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Full Length Article

Impact of patient portal behavioral engagement on subsistence consumers' wellbeing☆

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Abstract

Subsistence consumers, representing almost half the global population, live on low incomes, possess low levels of literacy, and generally experience poor health. Technology is a tool used to facilitate stronger connections between consumers and support services, including for subsistence consumers. Given the unique characterization of subsistence marketplaces, research needs to examine potential associations between subsistence consumers' individual resource integration and wellbeing via their behavioral engagement with technologies. Research is also warranted that investigates the factors that can moderate this association. A 45-day customized patient portal app was delivered via 26 healthcare service providers, resulting in the surveying of 336 subsistence consumers who used the portal. The results indicate positive associations between subsistence consumers' individual resource integration, patient portal behavioral engagement, and wellbeing. They also indicate that these associations are strengthened by service provider's resource support and subjective norms, and weakened by medical mistrust. Theoretical and managerial implications from this study's findings are discussed.

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1. Introduction

A range of engagement-facilitating technologies such as internet-of-things-based applications, social media, artificial intelligence, and eHealth platforms have gained significant traction among scholars and practitioners in the past decade. This interest is due to the ability of engagement-facilitating technologies to impact (negatively or positively) on a range of stakeholders including consumers (e.g. Agarwal et al., 2020; R.W. Belk, 2013; R.W. Belk & Llamas, 2013; Lowe et al., 2019; Ng & Wakenshaw, 2017; Rust & Kannan, 2002). Although such technologies are often perceived as less accessible to low-income or subsistence consumers (Lowe et al., 2019). Studies conducted in the subsistence marketplace context suggest that lack of individual resources (e.g. knowledge and education) can limit subsistence consumers' ability to (behaviorally) engage (i.e. in regard to their actual usage, time and energy spend) with the tangible/ intangible resources designed for them, such as service support, infrastructure, and technologies (Hussain et al., 2019; M. Viswanathan & Sreekumar, 2019; M. Viswanathan & Sridharan, 2012). Yet subsistence (or ‘bottom of the

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pyramid”) consumers are an important market for most businesses and their emerging technologies, as they comprise almost half the global population at over three billion (Azmat et al., 2015; Hasan et al., 2019; M. Viswanathan et al., 2019).

Subsistence consumers live on low incomes (typically less than US$5 a day), possess low levels of literacy, and generally experience poor health (Arli & Cadeaux, 2017; Blocker et al., 2013; Huang et al., 2019; M. Viswanathan et al., 2019). The infrastructure and service support (e.g., financial, technical) they receive is also often limited (Weidner et al., 2010). Amid such constraints, subsistence consumers have been known to uniquely assimilate and apply their individual (operant) resources on the available operant/operand resources to advance both their own and their community members’ quality of life (Blocker et al., 2013; Martin & Hill, 2015; Venugopal & Viswanathan, 2017). This may include assimilation of their individual resources such as competence in building community relations, application of limited skills to directly engage with services and technological innovations (operand/opera) designed for them such as mobile banking, literacy programs, and eHealth (Azmat et al., 2015; Hasan et al., 2019; Lowe et al., 2019; M. Viswanathan & Sreekumar, 2019).

While resource integration can occur concurrently (i.e. coincide) with engagement, resource integration chiefly acts as an antecedent (or as an enabler) to consumer engagement (see for e.g. L.D. Hollebeek, 2019; L.D. Hollebeek et al., 2019). Former studies echo similar views, suggesting that engagement can be the result of consumers integrating their own (individual) resources with those (operand/operand) of a service provider (see for e.g. Baron & Harris, 2008; Barrutia & Gilsanz, 2012; Hilbert et al., 2012).

Given this anecdotal link and the unique characterization of subsistence marketplaces, there is a need to empirically examine whether subsistence consumers’ individual resource integration acts as an antecedent to their directly observable interactions (i.e. behavioral engagement) with targeted services, including engagement-facilitating technologies (Azmat et al., 2015; Hasan et al., 2019; M. Viswanathan & Sreekumar, 2019). Further, little is known in the literature about the effect of behavioral engagement with technologies on consumer wellbeing (L.D. Hollebeek et al., 2019; L. Hollebeek & Belk, 2018). This therefore warrants research in the subsistence marketplaces context that examines whether behavioral engagement with technologies is linked to subsistence consumers’ wellbeing (M. Viswanathan & Sreekumar, 2019).

Commissurately, there is also the need to examine what might be some of the key factors (i.e. moderators) that strengthen (or weaken) the association between individual resource integration, technology-enabled behavioral engagement, and wellbeing. Most subsistence consumers rely on their families and extended social networks when deciding to trust and adopt new targeted innovations (Chikweche & Fletcher, 2010; Hasan et al., 2019; M. Viswanathan & Sreekumar, 2019), indicating that subjective norms can influence how they engage with such technologies (Agarwal et al., 2020; M. Viswanathan & Sridharan, 2012). Studies also highlight that subsistence consumers often require tangible/intangible resource support from other entities (e.g. their service providers) (Weidner et al., 2010), suggesting that service provider resource support can also influence consumers’ behavioral engagement with technologies. Medical mistrust has also been known to create a barrier to how these consumers engage with the health system and its innovations, which can have a moderating effect on their wellbeing outcomes (Polonsky et al., 2018; van der Heijden et al., 2019). Whilst, past studies indicate that factors such as culture, products vs. services, and personal values can influence the link between resource integration and consumer engagement (L.D. Hollebeek et al., 2019; Marbach et al., 2019). In the context of this study, which is grounded on the unique characterization of subsistence marketplaces (e.g. low incomes, lack of health services, social interdependence), three specific moderators deemed as relevant to the subsistence context were chosen. These included: service provider resource support, subjective norms, and medical mistrust (Hasan et al., 2019; Polonsky et al., 2018; M. Viswanathan, 2017; Weidner et al., 2010).

