at a faster rate than HCP adoption and the reason for this discrepancy could be explored in future studies. Patients' perspectives of what can be construed as satisfactory delivery of healthcare services may identify other factors than clinical measures. PRWs have the potential to produce deeper understanding of elements of HCP episodes of care valued by service users.

PRWs are both a reputation management tool and a source of valuable feedback that HCPs could be educated about in terms of their benefits to initiate change. PRWs enable patients to have a public voice, which can shape practices and continuous improvement activities of health care businesses (Atherton et al., 2020; Emmert et al., 2016). Improving HCPs' awareness of the evidence that supports and explains the capabilities of PRWs could be useful to the novice as well as to the experienced practitioner. Articulating principles for PRW adoption and how-to knowledge identified in the DOI knowledge stage can change how PRWs are perceived by HCPs and could potentially increase their adoption. The education could be included in a unit on service evaluation or professional development seminar which are popular topics in healthcare (Lloyd, et al., 2021).

PRWs are a form of public reporting that contributes to information symmetry, identified as a contemporary healthcare issue. Though not developed within the professions, HCPs have the opportunity to address information asymmetry by adopting a PRW through which they can correct publicly available information written about them. Second, in the case of negative reviews, HCPs have a free chance to correct the public record. The latter provides a vital opportunity to educate service users on the rationale for the healthcare intervention thereby reducing information asymmetry for the affected patient and for future patients who will read the review. Potentially, reviews are read by future service users who are equally important to educate as past users (Baka, 2016).

This research identified that patient satisfaction measures are an important source of feedback. Sufficient resources should be allocated by HCPs or their management to normalise patient feedback independent of the source. While PRWs provide real-time independent feedback, the potential stress or burnout it may cause warrants a proactive strategy. HCPs could be empowered and advantaged to adopt any means of patient feedback. Moreover, in the case of potential negative reviews, proactive engagement with the feedback could reduce the stress or burnout from worrying about and avoidance of reading review. Deliberate practice (Hambrick et al., 2014) that actively seeks to develop expertise and quantifies and documents trends in service feedback provides a practitioner the opportunity to address the feedback prior to it becoming public. Welcoming feedback and responding to especially negative feedback could reduce the stressors identified in this study of HCPs with motivation type external regulation—social.

The Australian health regulator AHPRA has an opportunity to educate and regulate HCPs in the space of online reviews. The qualitative analysis of comments made by participants in this study identified that 10% were unsure of the AHPRA regulations that may prohibit response to online comments. The same analysis found that HCPs were not aware of their legal right to respond to online reviews on third-party platforms. Clear regulation or guidelines for HCPs by AHPRA could increase principals' knowledge, which may lead to greater adoption.

While PRWs have data quality issues (Mulgund et al., 2020) and mixed results in representing healthcare quality outcomes (Placona et al., 2021), they can signal

possible breaches in healthcare standards. Empirical evidence supports the proposition that PRWs can identify potential noncompliant HCPs in the Netherlands (Kleefstra et al., 2016). This observation has implications for patient safety. Health regulators should monitor one-star reviews and be alerted to changes in such reviews as part of a proactive early intervention strategy. Doing so could improve patient safety and confidence as well as inform interventions for quality improvement.

The learnings from this study could assist HPAs in two ways. First, HPAs could provide guidelines, standards, resources, and training to build the confidence of HCPs to respond to negative online reviews. The perceived criticisms from such reviews could be more stressful for HCPs with motivation type external regulation—social and introjected regulation. By actively supporting HCPs, HPAs could reduce turnover in the profession. Second, of the four HPAs in Australia that were approached to contribute to the research through distribution to their members, only two, APA and OTA, facilitated the distribution of the research questionnaire to their members. The other two require membership of the association to enable communication with peers. An openness to the value of PRWs could be enabled if HPAs were to acknowledge that nonclinical research in health care has a role in both improving member wellbeing and PCC.

9.4 Strengths, Limitations, and Future Research

There are limitations in this research project; for example, the study sample comprised allied health professionals in Australia, and its findings apply to that group. However, there are common factors across HCPs in general (in Australia and worldwide), and therefore, the study could be replicated with other samples and in different contexts. Future quantitative studies are recommended to include other healthcare disciplines and different health systems. Further, healthcare disciplines with differing credence value are worthy of examination as the content on PRWs was found to have different values in terms of assessing healthcare quality. For example, comparing adoption intention of PRWs would likely yield different patterns among cosmetic surgeons (low credence value) and psychologists (high credence value).

In terms of country context, the findings of this study pertain to the unique funding and government policy of Australia which would be different in other countries. Furthermore, an area unexplored in this study is the influence of professional medical culture on performance and its influence on feedback acceptance (Baines et al., 2018).

Future studies should compare HCPs in different geographies with commodified and decommodified healthcare systems and professional medical cultures where PRWs are viewed differently. Consequently, comparing two countries with similar health systems but different supply and demand functions could assess health policy or cultural influences on PRW adoption.

Future research could explore the normative way a HCP receives feedback and whether it is affected by motivation type or the method of delivery. Controlling for feedback delivery when examining whether motivation type influences the adoption of public feedback could be informative. Whether personal and confidential or public feedback delivery modes have a similar effect as PRWs for those with different motivation types warrants further study.

PRW ownership was identified as creating a potential conflict of interest and consequentially may be subject to bias. PRW business models that require HCPs to pay have the potential to create financial inducements to withhold negative feedback (McLennan, 2020). Yet to be explored in the literature is the effect of different ownership types on HCPs using such to make changes to service delivery (Turk et al., 2020). Comparing the implementation of feedback between different platforms may also go some way to surface potential barriers to the adoption of PRWs.

One of the assumptions in understanding PRWs' potential for transformative health care is its contribution to PCC. No clear consensus on the conceptualisation of PCC was located in the literature reviews; some perceived it as a cultural shift while others embraced it as a vision rather than comprising actionable and meaningful initiatives (Fix et al., 2018). Motivation has been shown to influence the intention to adopt PRWs; however, whether HCP conceptualisation of PCC moderates the relationship between motivation and BI to adopt a PRW is yet to be discovered. The implication would be that adoption of a PRW requires more than just a focus on an enabler of PCC; rather, a commitment to and understanding of PCC is required for sustained adoption and use.

The strength of this study is the confirmation of a statistical measurement and structural model to estimate the effects of motivation and PCIs. However, design was cross-sectional and could not track the change in adoption of PRWs across time and how such awareness of and/or attitudes towards PRWs or how motivation type of a

HCP may change over time. This design limitation has implications for claiming causality, which requires temporal order to be established, one of the three preconditions to establish causality, the other two being association and possible alternate explanations (Warner, 2018). Further, this study did not explore all the possible alternative hypotheses for adopter characteristics such as socioeconomic characteristics, communication behaviour, and other personality variables identified in E. W. Rogers' (1983) five stages of the innovation decision process.

9.5 Summary

System characteristics and motivation type play important roles in the adoption of PRWs. This study showed direct and mediation analysis that the system characteristics of PRWs had a greater effect on a HCP's BI to adopt a PRW than motivation type. However, motivation type goes some way to explain why HCPs may not adopt PRWs even if all the system-related objections raised by HCPs were addressed by PRW platform operators. PRWs have a significant influence on evaluating HCPs and the services they provide, which has implications for the wellbeing of HCPs. Guidelines, policy, and professional development of HPAs could strategically address the potential stress caused by PRWs, independent of HCP adoption. Further, there is evidence that PRWs may be an early indicator of lapses in patient safety by HCPs or breaches in the therapeutic alliance and should be considered as a useful tool to inform compliance checks of HCPs. The regulatory environment is lagging the technology, and HCPs will benefit from clear directives if they are to adopt PRWs and utilise their benefits. The study adds to scholarly debate by reporting that the motivation continuum has differential influences on BI. The quantitative findings add new knowledge by administering the MWMS questionnaire in a previously untested geographical area and professional groups, finding that adopter and system characteristics influence BI to adopt a PRW. Finally, a conceptual model, which integrates SDT and DOI, could benefit other studies to enable empirical testing of alternative adopter characteristics and PCIs.

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Appendix B. Supplemental Literature Review

1. Systematic Review Questions

A literature review was performed on the broad topic of PRWs. This research did not identify any systematic reviews that investigate the adoption of PRWs by patients or HCPs. The objective of this review was to systematically collect, summarise, and synthesise information regarding previous studies published in the literature on PRWs from 2010 to 2020.

2.0 Search Strategy

The objective of the search strategy is to ensure that every effort has been taken to report studies that support the research questions (Kitchenham, 2004). Consequently, the defined search terms were broad. On 10 April 2019, the following electronic databases were searched between 2010 and 2019: Web of Science (all databases including Medline), ScienceDirect, CINAHL, Taylor & Francis Online, and Google Scholar for grey literature. These online databases were selected after a pilot search showed they provided the most results. The period for the start of the review was chosen as it reflected the year in which PRW studies first started to appear. The searches were performed using the following defined search terms: (“physician” or “doctor” or “provider”) AND (“review” or “rating”) AND (“online” OR “internet”). Mulgund et al. (2020) employed similar search terms for their literature review of PRWs.

As the timeframe for this project was extended, the literature review was updated on 17 February 2021 for the period May 2019 to December 2020 to capture new work that had been published since the last review date. The same search terms and databases were used, and a further 48 studies were included as part of the full text review process. A systematic review of PRWs relating to quality issues conducted by Mulgund et al. (2020) was identified in that search. On examination of the study by Mulgund et al., 15 studies that had not been previously incorporated into the review were included as part of a full text review.

2.1 Inclusion and Exclusion Criteria

The objective of applying exclusion and inclusion criteria is to establish that included studies are relevant to the research questions. Studies were considered eligible

if they (1) focused primarily on online reviews of health professionals, (2) were original research studies, and (3) were published between 2010 and 2020, (4) were written in English, (5) were published in the selected databases, and (6) were available as full text and had a methodological basis. Ineligible studies were (1) review papers, conference papers, or abstracts, (2) those where the primary focus was health condition information sharing, (3) focused on reviews that originated from social media or internal HCP platforms, (4) had a non-English manuscript, (5) outside the search timeframe, (6) not related to the research questions, and (7) were duplicated studies.

2.2 Study Selection Process

The initial search of the electronic databases returned 2,559 records, and a further 2,220 were found via electronic searching of Google Scholar, a total of 6,029 records. A summary of the results is presented in Figure B1. For each manuscript, preliminary relevance was determined by title. After the removal of duplicates, the exclusion and inclusion criteria were applied to the remaining 429 studies. The preliminary relevance of each study was determined by examining the abstract and title for each study, a screening method recommended by Okoli and Schabram (2010). A further 170 studies were removed as they did not meet the inclusion criteria. Each of the remaining studies were read in full and the exclusion/inclusion criteria were applied. A further 15 studies were included in this process as they originated from a systematic literature review of PRWs by Mulgund et al. (2020) that were not identified in the initial searches of databases.

For each reference, data were extracted and categorised into publication year, publication, country of origin, authors, theme, theoretical basis, dependent and independent variable, data source, results, conclusion, methodology, journal ranking, and impact score. All information was recorded in a Google Sheets spreadsheet to facilitate retrieval and summary. A summary of the results is presented in Figure B1.

A quality assessment of the selected studies is important to reduce bias and maximise internal and external validity (Kitchenham, 2004). Quality assessments also help distinguish the differing levels of evidence in the literature, and while not all low-quality studies will be excluded, they will be distinguished from higher quality studies (Okoli & Schabram, 2010). To address these concerns, a quality assessment was developed with the following criteria:

a. The topic was related to third-party platform PRW adoption.

b. The theoretical basis for the study was articulated.

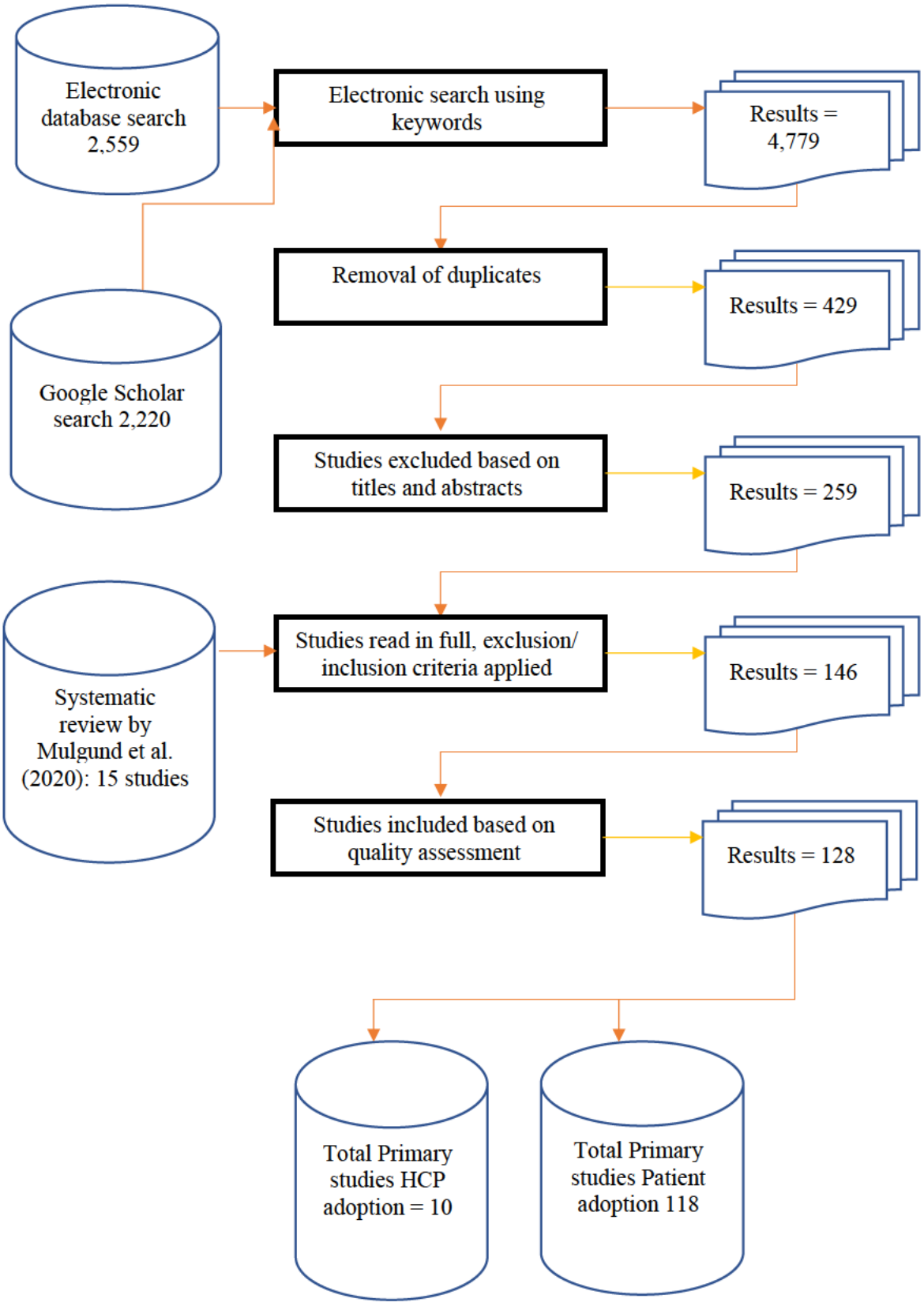
c. The research was ranked in the first or second quartile of its category in the Web of Science classifications or Scimago Journal & Country Rank.

d. The source of data was primary.

The criteria were uniformly applied to both quantitative and qualitative studies as recommended by Okoli and Schabram (2010). Each paper was scored on the quality criteria from 1 to 4; a score of 1 meant that the study only met one of the four criteria, while a score of 4 meant all the criteria were met. A minimum quality standard was at least of score of 2. The results of the quality assessment show the majority of studies scored 2 (n = 93), followed by 3 (n = 30), and 4 (n = 5) having the lowest. A further nine studies were excluded as they did not meet the minimum quality standard. Even though most studies scored a quality score of 2, 62% of studies originated from a journal that was in the first quartile Web of Science or Scimago category rank. Of the included studies that passed the quality assessment, 10 related to HCP adoption, and the remaining 118 examined patient adoption in some form. A summary of the results is presented in Figure B1.

Figure B.1

Reporting Items for Systematic Reviews



3.0 Data Extraction and Synthesis for the Systematic Literature Review

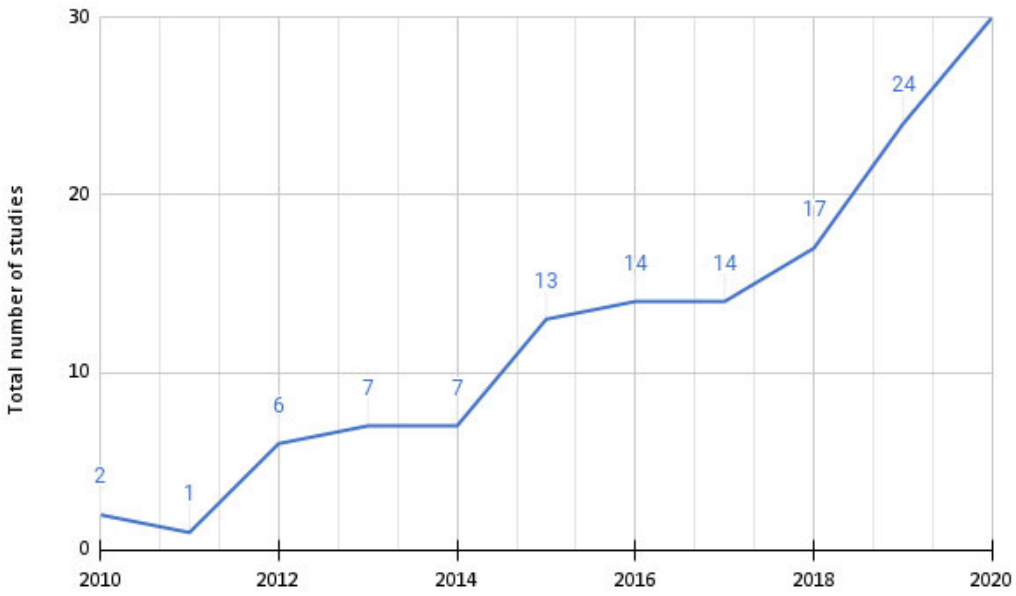
The process of data extraction is required to obtain all the information necessary to answer the systematic review questions (Kitchenham, 2004). This section details a chronological, publication, methodological, geographic, and subject view of the selected literature.

3.1 Chronological View

There are relatively small volumes of research in the short history of PRW research; however, interest in the field is growing. The distribution of all studies for the period 2010 to 2020 is shown in Figure B2. The total number of studies grew from two in 2010 to 128 by 2020. In the period 2010 to 2014, 23 studies were published; that total was exceeded in 2019 with 24 studies being published in that year. The interest in PRW in the last 5 years has grown quicker than the 5 preceding years.

Figure B.2

PRW Publications by Year



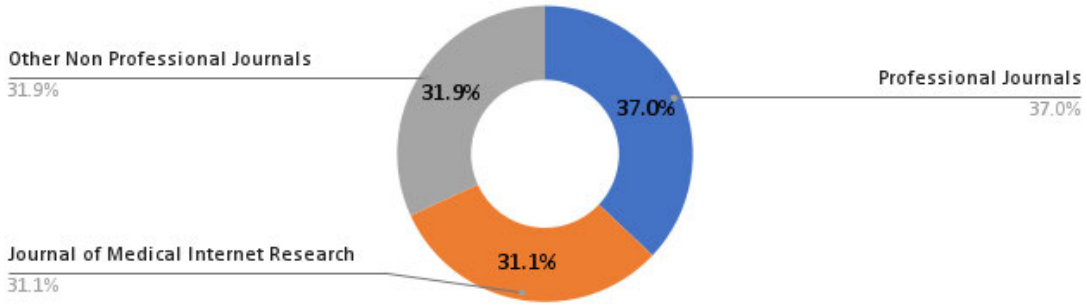
3.2 Publication Journals and Disciplines

In health care, a number of reputable journals publish medical domain-specific knowledge; however, they also investigate nonmedical phenomena of interest to their members. The journals and the subjects of their studies are inextricably linked; for

example, a study published in the *Journal of Hand Surgery* evaluated factors associated with positive reviews of hand surgeons (Trehan et al., 2016). This introduces a potential source of bias in the reporting of results and should be disclosed. A total of 37% of included studies originated from professional association journals, illustrated in Figure B35. This represents a concerted effort by the professional associations to provide their members with information, advice, and in some cases support for the contention that PRWs are not a measure of quality (J. Chen et al., 2018; Khan et al., 2020). The *Journal of Medical Internet Research* was the single journal with the most publications at 31.1%, while other journals accounted for 31.9%. The journal with the next highest number of publications on PRWs was the *BMC Health Services Research journal* with five publications during the review period. The fragmentation of the PRW research across healthcare specialities reflects the heterogeneity of healthcare services. As discussed in Section 3.3.4., not all healthcare service are credence goods, and reviews will reflect different measures as some healthcare outcomes are easier to rate by patients than others (McGrath et al., 2018; Saifee et al., 2017). The implication is the higher the degree of conflicting evidence, the greater the complexity for a HCP to use a PRW.