This study responds to research gaps by conducting a field study of a patient portal as a behavioral engagement-facilitating technology among 336 subsistence consumers (i.e. users of a patient portal). Patient portals are eHealth technologies that are generally accessed by users in the form of an application (app) via their smartphones or personal computers. It provides a direct, two-way mode of communication between app users and their healthcare service providers, and has the capacity to facilitate the storing of users’ medical information, uploading and transferring of medical documents, and scheduling of physician appointments (Tang et al., 2012; Zide et al., 2016). To determine whether subsistence consumers’ behavioral engagement leads to wellbeing outcomes, this study extracted their actual and rich user-level behavioral data such as the number of times the app was used, the number of times messages interacted and time spent per visit (Arcury et al., 2017; Jaakkola & Alexander, 2014; V. Viswanathan et al., 2017). As such, patient portal behavioral engagement in this study is viewed as subsistence consumers’ directly observable (behavioral) interactions with the patient portal app (i.e. focal object), enabled by their individual resource integration (Jaakkola & Alexander, 2014; V. Viswanathan et al., 2017).

In addressing existing research gaps, this study makes three main contributions. First, while other factors can act as antecedents to consumer engagement with technologies (L. Dessart, 2017), resource integration has been highlighted as necessary to develop consumer engagement, which could coincide with the engagement construct (L.D. Hollebeek, Srivastava, et al., 2019). Through its field study of a patient portal, this research has empirically demonstrated that individual integration of resources (i.e. skills, knowledge and competencies) acts as an antecedent to subsistence consumers’ behavioral engagement with technologies. This finding provides further credence to the growing consumer engagement and subsistence marketplace literature by validating that subsistence consumers are capable of integrating their individual resources, which acts as a key antecedent to their observable (i.e. actual rather than self-reported) interactions with engagement-enabled technologies (L.D. Hollebeek, Srivastava, et al., 2019; M. Viswanathan & Sreekumar, 2019).

Second, there is limited literature on the impact of engagement-facilitating technologies on consumers’ wellbeing, particularly in the context of subsistence marketplaces (L. Hollebeek & Belk, 2018; M. Viswanathan & Sreekumar, 2019). In response to this gap, this study contributes to the call for such research by empirically demonstrating that subsistence consumers’ behavioral engagement with the patient portal is positively related to their wellbeing. Third, this study shows that the links between individual
resource integration, patient portal behavioral engagement, and subsistence consumers are strengthened by healthcare providers’ resource support and subjective norms, and weakened by medical mistrust. Understanding these subsistence-specific moderators not only contributes to the existing literature (Agarwal et al., 2020; L. Hollebeek & Belk, 2018), but also informs policymakers and businesses about the factors that need to be leveraged and/or alleviated to improve subsistence consumers’ wellbeing via behavioral engagement-facilitating technologies. In the midst of the current COVID-19 pandemic crisis, the study findings also inform policymakers that eHealth services such as patient portals can work as an authentic behavioral engagement-enabled platform. For example communicating public health messages, and deliver basic services targeting hard to reach subsistence consumers (see for e.g. Mahmood et al., 2020).

In the following sections, previous research is first reviewed, aligned with the key constructs of this study that influenced the development of a conceptual model. This is followed by a discussion on the development of this study’s associated hypotheses. The design of the field study is then described, followed by an examination of its main findings. The implications of this study are then outlined, concluding with a summary of the limitations and future research directions.

2. Theoretical background

2.1. Subsistence consumers, marketplaces, and wellbeing

The term ‘subsistence’ describes “life circumstances wherein the ability to meet basic needs is chronically under threat” (Venugopal & Viswanathan, 2017, p. 1). Subsistence consumers are characterized as earning low incomes (typically less than US $5 dollar a day) (M. Viswanathan, 2017; M. Viswanathan et al., 2019). Most also have lower levels of literacy and access to resources, often leading to significant day-to-day survival challenges (Blocker et al., 2013; Chikweche & Fletcher, 2010; Hasan et al., 2019; M. Viswanathan & Sreekumar, 2019). Other relevant studies over the past two decades have deep-dived into how subsistence consumers think, feel, cope, and engage in marketplaces from a micro-level, bottom-up perspective (e.g. M. Viswanathan et al., 2019). Such literature has highlighted how this can contribute to the development of theories, policies, and interventions at the community and societal level (e.g. Azmat at al., 2015). Yet while subsistence marketplaces have mostly been characterized as resource deprived, research has uncovered that these consumers are often rich in other intangible or individual operant resources (e.g. competent in harnessing benefits from limited resources) (Chikweche & Fletcher, 2010; Sridharan & Viswanathan, 2008; Venugopal & Viswanathan, 2017).

Some subsistence marketplace studies have also emphasized how many of these consumers encounter significant health burdens (i.e. poor health) as they struggle to satisfy basic, fundamental health and wellbeing needs (Hasan et al., 2019; Huang et al., 2019; M. Viswanathan, 2017; Zide et al., 2016). Such health inequalities are often exacerbated by the limited amount of healthcare providers operating in low-income areas (van der Heijden et al., 2019; M. Viswanathan & Sreekumar, 2019). Many subsistence consumers feel alienated from healthcare services, commonly perceiving them as more accessible for those with higher resource levels, and as inadequate for their health needs (Macfarlane et al., 2000; Polonsky et al., 2018). This has contributed to medical mistrust within many subsistence marketplaces, which is also influenced by limited health literacy and negative healthcare experiences (Polonsky et al., 2018). This combination of medical mistrust and a lack of resources/support from healthcare service providers can result in lower levels of wellbeing among subsistence consumers.

Furthermore, the unique social characterization of subsistence marketplaces means these consumers often use their peer, family, or community support network to help them to better engage with such services (Hasan et al., 2019; Venugopal & Viswanathan, 2017). This has influenced the apparent need to develop tailored healthcare based on a bottom-up understanding of these marketplaces, to improve the health and wellbeing of disadvantaged consumers (M. Viswanathan et al., 2019). For example, innovative services that target the specific needs and limited resources of subsistence consumers, such as eHealth technologies, have been known to improve their wellbeing (Hasan et al., 2019; M. Viswanathan & Sreekumar, 2019).