Figure B.3

Frequency Distribution of Studies by Journal



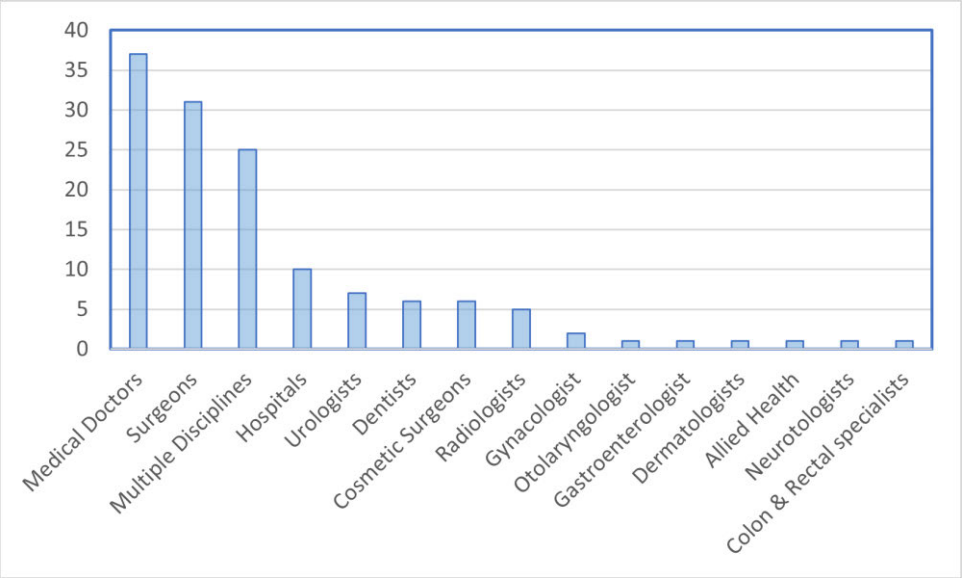
The studies do not categorially distinguish between private and public servicing HCPs; however, distinctions are made between hospitals and nonhospital locations, as well as medical disciplines in most cases. When categorising the studies, the process was to first identify a clear medical discipline such as surgeon. When the study was not specific and only referenced a PRW without specifying a discipline, it was classified as

multidisciplined as PRWs cover more than primary care doctors (medical doctors). This was the case when classifying PRW studies in hospitals.

As expected, the publication bias towards professional association journals is reflected in the number of healthcare professional disciplines that have been the subject to research. The disciplines are illustrated in Figure B4; the most-studied healthcare discipline was general practitioner, followed by surgeons of varying speciality then a tail of other specialities such as urologists and dentists. Of note, only one study examined allied health professionals. The research interest in PRWs is in their practical application rather than academic interest, predominantly originating from HCP disciplines rather than a growing interest from the academic community.

Figure B.4

Included Studies by Discipline



3.3 Research Methodology

A number of methodologies have been utilised in research covering patients and HCP adoption of PRWs. The most predominant methodology used was the positivist approach with 87 (68%) of all studies, followed by interpretivism with 37 studies, and four with mixed methods. The main source of data for the studies was secondary data with 72%. The key source of the secondary data were PRWs. The strength of research designs has been categorised as an evidence pyramid; the highest level of evidence are randomised control trials, while the lowest are observational studies. This systematic

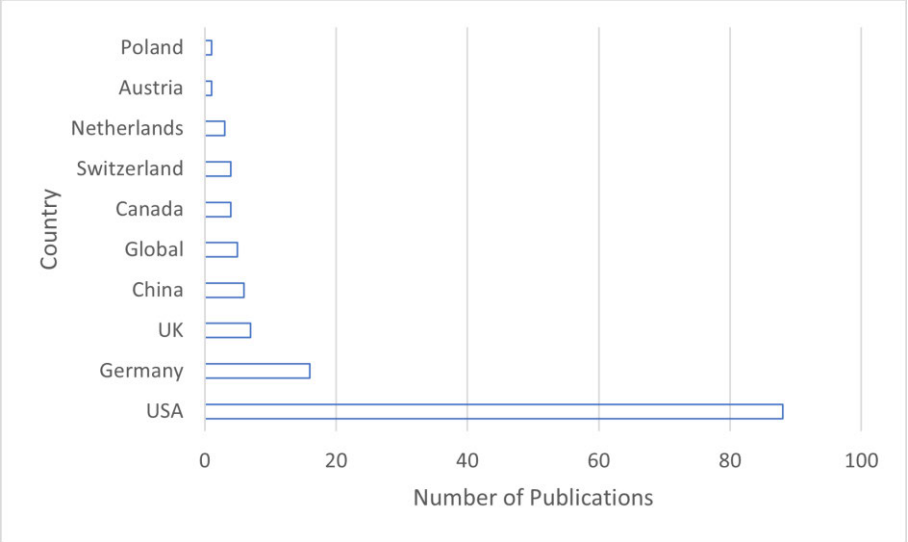
review found that the lowest form of evidence was overrepresented. Observational descriptive studies comprised 76 (60%) of all studies. In adoption research it is important to understand both adoption and potential adoption. With the majority of the data originating from PRWs where the adoption had already occurred, the research is skewed towards understanding users rather than nonusers. The aim of this research was to understand why HCPs have low adoption of PRWs; the existing studies are limited in this respect.

3.4 Coverage of Research Regions

Healthcare systems vary by country, and the country of origin will significantly impact the PRW study outcomes. Ten countries were included in this literature review. The count of studies by country is illustrated in Figure B5 and is dominated by the United States with 88 studies. Germany and the United Kingdom follow with 16 and seven studies, respectively. Five studies compared content and experiences in different countries and were categorised as "Global". The weighting of studies towards North America introduces potential bias. Of note, there were no included studies from the region of focus for this study, Australia.

Figure B.5

Included Studies by Country

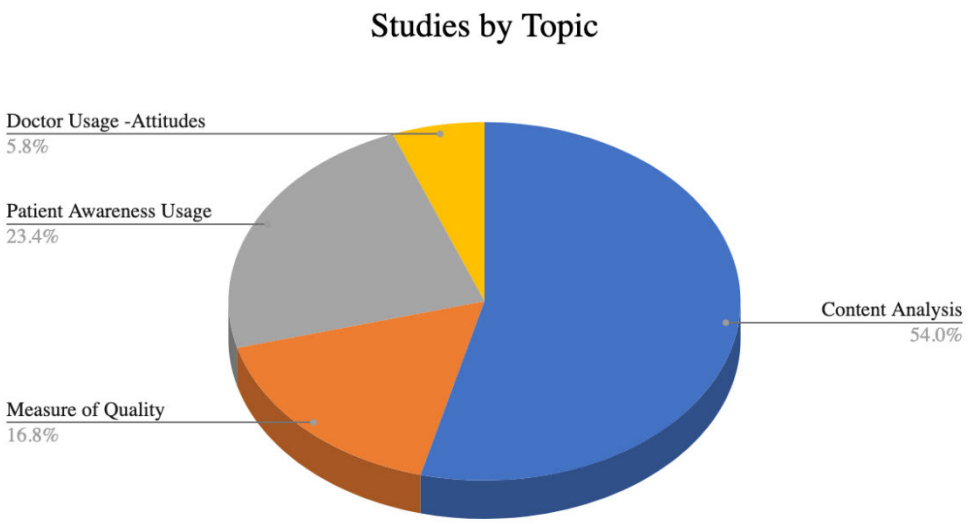


3.5 Study Topics

The topics examined in the studies varied; however, they can be summarised into four key areas: content analysis, patient usage, doctor usage, and measure of quality. This breakdown is summarised in Figure B6. The most heavily investigated area in PRW research is the content of PRWs, representing more than 54% of the total. The investigation into HCP usage of PRWs was relatively low with 5.8% compared to 23.4% investigating patient usage.

Figure B.6

PRW Empirical Research Topics



Appendix C. Ethics Approval

quest.noreply@vu.edu.au Wed, Aug 2, 2017, 2:51 PM

to Elisabeth.Wilson-Evered, renato.ulpiano

Dear PROF ELISABETH WILSON-EVERED,

Your ethics application has been formally reviewed and finalised.

» Application ID: HRE17-125
» Chief Investigator: PROF ELISABETH WILSON-EVERED
» Other Investigators: MR Renato Ulpiano, DR STEPHEN BURGESS
» Application Title: Adopting Health Practitioner Rating Websites: Assessing the influence of practitioners' motivation and system perceptions.
» Form Version: 13-07

The application has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007)' by the Victoria University Human Research Ethics Committee. Approval has been granted for two (2) years from the approval date; 02/08/2017.

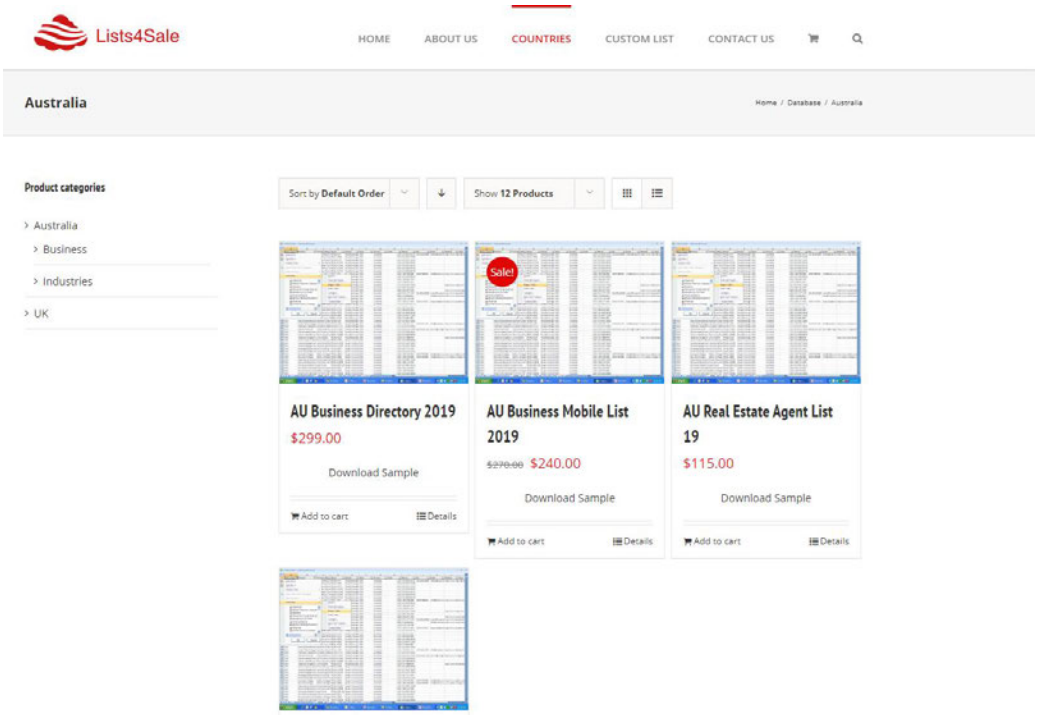
Continued approval of this research project by the Victoria University Human Research Ethics Committee (VUHREC) is conditional upon the provision of a report within 12 months of the above approval date or upon the completion of the project (if earlier). A report proforma may be downloaded from the Office for Research website at: http://research.vu.edu.au/hrec.php.

Please note that the Human Research Ethics Committee must be informed of the following: any changes to the approved research protocol, project timelines, any serious events or adverse and/or unforeseen events that may affect continued ethical acceptability of the project. In these unlikely events, researchers must immediately cease all data collection until the Committee has approved the changes. Researchers are also reminded of the need to notify the approving HREC of changes to personnel in research projects via a request for a minor amendment. It should also be noted that it is the Chief Investigators' responsibility to ensure the research project is conducted in line with the recommendations outlined in the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007).'

On behalf of the Committee, I wish you all the best for the conduct of the project.