Consumer wellbeing is often categorized into two facets: hedonic (e.g. pleasure, satisfaction, peace, happiness) and eudaimonic (e.g. life purpose, development of one’s potential) (Sharma et al., 2017). Although some scholars have hesitated to distinguish this way (e.g. Kashdan, Biswas-Diener & King, 2008), based on their more holistic perspective of wellbeing comprised of both eudaimonic and hedonic facets as recommended by some (Disabato, Goodman, Kashdan, Short & Jarden, 2016). This study has therefore viewed subsistence consumer wellbeing through a holistic lens encompassing how an individual’s competence, autonomy, and relatedness are achieved by engaging with an interactive service such as the patient portal app service (Sharma et al., 2017). Furthermore, due to the unique characterization of subsistence marketplaces (e.g. resource constraints such as low income and low literacy), some studies have suggested that these consumers experience lower levels of wellbeing (e.g. M. Viswanathan, 2017). Thus, scholars from both transformative service and subsistence marketplace research have highlighted that further examination of ways to improve subsistence consumer wellbeing is required, via greater accessibility and adoption of technologies and services innovations (J.S. Ancker et al., 2011; Blocker et al., 2013; Sharma et al., 2017; M. Viswanathan, 2017).

2.2. Patient portal as a behavioral engagement-facilitating technology in subsistence marketplaces

Patient portals are a secure eHealth technology that connects patients and their healthcare service providers via a dedicated portal app or website linked to their smartphones or computers. These portals generally offer a range of services, such as scheduling appointments, uploading and accessing health/medical information, renewing prescriptions, and exchanging messages (Osborn et al., 2010; Tang et al., 2012; Zide et al., 2016). Given that healthcare service providers are able to facilitate more
informed, efficient, and needs-based services via patient portals, such engagement-facilitating technology should help to overcome health system deficiencies impacting subsistence consumer wellbeing (Hasan et al., 2019; Lyles et al., 2016; M. Viswanathan & Sreekumar, 2019). The information within patient portals (e.g. terminology definitions) could also act as an educational resource for subsistence consumers, consequently increasing their health literacy/knowledge (operant resource) and influencing more meaningful engagement with the portal app and their healthcare providers (Davey & Grönroos, 2019; Krist et al., 2012; Lyles et al., 2016; Zide et al., 2016).

L. Dessart et al. (2016) state “there seems to be a level of disagreement on the number of dimensions of engagement as well as their definition or composition” (p. 405). Furthermore, the authors highlight that “to date, there is no agreement on the best way to represent engagement, nor is there consensus on the meaning of the dimensions” (p. 402). For instance, several studies have viewed engagement as a multi-dimensional psychological state (i.e. cognitive, affective and behavioral) initiated by consumer engagement with a focal object or service (Brodie et al., 2011; Glavee-Geo et al., 2019; L.D. Hollebeek et al., 2014). A competing approach in one stream of studies has viewed engagement as the directly observational behavioral interactions (i.e. a range of actual engagement behaviors/actions) with a brand or service, resulting from motivational drivers (see for e.g. Van Doorn et al., 2010; Jaakkola & Alexander, 2014; V. Viswanathan et al., 2017). Studies therefore suggest that specific dimension/s of consumer engagement, including its composition may vary depending on study objectives and across contexts or applications (Groeger et al., 2016; V. Viswanathan et al., 2017).

Past research informs that due to their social interdependence and low education levels, responses of subsistence consumers may suffer several biases (Ingenbleek et al., 2013). These include: i) recall bias with instruments measuring past events, ii) tendency to agree rather than disagree with self-reported measures, and iii) generally perceiving self-reported subjective instruments as complex if it is not kept simple and concrete (Ingenbleek et al., 2013; M. Viswanathan et al., 2008). Similarly, in the context of this study, asking the subsistence consumer respondents to recall and self-report their multidimensional engagement (i.e. emotional, cognitive and behavioral) with the patient portal app after a certain period of time, pragmatically can suffer from these response biases. Additionally, depending on the context or application, several studies have shown that engagement can manifest in ‘behavioral dimensions’ and have used this manifestation to test antecedents and consequences of engagement (see e.g. Jaakkola & Alexander, 2014; V. Viswanathan et al., 2017). To mitigate the possible biases and aligning with this study’ aim of testing the link between actual engagement with the patient portal and subsistence consumers’ wellbeing, this study therefore adopted a ‘behavioral manifestation’ of the consumer engagement construct. Such behavioral manifestation, per se, provides an advantage over the widely used self-reported multidimensional measure of engagement, relevant to the context of this study (V. Viswanathan et al., 2017). Relevantly, it is acknowledged that this manifestation does not negate the widely used psychological dimensions of engagement (e.g. L.D. Hollebeek et al., 2014).

2.3. Resource integration, behavioral engagement, and wellbeing in subsistence marketplaces

Resources are generally viewed as either operant (e.g. skills, knowledge, and competencies) or operand (e.g. tangible equipment) (Madhavaram & Hunt, 2008; S.L. Vargo & Lusch, 2017). Most scholars agree that when consumers integrate their individual resources with a service provider’s resources (operand/operand), this is likely to result in increased consumer engagement (see for e.g. Baron & Harris, 2008; Barrutia & Gilsanz, 2012; Hilibbert et al., 2012; L.D. Hollebeek, Sprott, et al., 2019). In the subsistence consumer context, such resource integration with healthcare providers, via technology access (i.e. patient portals), is also likely to increase consumer engagement.

Yet technology access may not always influence subsistence consumer engagement, meaning there may not be increased sustained participation (Agarwal et al., 2020; Zide et al., 2016). This factor is an important consideration when examining engagement with technology in subsistence marketplaces; that is, the inability to become aware of, access, maintain, and meaningfully use digital technologies (Van Deursen & van Dijk, 2019). Thus, it was deemed important in this study to address the ability of subsistence consumers to integrate their individual resources to interact with the service innovations offered by their healthcare providers, particularly when examining the use of an engagement-facilitating patient portal (Zide et al., 2016). A better understanding of this process has been determined as important to enhance these consumers' inclusion within the health system, and improve their health literacy and overall wellbeing (Anderson et al., 2013; Berry & Bendapudi, 2007; L.D. Hollebeek & Andreasen, 2018; Lyles et al., 2016). For example, without healthcare service provider resource support (e.g. interpersonal education) and customized technology design (e.g. less technical jargon and simple navigation), subsistence consumers may be restricted in their meaningful use of engagement-facilitating technologies (M. Viswanathan & Sreekumar, 2019). Thus, increased engagement with patient portals tailored for subsistence marketplaces should reduce these consumers’ defense and avoidance mechanisms (often stemming from cognitive weaknesses due to low education) (Zide et al., 2016).

2.4. Potential moderators of patient portal behavioral engagement and consumer wellbeing

From the discussion presented thus far, it would appear that individual resource integration increases patient portal behavioral engagement, which in turn enhances subsistence consumer wellbeing. This study has contributed further to the literature by examining the moderators where such resource integration, patient portal behavioral engagement, and subsistence consumer wellbeing could be weakened or strengthened. Drawing on the extant literature, three moderators were consequently identified as potential influencers of patient portal behavioral engagement in the subsistence marketplace context: service provider resource support, subjective norms, and medical mistrust.
A narrow pool of literature has considered the role of healthcare service provider's resource support in maximizing health and wellbeing outcomes in under-served populations (J.S. Ancker et al., 2011; Grossman et al., 2019; M. Viswanathan & Sreekumar, 2019). They have highlighted the vital role that provider resource support plays in the empowerment and improvement of vulnerable consumers’ capability to use innovations such as patient portal for meaningful engagement (Grossman et al., 2019). This extant literature contends that to mitigate avoidance of targeted innovations and achieve meaningful consumer engagement for better wellbeing outcomes, support from a facilitator (e.g., healthcare service provider) is integral (M. Viswanathan & Sreekumar, 2019). Such support should not only influence how consumers integrate their limited resources, it should also create trusting relationships that drive consumer engagement with the service offerings (Jaakkola & Alexander, 2014).

Subjective norms are viewed as a consumer’s perception of how referents (i.e., community members, family, and friends) would react (favorably or unfavorably) to an action (e.g., behavioral engagement with the patient portal) (Zhang et al., 2012). The influential power of social networks, collective needs, and subjective norms in subsistence marketplaces has been widely acknowledged in previous research (e.g., Chikweche & Fletcher, 2010; Hasan et al., 2019; M. Viswanathan et al., 2012; M. Viswanathan et al., 2014). Unlike in non-subsistence markets, most subsistence consumers rely on their families and extended social networks as ‘cushions’ for their resource deficiencies (i.e., knowledge, technology, and health literacy) and to cope with limited resources (Chikweche & Fletcher, 2010; Sridharan & Viswanathan, 2008). Word-of-mouth is therefore often more influential during these consumers’ cognitive decision-making processes, including when deciding to adopt innovations such as a patient portal (Chikweche & Fletcher, 2010).

Furthermore, subsistence consumers may experience limited access to medical physicians and nurses (M. Viswanathan, 2017). This, combined with a fractured healthcare system involving access limitations, differential treatments, and poor health literacy, can contribute to medical mistrust (Polonsky et al., 2018; van der Heijden et al., 2019; M. Viswanathan & Sreekumar, 2019). The corresponding prevalence of medical mistrust creates a significant barrier to satisfying their health and wellbeing needs (van der Heijden et al., 2019; M. Viswanathan & Sreekumar, 2019). Medical mistrust may also influence subsistence consumers’ consumption trade-off decisions, such as reducing or avoiding medical help to re-divert limited funds to care for children and/or reduce family expenses (Agarwal et al., 2020; Blocker et al., 2013; Sridharan & Viswanathan, 2008; M. Viswanathan & Sridharan, 2012). Thus, it was deemed as important in this study to understand the influence of medical mistrust on the relationship between individual resource integration, patient portal behavioral engagement, and subsistence consumer wellbeing.

This study’s literature review resulted in the development of a conceptual model (see Fig. 1). This proposed model investigates whether subsistence consumers’ resource integration affects their behavioral engagement with an engagement-facilitating technology (patient portal), and whether this in turn results in positive wellbeing. It has proposed three moderating variables that can influence this mediating (indirect) relationship: service provider resource support, subjective norms, and medical mistrust. In the following sections, these relationships are further examined and aligned with the corresponding hypotheses.

3. Hypotheses development

As outlined in Section 2.3, consumer individual resources generally relates to intangible resources such as skills, knowledge and competencies (S.L. Vargo & Lusch, 2017), which has been integrated into this study as “the processes by which customers deploy their resources as they undertake activities that will facilitate subsequent consumption/use...” (Hilbert et al., 2012, p. 3). Previous studies have suggested that antecedents such as personal characteristics and competencies can impact on technology engagement (e.g., L. Dessart, 2017; Van Doorn et al., 2010), although few have focused on subsistence consumers’ individual resource integration. Despite limited resources, subsistence consumers often innovatively leverage their unique characterizations to engage with services and technologies (Chikweche & Fletcher, 2010; Sridharan & Viswanathan, 2008; Venugopal & Viswanathan, 2017).

While consumer resource integration can overlap with how they engage with a focal product/service (L.D. Hollebeek, Sprott, et al., 2019; Sharma et al., 2017), it has also been highlighted as an important enabler and therefore an antecedent of consumer engagement (L.D. Hollebeek, 2019; L.D. Hollebeek, Sprott, et al., 2019; Tari Kasnakoglu, 2016). Findsrud, Tronvoll and Edvardsson (2018, p. 510) stated that “resource integration is performed by actors, enabled by competencies, and driven by motivation and institutional arrangements”. As such, this study has viewed individual resource integration as subsistence consumers’ incorporation, assimilation, and application of such (i.e. operant/operand) resources for consequent engagement with the focal object (i.e. patient portal), which can lead to positive consumer wellbeing (e.g., L.D. Hollebeek, 2019; L.D. Hollebeek, Sprott, et al., 2019; Skålén et al., 2015; S.L. Vargo & Lusch, 2008). It was subsequently determined in this study that the integration of subsistence consumers’ resources is the key enabler for them to engage with the patient portal (Findsrud et al., 2018; L.D. Hollebeek, 2019). Thus, it was proposed that:

H1. Subsistence consumers’ individual resource integration is positively related to their behavioral engagement with the patient portal.