Secretary, Human Research Ethics Committee
Phone: 9919 4781 or 9919 4461
Email: researchethics@vu.edu.au

Appendix D. Lists for Sale



Appendix E. MWMS Questionnaire

MWMS Questionnaire

The Multidimensional Work Motivation Scale (MWMS)

Amotivation
- Am1 I don't, because I really feel that I'm wasting my time at work.
- Am2 I do little because I don't think this work is worth putting efforts into.
- Am3 I don't know why I'm doing this job, it's pointless work

Extrinsic regulation—social
- Ext-Soc1 To get others' approval (e.g., supervisor, colleagues, family, clients …).
- Ext-Soc2 Because others will respect me more (e.g., supervisor, colleagues, family, clients …).
- Ext-Soc3 To avoid being criticized by others (e.g., supervisor, colleagues, family, clients

Extrinsic regulation—material
- Ext-Mat1 Because others will reward me financially only if I put enough effort in my job (e.g., employer, supervisor …).
- Ext-Mat2 Because others offer me greater job security if I put enough effort in my job (e.g., employer, supervisor …).
- Ext-Mat3 Because I risk losing my job if I don't put enough effort in it

Introjected regulation
- Introj1 Because I have to prove to myself that I can.
- Introj2 Because it makes me feel proud of myself.
- Introj3 Because otherwise I will feel ashamed of myself.
- Introj4 Because otherwise I will feel bad about myself

Identified regulation
- Ident1 Because I personally consider it important to put efforts in this job.
- Ident2 Because putting efforts in this job aligns with my personal values.
- Ident3 Because putting efforts in this job has personal significance to me

Intrinsic motivation
- Intrin1 Because I have fun doing my job.
- Intrin2 Because what I do in my work is exciting.
- Intrin3 Because the work I do is interesting.

The stem is "Why do you or would you put efforts into your current job?" and is accompanied by the scale: 1 = "not at all", 2 = "very little", 3 = "a little", 4 = "moderately", 5 = "strongly", 6 = "very strongly", 7= "completely". The scale can be obtained in other languages by contacting the first or second authors.
(Gagné et al., 2015)

Appendix F. Perceived Characteristics of an Innovation Questionnaire

Perceived Characterises of an Innovation Questionnaire – original scale

Relative Advantage

1. Using a PWS enables me to accomplish tasks more quickly.
2. Using a PWS improves the quality of work I do.
3. Using a PWS makes it easier to do my job.
4. The disadvantages of my using a PWS far outweigh the advantages.
5. Using a PWS improves my job performance.
6. Overall, I find using a PWS to be advantageous in my job.
7. Using a PWS enhances my effectiveness on the job.
8. Using a PWS gives me greater control over my work.
9. Using a PWS increases my productivity.

Compatibility

1. Using a PWS is compatible with all aspects of my work.
2. Using a PWS is completely compatible with my current situation.
3. I think that using a PWS fits well with the way I like to work.
4. Using a PWS fits into my work style.

Ease of Use (Complexity)

1. I believe that a PWS is cumbersome to use.
2. It is easy for me to remember how to perform tasks using a PWS.
3. My using a PWS requires a lot of mental effort.
4. Using a PWS is often frustrating.
5. My interaction with a PWS is clear and understandable.
6. I believe that it is easy to get a PWS to do what I want it to do.
7. Overall, I believe that a PWS is easy to use.
8. Learning to operate a PWS is easy for me.

Source G. C. Moore and Benbasat (1991).

Appendix G. Cognitive Interview Summary

Lia Paolo – Speech Pathologist - 7/8/2017

- Q6- give option for length of service as difficult to remember exact time period
- Q7- not clear, needed to reexplain what a PRW, may have not used one in the past and difficult to understand. last part of Q7 - split question have you used on in past if yes then what is your experience
- Q8- not clear – multi choice would make it easier
- Q9- a lot of questions in one box, break it into components
- Q13-different word instead of cumbersome -
- Q14- need to be able to see the question again if scrolling long pages or on a small screen
- Last question – assuming that you did have access - not clear what the differences are between the first two or all three
- Q15- move the question to the top

Sandra D'Souza – Psychologist - 3/10/2017

- The choice for sex needs to include 'other'
- Not clear whether the study was approved by the ethics committee
- What is SDT?
- It looks too long and was going to stop, need to have the time taken earlier on in the piece
- How will my answers be kept confidential?
- Too many options in the Likert scale looks daunting and too many questions for Part 10 need to block them into smaller chunks
- Part 10 seems repetitive – need to make it clearer that the questions will be repetitive

Lindsay Walderman – Speech Pathologist - 6/10/2017

- Too much information in the introductory statement
- Important to know why participants have been invited
- Questions are too long, needs breaking down into smaller components
- Some questions sound the same
- PRW not explained clearly enough, am I completing from a patient perspective , the practitioner completing one or being rated by one
- Pre -order question so the PRW questions come up first rather than the motivation questions to keep it in context
- Re competition – will I get added to a mailing list, will I get spam if I enter the competition

Andrea Morris– Occupational Therapist - 6/10/2017

- Intro blurb is long and likely to put therapist off completing the survey
- The word compatible with my work in Q10 sub question xx – compatible with my work is unclear

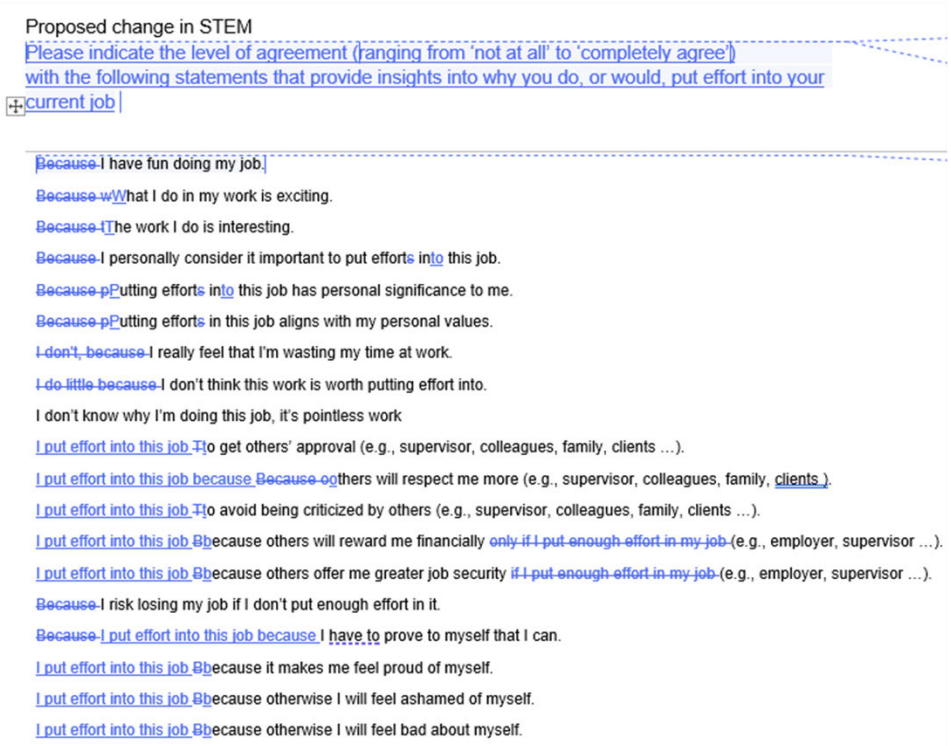
Maria Guzzardi – Speech Pathologist – 10/10/2017

- Title and the phrase the same
- 1st paragraph is one long sentence
- Spelling error in second paragraph
- Inconsistent with age brackets

Appendix H. Expert Reviews of Questionnaire

Expert Review of questionnaire

Self Determination Theory



Proposed change in STEM

Please indicate the level of agreement (ranging from 'not at all' to 'completely agree') with the following statements that provide insights into why you do, or would, put effort into your current job

Because I have fun doing my job.

Because wWhat I do in my work is exciting.

Because tThe work I do is interesting.

Because I personally consider it important to put efforts into this job.

Because pPutting efforts into this job has personal significance to me.

Because pPutting efforts in this job aligns with my personal values.

I don't, because I really feel that I'm wasting my time at work.

I do little because I don't think this work is worth putting effort into.

I don't know why I'm doing this job, it's pointless work

I put effort into this job Tto get others' approval (e.g., supervisor, colleagues, family, clients …).

I put effort into this job because Because ogthers will respect me more (e.g., supervisor, colleagues, family, clients).

I put effort into this job Tto avoid being criticized by others (e.g., supervisor, colleagues, family, clients …).

I put effort into this job Bbecause others will reward me financially only if I put enough effort in my job (e.g., employer, supervisor …).

I put effort into this job Bbecause others offer me greater job security if I put enough effort in my job (e.g., employer, supervisor …).

Because I risk losing my job if I don't put enough effort in it.

Because I put effort into this job because I have to prove to myself that I can.

I put effort into this job Bbecause it makes me feel proud of myself.

I put effort into this job Bbecause otherwise I will feel ashamed of myself.

I put effort into this job Bbecause otherwise I will feel bad about myself.

Expert Review

Perceived Characteristics of an Innovation Questionnaire

Q11 ~~For each of the following statements~~ Please indicate ~~whether~~ the level to which you agree or disagree with the following statements (ranging from strongly disagree to strongly agree).

Using a PRW *enables/will enable* me to access customer feedback more quickly
Using a PRW *improves/will improve* the quality of work I do
Using a PRW ~~*will*~~ *make~~s~~/will make~~s~~* it easier to do my job.
The disadvantages of *me using/ potentially using* a PRW far outweigh the advantages
Use of~~ing~~ a PRW *improves/ will potentially improve* my job performance.
Overall, I find *using or the ability to use* a PRW will be advantageous in my job
Using a PRW *enhances/ will enhance* my effectiveness on the job
Using a PRW *has given me/ will give me* greater control over my work
Using a PRW *increases/will increase* my productivity
Using a PRW *is or will be* compatible with all aspects of my work
Using a PRW *is or will be* completely compatible with my current situation
I think that using a PRW *fits well or will fit well* with the way I like to work
Using a PRW *fits or will fit* into my work style
I believe that a PRW *is or ~~will~~ could be* difficult to use
It *is easy (or will be easy)* for me to remember how to use ~~the functionality of~~ a PRW
Mey use~~ing~~ of a PRW *requires/ will require* ~~or requires~~ a lot of mental effort
~~Using a~~A PRW *is or will be* often frustrating to use
My interaction with a PRW *is or will be* clear and understandable
I believe that *it is easy (or will be easy)* to get a PRW to do what I want it to do
Overall, I believe that a PRW *is or will be easy* to use
Learning to operate a PRW *is or will be easy* for me ~~to use~~

Behavioural Intention

Q13 ~~For each of the statements state~~ Please indicate the level to which you agree or disagree with the following statements (ranging from strongly disagree to strongly agree). ~~whether you agree or disagree.~~

Assuming that I had access to a PRW, I intend to use it
If I had access to a PRW over the next few months, I predict that I would use it
I plan to use a PRW in the next few months

Appendix I. Gagné Authorisation for MWMS Changes

RE: MWMS questionnaire - data collection DBA ×

Marylene Gagne <marylene.gagne@uwa.edu.au> Mon, 28 Aug 2017, 22:26

to me

Dear Renato, sorry for the late response but I can't keep up with the emails I'm receiving this month as I travelled for 2 weeks. Still catching up. I don't think the changes you brought would cause any issues. Best of luck with the testing.