Consumers’ behavioral engagement with healthcare engagement-facilitating technologies such as mobile and eHealth can increase patient wellbeing outcomes (e.g., Krist et al., 2012; Tang et al., 2012; Zide et al., 2016). Wellbeing outcomes may include an uplift in self-esteem, improved digital and health literacy, and positive changes in general quality of life (Anderson et al., 2013). Therefore, as consumers’ behavioral engagement with eHealth technologies increases, they will likely have better control of their health (i.e. increased self-efficacy), resulting in improved wellbeing. Subsistence consumers’ willingness to engage in social and health innovations can also elevate their life satisfaction, and health and wellbeing (Hasan et al., 2019; M. Viswanathan & Sreekumar, 2019). This study has therefore posited that patient portal behavioral engagement leads to improved wellbeing among subsistence consumers, subsequently proposing that:
H2. Subsistence consumers' behavioral engagement with the patient portal is positively related to their wellbeing.

Healthcare technologies such as patient portals can enable better connection between healthcare service providers and consumers of their services (Osborn et al., 2010; Tang et al., 2012; Zide et al., 2016). This can subsequently increase consumer confidence in these healthcare service providers, and encourage them to participate in health services without fear of differential treatment based on socioeconomic status and/or resource limitations such as cognitive weakness. Such increased confidence and acceptance is particularly important within subsistence marketplaces, as these have been recognized as key driver of their willingness to engage with technologies (e.g. J.S. Ancker & Kaufman, 2007; Cortis, 2012; Hibbert et al., 2012; M. Viswanathan & Sreekumar, 2019; Zide et al., 2016). Thus, engagement-facilitating technologies that promote inclusiveness are more likely to empower rather than alienate these subsistence consumers, encouraging them to integrate their individual resources to better engage with targeted technologies, which in turn will improve their wellbeing. It was therefore proposed in this study that:

H3. Patient portal behavioral engagement mediates the relationship between individual resource integration and subsistence consumers' wellbeing.

Whilst, M. Viswanathan and Sridharan (2012) contended that subsistence consumers are generally aspiring consumers that are willing to adopt innovative services that “promise to fundamentally improve life circumstances” (p. 2). It has also been suggested that these consumers’ lower health literacy, income, and access to resources levels can hinder the wellbeing benefits (Zide et al., 2016). Further, other studies correspondingly argue that meaningful engagement with eHealth technologies among subsistence individuals requires enhanced support from their healthcare service providers, to increase subsistence consumer confidence and capabilities (J.S. Ancker et al., 2011; Arcury et al., 2017; C.S. Kruse et al., 2015a, 2015b).

Furthermore, from both resource-based and service logic perspectives, it has been recognized that service provider resource support – operant or operand – can influence consumers to integrate their existing individual resources, leading to enhanced technology engagement (Cortis, 2012; Grönroos, 2011; Hibbert et al., 2012). In the context of subsistence marketplaces, it is contended that healthcare provider’s resource support leverages these subsistence consumers’ ability to meaningfully engage with technologies like the patient portal, which will then enhance their wellbeing outcomes (Agarwal et al., 2020; Arcury et al., 2017). Thus, the following hypothesis was proposed in this study:

H4. The higher the level of service provider resource support, the stronger the influence of individual resource integration on subsistence consumers’ wellbeing via behavioral engagement.

The influence of subjective norms as an extrinsic motivator of consumer engagement has been extensively studied (e.g. Chikweche & Fletcher, 2010; Hasan et al., 2019; M. Viswanathan et al., 2012; M. Viswanathan et al., 2014). They often reflect consumers’ perceived reactions and expectations of salient others (Fu et al., 2010). Some research has suggested that subjective norms can dampen autonomous behaviors in non-subistence marketplaces (e.g. Fu et al., 2010). Research in the context of subsistence marketplaces has contended that family and friends can positively influence their decision-making processes and consumption behaviors (Chikweche & Fletcher, 2010; Glavee-Geo et al., 2019; Hasan et al., 2019; Sridharan & Viswanathan, 2008; M. Viswanathan et al., 2012).

In line with this, Agarwal et al. (2020) identified that a lack of consumer engagement with healthcare systems can hinder their wellbeing. Past studies have highlighted that to mitigate this lack of engagement with the health system, there is a need to
recognize that many of these consumers leverage the opinion of their social/community network on whether they should integrate their resources for meaningful engagement with eHealth focused technologies (Glavee-Geo et al., 2019; Hasan et al., 2019; M. Viswanathan et al., 2014). It is therefore anticipated in this study that higher levels of subjective norms can influence subsistence consumer integration of their limited resources for effective behavioral engagement with targeted technologies, resulting in improved wellbeing. Thus, it was proposed that:

**H5.** The higher the level of subjective norms, the stronger the influence of individual resource integration on subsistence consumers’ wellbeing via behavioral engagement.

Trust can influence subsistence consumer engagement with healthcare services and technologies (J.S. Ancker et al., 2011; J.S. Ancker & Kaufman, 2007). M. Viswanathan and Sreekumar (2019) contended that in the absence of trust in the broader healthcare ecosystem, these consumers are less likely to engage with relevant technologies (e.g. patient portals). Medical mistrust can stem from a range of factors such as low levels of health literacy, experience of health system failure(s), fear of differential treatment, and a perceived disregard of human rights (Polonsky et al., 2018). Such distrust factors, which can be cognitive or affective, can dampen the way these vulnerable consumers engage with the healthcare system or innovation (Polonsky et al., 2018; M. Viswanathan & Sreekumar, 2019). These higher levels of medical mistrust among subsistence consumers are likely to hinder their engagement with technology-facilitated healthcare services, even though the intent and actual delivery may be positive, leading to weaker wellbeing (Barrutia & Gilsanz, 2012; Macfarlane et al., 2000). Thus, it was proposed in this study that:

**H6.** The higher the level of medical mistrust, the weaker the influence of individual resource integration on subsistence consumers’ wellbeing via behavioral engagement.