Marylene Gagne

From: Renato Ulpiano [mailto:renato@ladybughouse.com.au]
Sent: Saturday, 26 August 2017 12:57 PM
To: Marylene Gagne
Subject: MWMS questionnaire - data collection

Hi Marlene,

Sorry to be so persistent, but i thought I would give it one final try before i finalise the MWMS for data collection

I know that you are extremely busy, but I thought you may be able to point me in the right direction, see below

cheers
Renato
---------- Forwarded message ----------
From: **Renato Ulpiano** <renato@ladybughouse.com.au>
Date: 14 August 2017 at 18:01
Subject: Research Question - SDT and The Multidimensional Work Motivation Scale
To: marylene.gagne@uwa.edu.au
Cc: Elisabeth Wilson-Evered <Elisabeth.Wilson-Evered@vu.edu.au>

Hi Marlene,

I have been reading your work with great interest. I am completing a Professional Doctorate at Victoria University (part time) in Melbourne with Professor Elisabeth Wilson-Evered as my Principal Supervisor. I have recently received ethics approval for my study and moving into the data collection stage.

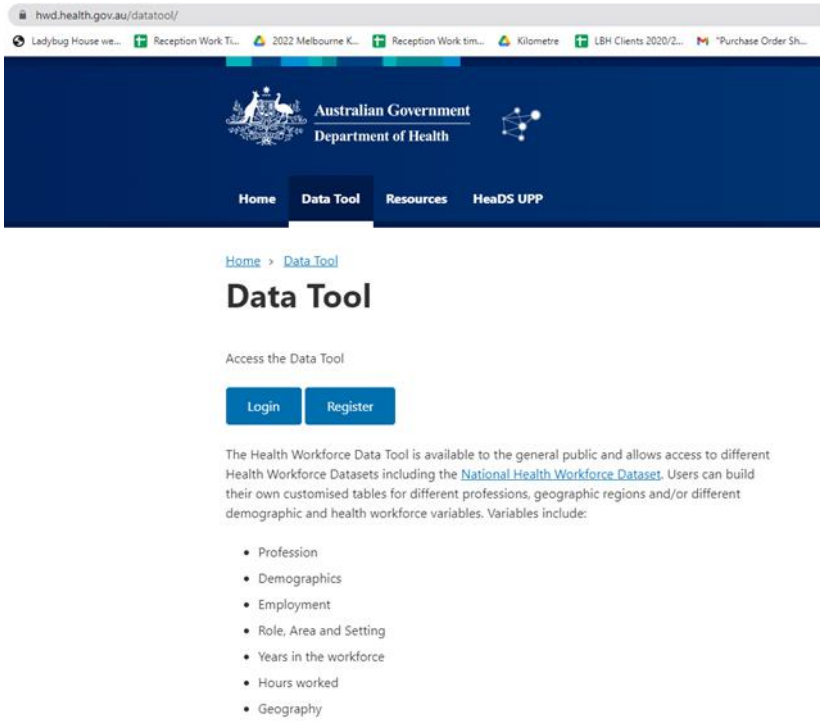
The doctoral topic is "Adopting Health Practitioner Rating Websites: Assessing the influence of practitioners' motivation and system perceptions".

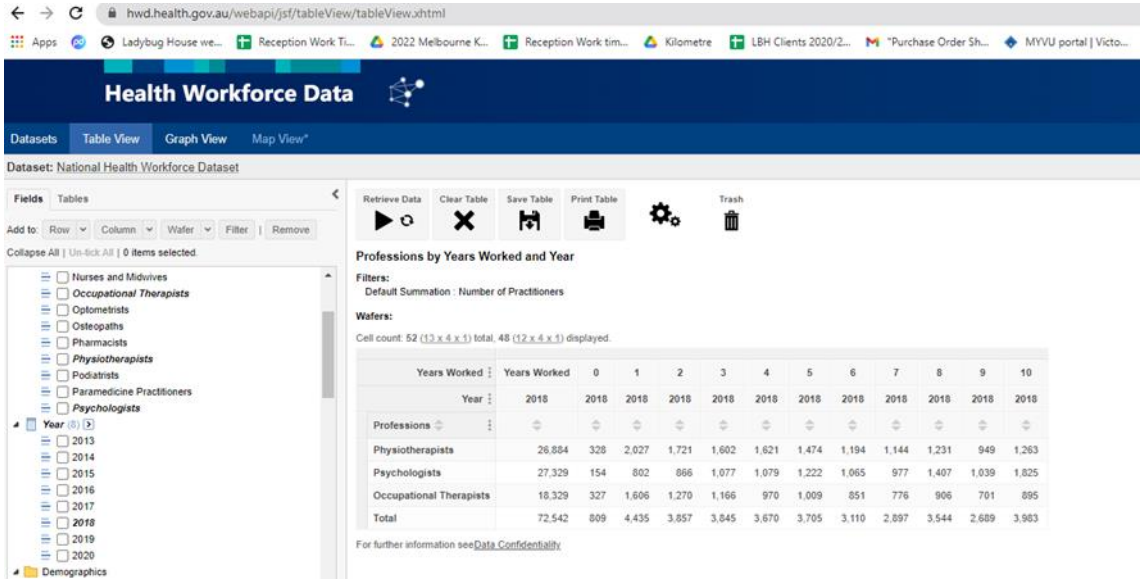
I have developed a conceptual model and will be using Self Determination Theory and Rogers Diffusion of Innovation in this study.

I will be using the The Multidimensional Work Motivation Scale that you and co authors validated in 2015 and published in

Appendix J. Allied Health Professionals Years Working

The source data to determine the number of years worked by health professionals was from the Australian Government Department of Health – Data Tool. The tool does not require payment but does require registration.





The calculation for the number of allied health professionals who worked greater than 10 years was equal to the sum of the total number of allied health professionals working 0-10 years minus the total number of allied health professionals working.

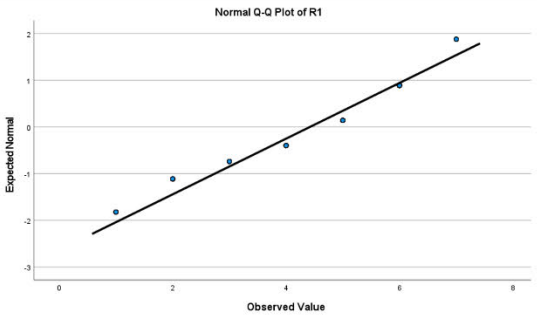
Appendix K. Codebook

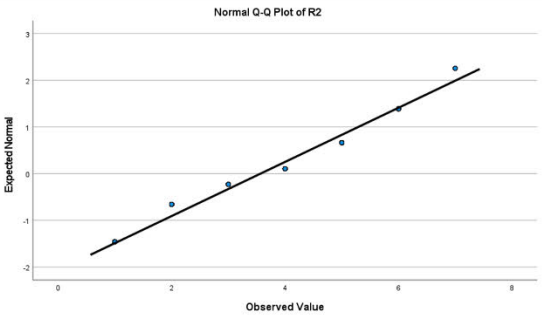
Code Book - Variable Information			
Variable	Position	Label	Measurement Level
ID	1	<none>	Scale
Q1	19	What is your age?	Scale
Q2	20	What is your gender? - Selected Choice	Scale
Q2_3_TEXT	21	What is your gender? - Other - Text	Nominal
Q3	22	In what health profession do you work? - Selected Choice	Scale
Q4	23	Which State or Territory do you live in?	Scale
Q5	24	Are you currently practicing in your profession?	Scale
Q6	25	How many years have you practiced in your profession?	Scale
Q7	26	I have used a product/service rating website in the past to review other peoples comments or rate an organisation, such as tripadvisor.com or urbanspoon.	Scale
Q8	27	I have used a PRW either as a practitioner, or to rate another health professional?	Scale
R1	28	R1	Scale
R2	29	R2	Scale
R3	30	R3	Scale
R4	31	R4	Scale
R5	32	R5	Scale
R6	33	R6	Scale
R7	34	R7	Scale
R8	35	R8	Scale
R9	36	R9	Scale
C1	37	C1	Scale
C2	38	C2	Scale
C3	39	C3	Scale
C4	40	C4	Scale
EOU1	41	E1	Scale
EOU2	42	E2	Scale
EOU3	43	E3	Scale
EOU4	44	E4	Scale
EOU5	45	E5	Scale
EOU6	46	E6	Scale
EOU7	47	E7	Scale
EOU8	48	E8	Scale

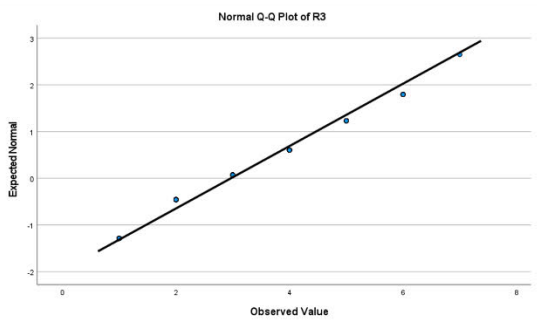
Variable	Position	Label	Measurement Level
IN1	49	IN1	Scale
IN2	50	IN2	Scale
IN3	51	IN3	Scale
ID1	52	ID1	Scale
ID2	53	ID2	Scale
ID3	54	ID3	Scale
AM1	55	Am1	Scale
AM2	56	Am2	Scale
AM3	57	Am3	Scale
ERS1	58	ERS1	Scale
ERS2	59	ERS2	Scale
ERS3	60	ERS3	Scale
ERM1	61	ERM1	Scale
ERM2	62	ERM2	Scale
ERM3	63	ERM3	Scale
IJ1	64	IJ1	Scale
IJ2	65	IJ2	Scale
IJ3	66	IJ3	Scale
IJ4	67	IJ4	Scale
B1	68	B1	Scale
B2	69	B2	Scale
B3	70	B3	Scale
Q12	71	Please describe your experience in receiving feedback or giving feedback to other health professionals.	Nominal
Q13	72	Whether or not you have used a PRW, what advice would you offer others in your profession about the use of such online customer feedback tools, at this time or even into the future?	Nominal
Q14	73	What is your opinion on the importance of PRWs now, and how might that view change in 5 years from now?	Nominal
Q3_4_TEXT	74	In what health profession do you work? - Other - Text	Nominal
Q9___Topics	75	Q9 - Topics	Nominal
R4r	76	R4R	Scale
E1R	77	E1R	Scale
E3R	78	E3R	Scale
E4R	79	E4R	Scale

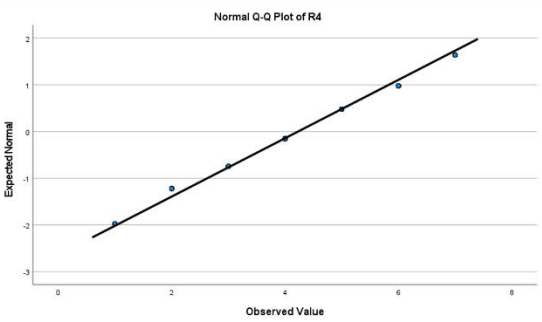
Appendix L. QQ Plots

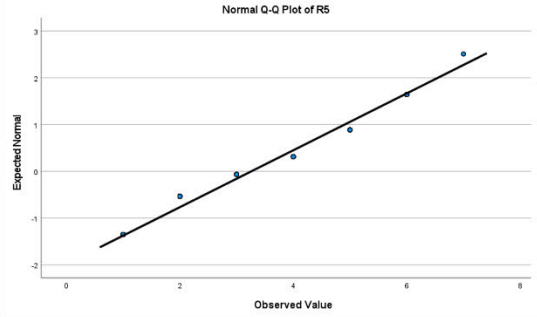
Relative Advantage QQ Plots

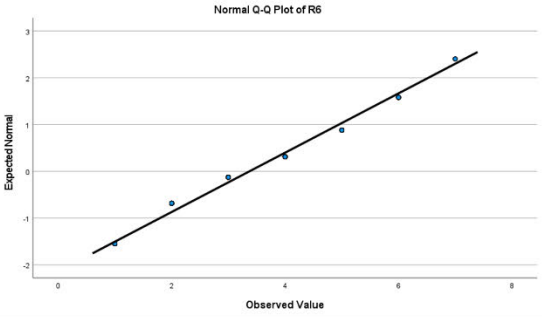


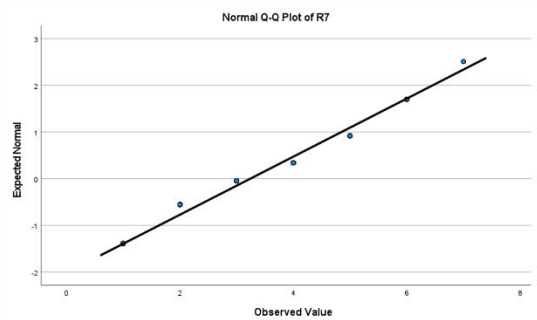


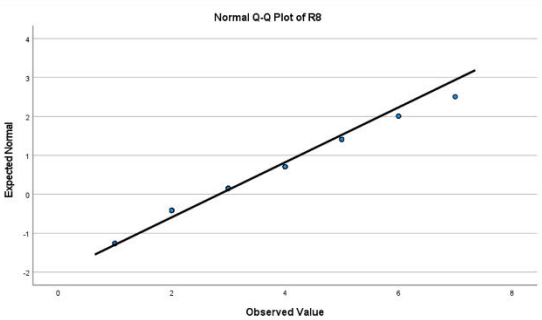


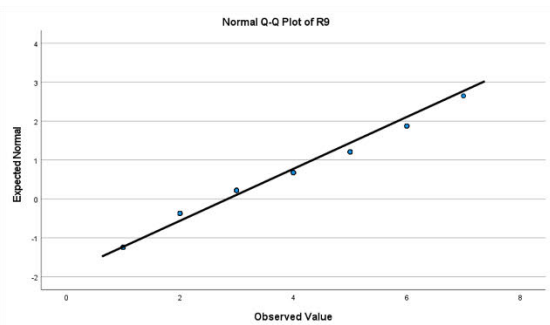




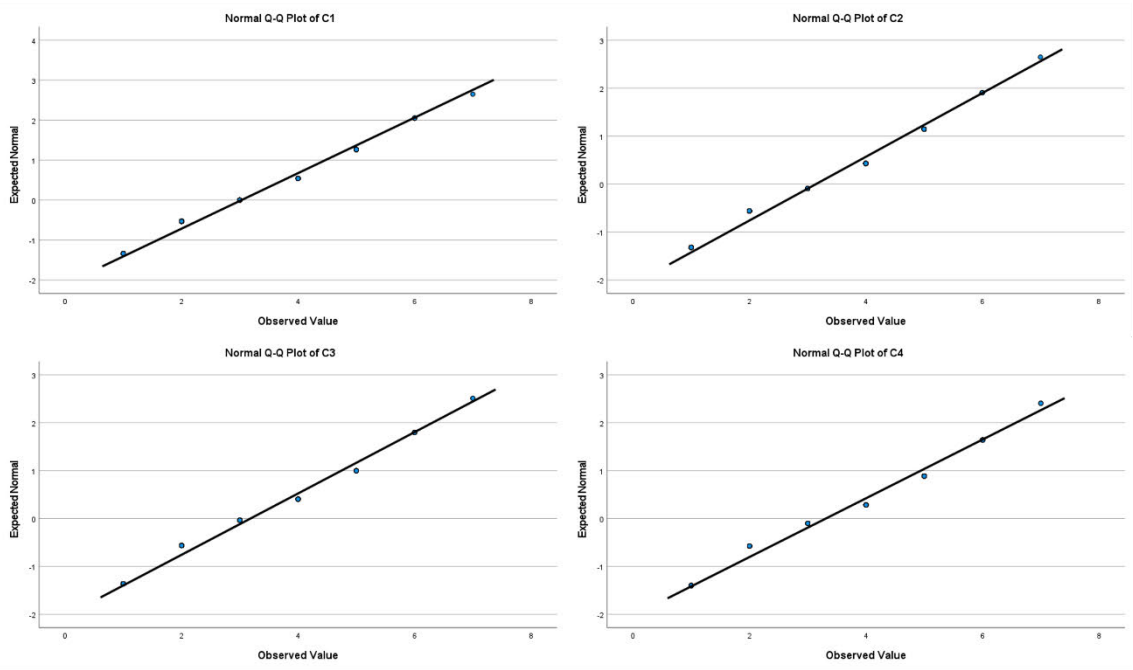




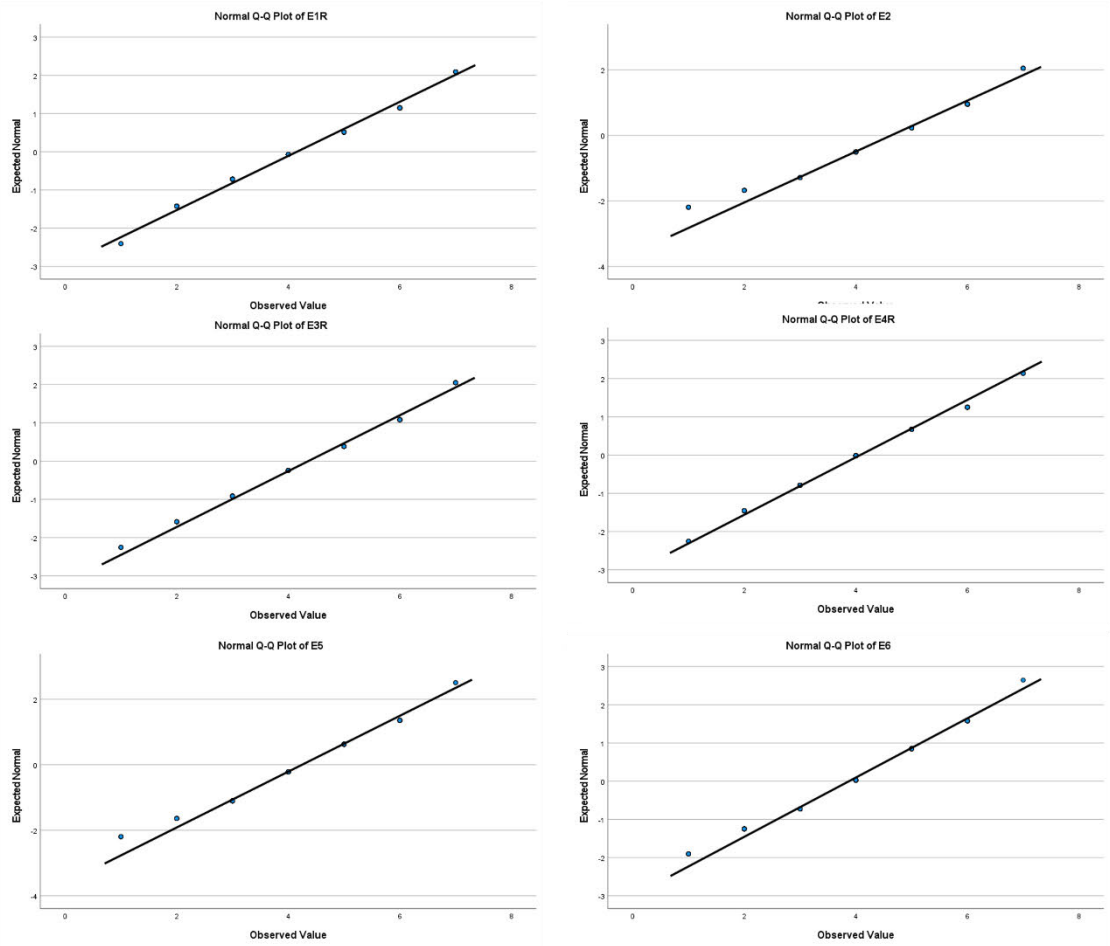




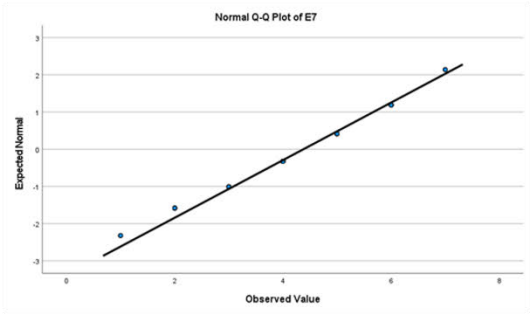
Compatibility QQ Plots

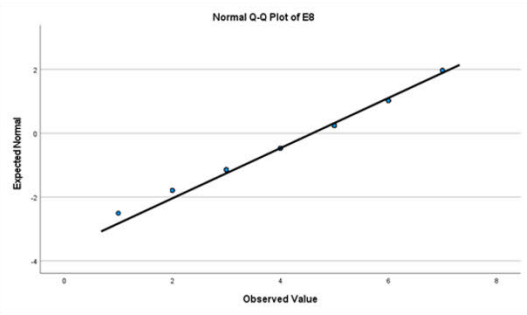


Complexity (Ease of Use) QQ Plots

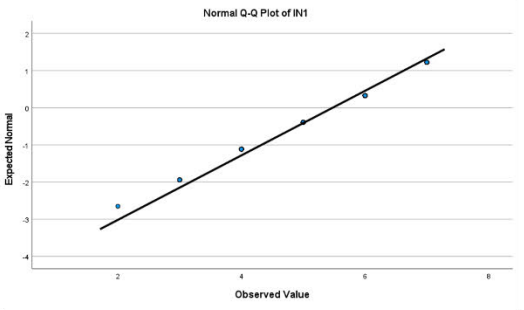


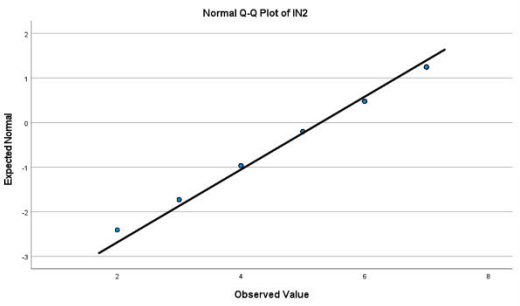
Complexity (Ease of Use) QQ Plots (continued)