### 4. Method

#### 4.1. Data collection

To assess the conceptual model, a patient portal field study was conducted in Bangladesh, for three reasons. First, while Bangladesh has a very high annual GDP growth rate (7.86% in 2018), 24.3% of the population live below the national poverty line, indicating a large amount of subsistence consumers (Asian Development Bank, 2019). In the Bangladeshi context, individuals earning less than US$150 a month (i.e. US$5 a day) are typically characterized as subsistence (or bottom of the pyramid) consumers (Asian Development Bank, 2019; Munir et al., 2015). Second, the country has recently adopted a ‘Digital Bangladesh’ vision that emphasizes the broader and effective use of technology to improve education, health, job placement, and poverty reduction (Zaman, 2019). Third, Bangladesh has successfully integrated various social, technological, and healthcare innovations over the past decade, often targeted at subsistence consumers. For instance, investment in support initiatives has given most rural and subsistence consumers access to web-enabled smartphones and mobile financial services (Hasan et al., 2019). Furthermore, other studies have shown that Bangladesh’s subsistence consumers have a particularly high willingness to adopt new digital technologies, including mobile banking and eHealth services (Alam et al., 2019; Hasan et al., 2019).

To conduct this field study, access to a patient portal app developed by a local startup tech company and an NGO specializing in healthcare in subsistence marketplaces was obtained on a pro-bono basis. To minimize potential issues while collecting the data from subsistence consumers, such as method bias, fake responses, and non-equivalence of constructs (Ingenbleek et al., 2013), mitigation steps were taken during the design and data collection stages (Christensen et al., 2017; Ingenbleek et al., 2013). After receiving ethics clearance from a local university, this research was carried out in two stages. First, as per Ingenbleek et al.’s (2013) pre-test recommendation to refine and tailor field interventions, feedback was obtained from eight subsistence-market-focused healthcare service providers and 20 conveniently sampled subsistence consumers, to ensure relevance of the patient portal. This forum involved a demonstration of the key features of the Android-phone-enabled patient portal, including touch-enabled buttons for booking healthcare appointments, obtaining prescriptions, uploading health data, and communicating with healthcare service providers. For ease of access and navigation, these interface buttons displayed pop-up descriptive boxes when participants clicked on them (see Appendix 1 for a prototype illustration of this). The subsistence consumer participants were informed that if agreed to by them, both the research team and the healthcare service provider would have access to the patient portal behavioral engagement data. This forum also assisted the research team to refine and identify additional features for the patient portal app, including: i) making the interface design more simplistic and user-friendly through more visuals and less technical jargon (Lum et al., 2019); and ii) adding an optional text-to-speech feature that read out the pop-up descriptive boxes.

During this pre-study forum, the subsistence consumer participants were also shown the survey and asked to provide feedback on its measures and content validity. This led to minor changes in the wording of some survey items, as well as the dropping of several (see Section 4.3). Feedback was also sought from forum participants on the number of days the app should be trialed targeting subsistence consumers, based on whether it would be feasible for healthcare service providers and patients to engage with the portal. A 45-day trial period was subsequently selected as an appropriate length of time. Both at this forum and during the second data collection stage (as discussed below), the questionnaire and patient portal interfaces were presented in Bengali. They were first written in English and then translated into Bengali by the research team, and then back-translated into English by a team of bilingual business academics. These rigorous techniques ensured functional and conceptual equivalence of both the patient portal interfaces and survey items during the translation process (Orth & Holancova, 2004).
Second, the NGO provided a list of 285 healthcare service providers that generally service subsistence consumers. Given the complex nature of the current study and drawing on their past interactions with healthcare service providers in Bangladesh, the NGO recommended the research team to make initial contacts via phone calls followed by in-person visits. This was suggested to enhance the likelihood of attaining healthcare service providers’ consent to participate in this study. Adhering to this recommendation and taking into account the time and budget constraints, the research team decided to narrow down the list of healthcare service providers that could be approached for possible participation in this study. Subsequently, a systematic selection sampling technique was applied using the Complex Samples function in IBM SPSS 25, to generate a refined representative list of 150 healthcare service providers (≈ 50% of 285 cases) (IBM Corp., 2017). Of the 150 approached, 26 healthcare service providers agreed to participate in this study. These providers spread across three major cities in Bangladesh (i.e. Dhaka, Chittagong, and Rangpur).

These healthcare service providers were asked to use the patient portal to provide additional support to their clients/patients for a period of 45 days. They were informed that all relevant medical data would be confidential and will not be retained by the research team. The field study was promoted by these healthcare providers to subsistence consumers who used their services, and over a two-week period they installed the patient portal app (using an APK file format) to Android mobile devices of those clients (i.e. individuals) that agreed to participate. The trial app was designed so that after 45 days of usage, it was automatically deactivated. The startup tech company helped to install the application and provide any necessary technical training and support to the participating healthcare providers. This included training them to install the app for those subsistence consumers visiting their healthcare practice and voluntarily choosing to use it from their own Android-enabled devices. At the completion of the 45-day period, subsistence consumers (users of the patient portal app) were interviewed using systematic random sampling (Andaleeb, 2001) and surveyed about their patient portal experience.

At the conclusion of the field study, with the healthcare provider’s approval, the research team asked individuals in each healthcare provider’s waiting area that had the last appointment at the end of every hour, whether they would participate in the survey. Those individuals who agreed were asked simple screening questions to ensure they met the criteria, including being briefed about the typical income range of subsistence consumers in Bangladesh (i.e. less than US$5 a day). They were also asked if they had used the patient portal since their last visit to the healthcare provider and about the randomly generated, four-digit user ID assigned to them by the app. This helped the research team to match survey responses to actual interactions (i.e. behavioral engagement) with the patient portal. Those participants that qualified were provided with a plain language letter explaining the entire project, including ethics clearance, which was read out to them if requested.

As generally subsistence consumers have limited literacy (Hasan et al., 2019), this study’s survey was administered verbally by research assistants that recorded the responses with pen and paper (Ingenbleek et al., 2013). The respondents were asked about their individual resource integration, healthcare provider’s resource support, medical mistrust, and wellbeing (in random order) in relation to their 45 days of patient portal interactions. In total, 336 valid subsistence consumer (patient) responses were collected. This included 58.6% males and 41.4% females. Most participants’ education levels were below high school (46.7%), which is representative of the subsistence consumer segment, and they were mainly in the 16–25 year (40.2%) and 26–35 years (33%) age brackets, similar to other studies focused on subsistence marketplaces (e.g. Hasan et al., 2019).