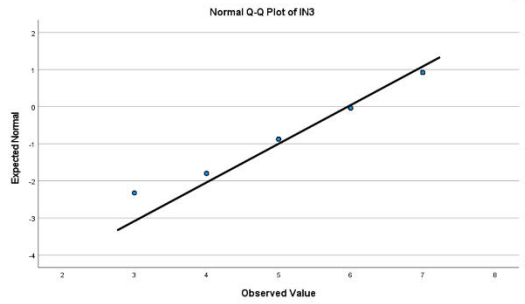




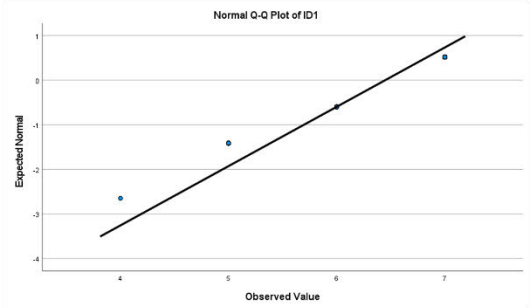
Intrinsic Motivation QQ Plots

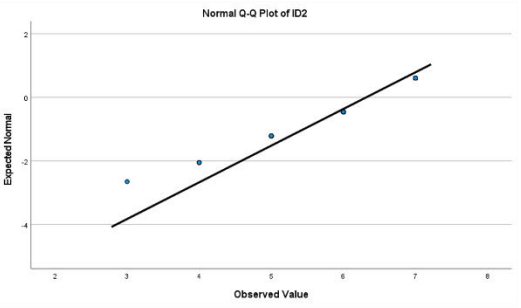


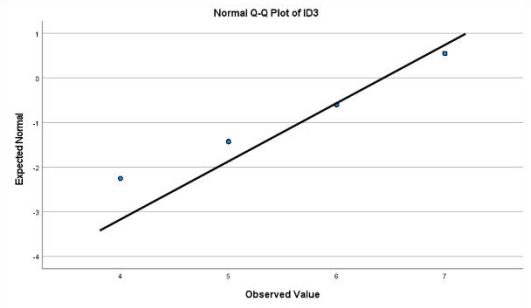




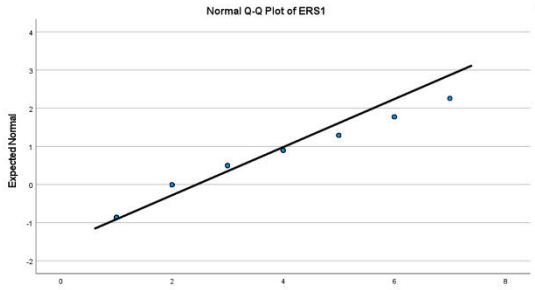
Identified Regulation QQ Plots

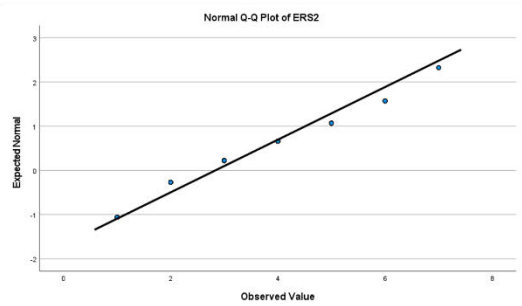


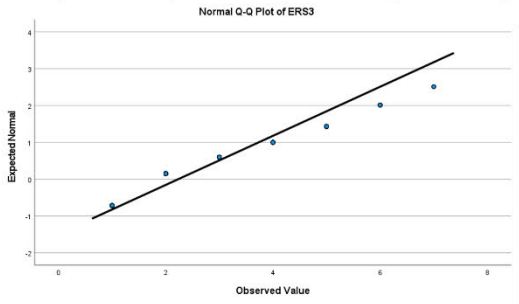




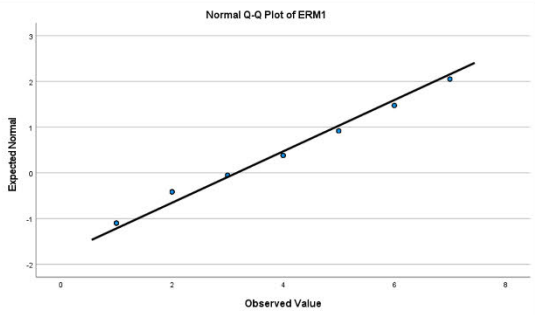
Extrinsic Regulation - Social QQ Plots

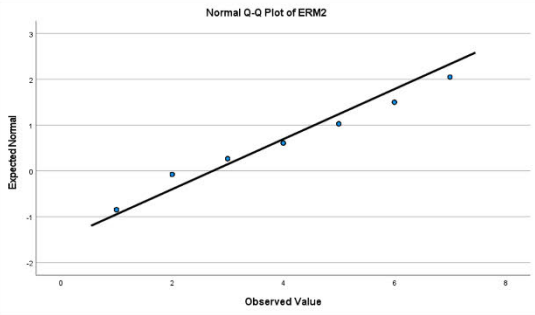


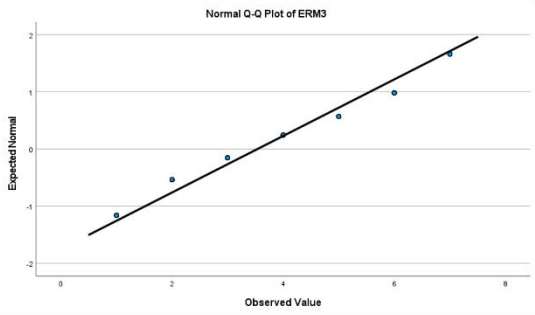




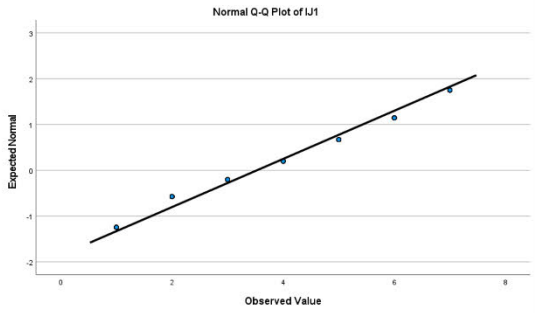
Extrinsic Regulation - Material QQ Plots

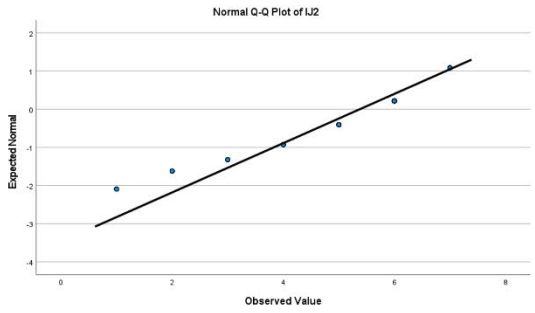




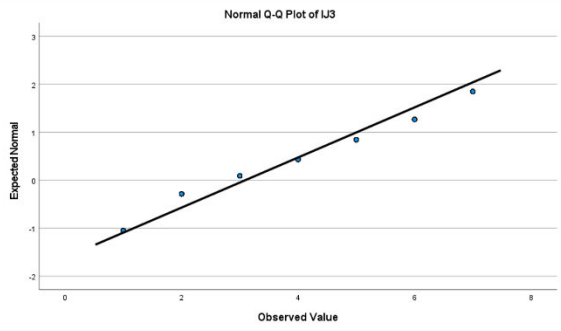


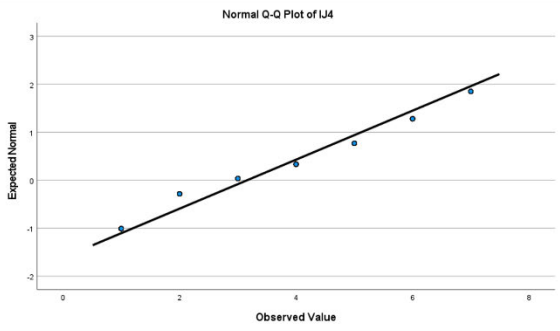
Introjected Regulation QQ Plots



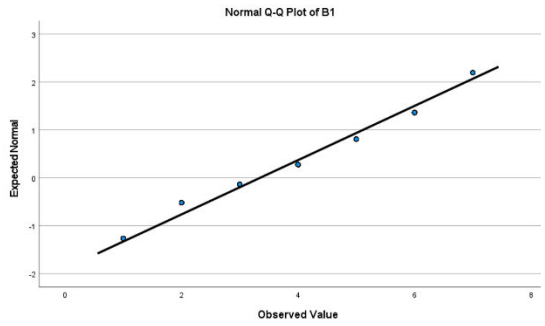


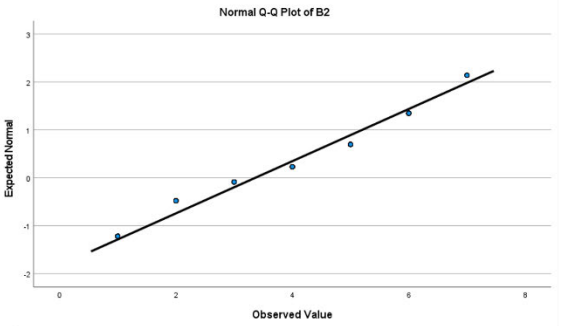
Introjected Regulation QQ Plots (continued)

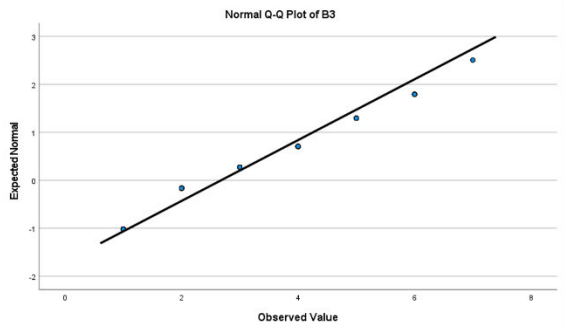




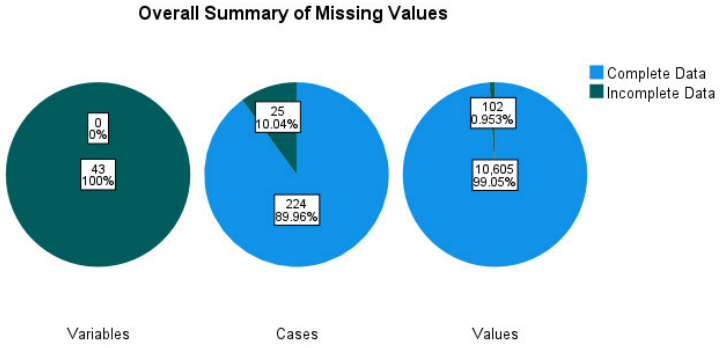
Behavioural Intention QQ Plots

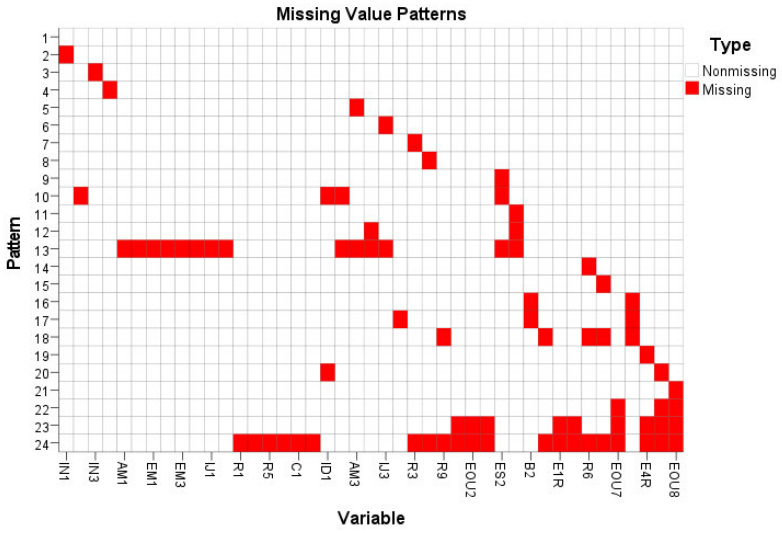


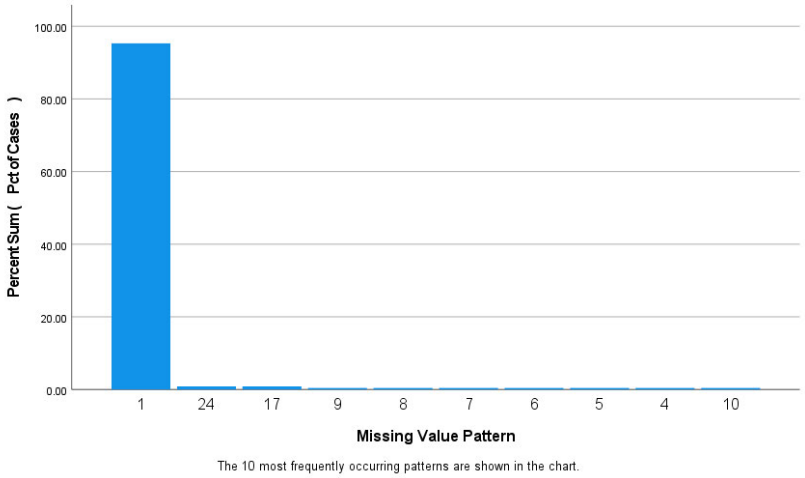




Appendix M. MCAR Analysis







Appendix N. Cronbach Alpha

Scale: Relative Advantage

Case Processing Summary

		N	%
Cases	Valid	243	97.6
	Excluded[a]	6	2.4
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.934	.936	9

Scale: Ease of Use

Case Processing Summary

		N	%
Cases	Valid	242	97.2
	Excluded[a]	7	2.8
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.853	.855	8

Scale: Identified Regulation

Case Processing Summary

		N	%
Cases	Valid	245	98.4
	Excluded[a]	4	1.6
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.898	.900	3

Scale: Introjected Regulation

Case Processing Summary

		N	%
Cases	Valid	245	98.4
	Excluded[a]	4	1.6
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.756	.752	4

Scale: External Regulation - Social

Case Processing Summary

		N	%
Cases	Valid	248	99.6
	Excluded[a]	1	.4
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.831	.831	3

Scale: Compatibility

Case Processing Summary

		N	%
Cases	Valid	244	98.0
	Excluded[a]	5	2.0
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.919	.920	4

Scale: Intrinsic Motivation

Case Processing Summary

		N	%
Cases	Valid	246	98.8
	Excluded[a]	3	1.2
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.858	.859	3

Scale: Behavioural Intention

Case Processing Summary

		N	%
Cases	Valid	245	98.4
	Excluded[a]	4	1.6
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.942	.942	3

Scale: External Regulation - Material

Case Processing Summary

		N	%
Cases	Valid	245	98.4
	Excluded[a]	4	1.6
	Total	249	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.671	.680	3

Appendix O. Correlation Matrices

Correlation Matrix - SDT															
	IN1	IN2	IN3	ID1	ID2	ID3	ES1	ES2	ES3	EM1	EM2	EM3	IJ1	IJ2	IJ4
IN1	1	0.78	0.59	0.38	0.43	0.38	0.01	-0.08	-0.11	0	0.01	-0.01	0.04	0.26	-0.05
IN2	0.78	1	0.64	0.41	0.4	0.38	-0.05	-0.06	-0.09	0	0.02	0	0.05	0.34	-0.07
IN3	0.59	0.64	1	0.68	0.64	0.65	-0.01	-0.06	-0.15	-0.01	-0.02	0.02	0.04	0.37	-0.07
ID1	0.38	0.41	0.68	1	0.75	0.77	0.04	-0.04	-0.1	-0.03	-0.02	0.02	0.04	0.33	0.04
ID2	0.43	0.4	0.64	0.75	1	0.78	0.07	0.02	-0.07	0.03	0.05	-0.02	0.06	0.32	0.07
ID3	0.38	0.38	0.65	0.77	0.78	1	0.01	0.01	-0.1	0.06	0.04	0.05	0.06	0.3	0.12
ES1	0.01	-0.05	-0.01	0.04	0.07	0.01	1	0.69	0.57	0.43	0.49	0.18	0.22	0.16	0.21
ES2	-0.08	-0.06	-0.06	-0.04	0.02	0.01	0.69	1	0.6	0.5	0.56	0.2	0.33	0.16	0.28
ES3	-0.11	-0.09	-0.15	-0.1	-0.07	-0.1	0.57	0.6	1	0.36	0.42	0.21	0.27	0.14	0.3
EM1	0	0	-0.01	-0.03	0.03	0.06	0.43	0.5	0.36	1	0.64	0.26	0.31	0.21	0.18
EM2	0.01	0.02	-0.02	-0.02	0.05	0.04	0.49	0.56	0.42	0.64	1	0.33	0.32	0.19	0.24
EM3	-0.01	0	0.02	0.02	-0.02	0.05	0.18	0.2	0.21	0.26	0.33	1	0.26	0.18	0.34
IJ1	0.04	0.05	0.04	0.04	0.06	0.06	0.22	0.33	0.27	0.31	0.32	0.26	1	0.46	0.32
IJ2	0.26	0.34	0.37	0.33	0.32	0.3	0.16	0.16	0.14	0.21	0.19	0.18	0.46	1	0.26
IJ4	-0.05	-0.07	-0.07	0.04	0.07	0.12	0.21	0.28	0.3	0.18	0.24	0.34	0.32	0.26	1

Correlation Matrix PCI											
	R1	R2	R3	R7	R8	C1	C3	C4	E6	E7	E8
R1	1	0.58	0.49	0.52	0.48	0.53	0.5	0.48	0.31	0.33	0.19
R2	0.58	1	0.71	0.74	0.68	0.61	0.66	0.58	0.39	0.33	0.19
R3	0.49	0.71	1	0.79	0.79	0.59	0.66	0.62	0.39	0.27	0.19
R7	0.52	0.74	0.79	1	0.79	0.66	0.7	0.62	0.36	0.26	0.15
R8	0.48	0.68	0.79	0.79	1	0.68	0.71	0.66	0.37	0.24	0.11
C1	0.53	0.61	0.59	0.66	0.68	1	0.73	0.66	0.27	0.2	0.04
C3	0.5	0.66	0.66	0.7	0.71	0.73	1	0.8	0.35	0.28	0.15
C4	0.48	0.58	0.62	0.62	0.66	0.66	0.8	1	0.34	0.33	0.21
E6	0.31	0.39	0.39	0.36	0.37	0.27	0.35	0.34	1	0.64	0.53
E7	0.33	0.33	0.27	0.26	0.24	0.2	0.28	0.33	0.64	1	0.67
E8	0.19	0.19	0.19	0.15	0.11	0.04	0.15	0.21	0.53	0.67	1

Correlation Matrix - BI

	B1	B2	B3
B1	1	0.92	0.79
B2	0.92	1	0.8
B3	0.79	0.8	1

Appendix P. Mediation Analysis Full Results

Mediation Analysis full results

User-defined estimands

Parameter	Estimate	Lower	Upper	P
ERM_RA_BI	.117	-.070	.331	.203
ERS_RA_BI	.049	-.137	.254	.575
INJ_RA_BI	-.099	-.333	.094	.304
ID_RA_BI	-.300	-.680	.000	.050
IN_RA_BI	.120	-.081	.431	.237
ERM_EOU_BI	.012	-.031	.077	.456
ERS_EOU_BI	.012	-.034	.085	.515
INJ_EOU_BI	-.039	-.137	.003	.074
ID_EOU_BI	-.040	-.178	.026	.241
IN_EOU_BI	.084	.018	.227	.011

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
RelativeAda	<---	ExtrinsicMateriala	.133	.087	1.519	.129	EX1
RelativeAda	<---	ExtSociala	-.067	.091	-.736	.461	EXS1
RelativeAda	<---	Introjecteda	-.112	.106	-1.059	.289	IJ1
RelativeAda	<---	Identifieda	-.339	.151	-2.243	.025	ID1
EOUa	<---	Identifieda	-.178	.144	-1.234	.217	ID2
EOUa	<---	Introjecteda	-.178	.105	-1.690	.091	IJ2
EOUa	<---	ExtSociala	.054	.088	.617	.538	EXS2
EOUa	<---	ExtrinsicMateriala	.055	.084	.662	.508	EX2
EOUa	<---	Intrinisic	.377	.101	3.746	***	IN2
RelativeAda	<---	Intrinisic	.136	.100	1.362	.173	IN1
Behavoira	<---	EOUa	.222	.075	2.956	.003	EOU1
Behavoira	<---	Identifieda	-.072	.140	-.515	.607	directID
Behavoira	<---	Introjecteda	-.035	.097	-.362	.718	directinj
Behavoira	<---	ExtSociala	-.191	.085	-2.234	.025	directers
Behavoira	<---	ExtrinsicMateriala	.141	.081	1.735	.083	directerm
Behavoira	<---	RelativeAda	.884	.108	8.189	***	RA1
Behavoira	<---	Intrinisic	.120	.098	1.226	.220	directIN

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	105	465.955	272	.000	1.713
Saturated model	377	.000	0		
Independence model	52	4462.231	325	.000	13.730

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.896	.875	.954	.944	.953
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.837	.750	.798
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	193.955	138.099	257.685
Saturated model	.000	.000	.000
Independence model	4137.231	3925.075	4356.673

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	1.894	.788	.561	1.047
Saturated model	.000	.000	.000	.000
Independence model	18.139	16.818	15.956	17.710

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.054	.045	.062	.219
Independence model	.227	.222	.233	.000