4.2. Measurement instruments

All of this study’s measurement instruments were adapted or refined from previous research (see Table 1). For example, several former studies determined that consumers’ individual resources are comprised of three main dimensions – competencies, knowledge, and skills – capable of acting on operand resources (e.g. Barrutia & Gilsanz, 2012; L.D. Hollebeek & Andreassen, 2018; S.L. Vargo & Lusch, 2008). Drawing on this, this study used three items related to knowledge, skills, and competencies when measuring the individual resource integration construct. A review of the literature also indicated that three items representing the developmental interactional capability component of the broader service-dominant orientation scale (Karpen et al., 2015) measured service provider resource support in general. These three items were consequently adapted to the healthcare service provider context of this study (see Table 1). Furthermore, Polonsky et al.’s (2018) seven-item medical mistrust scale was tested among subsistence consumers during the pre-study phase, where four of the items were determined as acceptable content validity for this study (see Table 1). Lastly, subjective norms was measured via three items adopted from Hasan et al. (2019), while subsistence consumer wellbeing was measured via three items adopted from Ryff (2014) and Sharma et al. (2017).

Former studies have used the psychometrically validated, multi-dimensional consumer engagement measure (e.g. L.D. Hollebeek et al., 2014; Vivek et al., 2014), and some have used directly observable user-generated behaviors such as log-ins, check-ins, word-of-mouth, frequency, and recency of usage (e.g. Jaakkola & Alexander, 2014; V. Viswanathan et al., 2017). As justified earlier, this study takes a behavioral viewpoint of the engagement construct. Subsequently, an array of rich and directly observable behaviors extracted from the portal app were used in this study to measure behavioral engagement. These behaviors included: i) # of times app was visited (used) (M = 6.9; SD = 1.74); ii) # of times interacted via messaging option (M = 6.45; SD = 1.33); and iii) amount of time spent (in minutes) per visit (i.e. between log-in and log-out) (M = 8.14; SD = 0.96). These three items representing patient portal behavioral engagement were individually standardized prior to their inclusion in the structural model path analysis (see Section 5).

4.3. Control variables

Three demographic variables – gender, age and, education – were statistically controlled that could potentially influence subsistence consumers’ portal behavioral engagement and their wellbeing. Gender was coded as male = 1 and female = 2. As the remaining control variables contained multiple categories, dummy codes were created for each of them by selecting the most
prominent category as the reference group. For example, education was measured across four categories – below high school, high school, college, and graduation or above – and as below high school had the highest amount of participants, it was determined as the reference group (Fujimoto et al., 2016).

4.4. Reliability and validity

A multi-factor confirmatory factor analysis (CFA) was conducted using AMOS 25, which showed acceptable model fitness indices $\chi^2 / df = 2.3$; Goodness of Fit Index (GFI) = 0.94; Comparative Fit Index (CFI) = 0.94; Tucker-Lewis Fit Index (TLI) = 0.93; Incremental Fit Index (IFI) = 0.94; Root Mean Square Error of Approximation (RMSEA) = 0.06; Standardized Root Mean Square Residual (SRMR) = 0.03 (Hair et al., 2010).

As shown in Table 2 below, composite reliability values for each measure were greater than 0.80, and the average variance extracted (AVE) values were greater than 0.5, indicating that all the latent constructs hypothesized in this study had adequate reliability and convergent validity. Furthermore, the square root of AVE of each construct was greater than inter-construct correlations, and all heterotrait-monotrait ratio of correlations (HTMT) values were below the suggested level of 0.85, which demonstrated discriminant validity (Hair et al., 2010; Henseler et al., 2015).

4.5. Common method variance bias tests

The actual consumer behavioral engagement data was extracted from the patient portal, which prevented common method variance (CMV) bias from arising from a single source, or self-reported data (Podsakoff et al., 2003). Furthermore, it was ensured that responses were kept anonymous, and it was made clear there were no right or wrong answers to prevent evaluation hesitation, which also assisted in minimizing CMV bias. As other latent constructs in the conceptual model, outside of the behavioral engagement measure, were self-reported by respondents (i.e. users of the portal app), the marker variable technique was used to test for the presence of any CMV bias (Bagozzi, 2011). A theoretically unrelated latent construct – attitude toward mobile advertising – manifested via three items was used as the marker variable (Lindell & Whitney, 2001). All correlations between the independent and dependent variables remained statistically significant after the inclusion of the marker variable, which also indicated no CMV bias within this study’s data (Bagozzi, 2011).

### Table 1

| Measurement items | SMC$^a$ |
|-------------------|--------|
| Consumer wellbeing |        |
| The patient portal provided me with better sense of control (i.e. autonomy) in regard to my healthcare. | 0.45 |
| The patient portal provided me with better sense of confidence (i.e. competence) in regard to my healthcare. | 0.77 |
| This patient portal provided me with better sense of building trusting relationships with others (i.e. relatedness) in regard to my healthcare. | 0.94 |
| Consumer behavioral engagement |        |
| In the last 45 days |        |
| # of times interacted through messaging option | 0.61 |
| Time spent each time the app was visited | 0.81 |
| # of times the app was visited | 0.80 |
| Consumer resource integration |        |
| In regard to the patient portal |        |
| I have used my knowledge to use this service successfully. | 0.77 |
| I have used my skills to use this service successfully. | 0.67 |
| I was competent (capable) to use this service successfully. | 0.74 |
| Provider resource support |        |
| In regard to the patient portal, my healthcare service provider |        |
| Shared useful information. | 0.77 |
| Provided good technical support when needed. | 0.78 |
| Provided the advice I needed to use this service successfully. | 0.73 |
| Subjective norms |        |
| People (e.g. family, friends, community leader) who are important to me recommended me to use the patient portal. | 0.71 |
| People (e.g. family, friends, community leader) who influence my behavior found using the patient portal would be beneficial for me. | 0.68 |
| People (e.g. family, friends, community leader) whose opinions that I value thought using the patient portal was a good idea. | 0.75 |
| Medical mistrust |        |
| You’d better be cautious when dealing with healthcare organizations/providers. | 0.65 |
| Patients have sometimes been deceived or misled by healthcare organizations/providers. | 0.66 |
| When healthcare organizations/providers make mistakes, they usually cover it up. | 0.76 |
| Sometimes I wonder if healthcare organizations/providers really know what they are doing. | 0.73 |

$^a$ Squared multiple correlations.
was also found as signif-
ificant. As shown in Table 4, the moderation analysis also pro-
support for H6, in that the results show negative and signif-
icant. Fig. 2(B) illustrates that the mediated relationship between individual resource integration and con-
teved as medical mistrust increases. To con-
icts were marginally different from the SEM path coef-
Direct and mediated path results.

Table 2
Correlations between measures.

| Mean | SD   | CR   | AVE   | Gen | Edu | Age | PRS | CRI | PPE | WB  | MM | SN |
|------|------|------|-------|-----|-----|-----|-----|-----|-----|-----|----|----|
| Gen  | –    | –    | –     | –   | –   | –   | –   | –   | –   | –   | –  | –  |
| Edu  | –    | –    | –     | –   | –   | –   | 0.05| –   | –   | –   | –  | –  |
| Age  | 34   | 7.2  | 0.91  | 0.76| 0.11| –   | –0.08| 0.05| –   | –   | –   | –  |
| PRS  | 7.4  | 1.3  | 0.91  | 0.76| 0.11| –   | –0.01| –0.04| 0.87| 0.85| 0.84| –  |
| CRI  | 7.3  | 1.4  | 0.89  | 0.73| 0.11| 0.04| –   | –0.04| 0.74*| 0.85| 0.86| –  |
| PPE  | –    | –    | 0.90  | 0.74| 0.14| 0.02| –   | –0.11| 0.81*| 0.67*| 0.84| –  |
| WB   | 5.2  | 1.3  | 0.88  | 0.71| 0.03| 0.06| –   | –0.05| 0.58*| 0.56*| 0.56*| 0.84|
| MM   | 3.1  | 1.5  | 0.91  | 0.71| –   | 0.04| 0.10| –0.82*| –0.70*| –0.67*| –0.53*| 0.84|
| SN   | 7.0  | 1.2  | 0.88  | 0.72| 0.09| 0.03| –   | –0.02| 0.79*| 0.49*| 0.54*| 0.42*|

* Correlation is significant at the 0.05 level; SN = subjective norms; PRS = provider resource support; CRI = consumers’ individual resource integration; PPE = patient portal engagement; WB = wellbeing; MM = medical mistrust; Gen = gender; Edu = education; square root of the AVE for each construct is shown on the diagonal; CR = composite reliability; AVE = average variance extracted; n = 336.

5. Structural model results

5.1. Direct and mediating effects

Prior to analyzing the direct and mediated path effects, a full structural model was run that showed acceptable fit indices ($\chi^2/df = 1.99$; CFI = 0.98; TLI = 0.97; RMSEA = 0.05; SRMR = 0.03). A power test of the structural model was also conducted, which showed a value of 1, indicating the dyad sample size of 336 was adequate to test this study’s hypothesized relationships (MacCallum et al., 1996). The results of the direct path analysis showed a significant and positive relationship between subsistence consumers’ individual resource integration and patient portal behavioral engagement ($\beta = 0.37$, $p < .01$), thereby supporting H1 (see Table 3). It was also found that patient portal behavioral engagement was directly and significantly related to wellbeing ($\beta = 0.40$, $p < .01$), thus providing support for H2. The analysis also identified that patient portal behavioral engagement significantly mediated the relationship between individual resource integration and subsistence consumers’ wellbeing ($\beta = 0.15$, $p < .01$), providing support for H3.

5.2. Moderating effects

The moderation analysis was conducted using SEM, where the interactions were estimated one at a time (similar to the approach applied by Homburg et al., 2010). The moderation analysis identified that the interaction between service provider resource support and subsistence consumers’ individual resource integration was significant and positive ($\beta = 0.08$, $p < .01$), indicating the relationship between individual resource integration and patient portal behavioral engagement is moderated by the level of provider resource support (see Table 4). The analysis also suggested support for H4, as zero did not fall between the upper and lower CIs for the index of moderated mediation value (i.e. 0.01). Further probing of this moderated mediation effect between low (-1SD) and high (+1SD) values, as shown in Fig. 2(A), suggests that higher levels of provider resource support strengthens the mediated relationship between individual resource integration and wellbeing.

The moderation analysis also shows significant and positive interaction between subjective norms and individual resource in-
tegration ($\beta = 0.07$, $p < .01$), indicating that subjective norms moderates the relationship between individual resource integration and patient portal behavioral engagement. The index of moderated mediation was also found to be significant, thereby providing support for H5 (see Table 4). Fig. 2(B) illustrates that the mediated relationship between individual resource integration and con-
sumer wellbeing is strengthened as the level of subjective norms increases. As shown in Table 4, the moderation analysis also pro-
vides support for H6, in that the results show negative and significant interaction between medical mistrust and individual resource integration ($\beta = -0.09$, $p < .05$). The index of moderated mediation value for the conditional effect of medical mistrust was also found to be significant. Fig. 2B further illustrates that the mediated relationship between individual resource integration and consumer wellbeing is weakened as medical mistrust increases. To confirm the robustness of the SEM results, the hypothesized direct, mediated, and moderated relationships were also run via generalized linear modelling (GLM). While the GLM path coefficients were marginally different from the SEM path coefficients, their significance levels and directions remained the same.

Table 3
Direct and mediated path results.

| Direct effects | Indirect effect |
|---------------|---------------|
| Effect SE p Lower CI Upper CI Conclusion |
| CRI → PPE 0.37 0.04 0.00 0.29 0.45 H1: Supported |
| PPE → WB 0.40 0.09 0.00 0.23 0.58 H2: Supported |
| CRI → PPE → WB 0.15 0.04 0.00 0.08 0.23 H3: Supported |

CRI = consumers’ individual resource integration; PPE = patient portal behavioral engagement; WB = wellbeing (outcome variable); MM = medical mistrust (moderating variable); CI = confidence interval (95%).
They have also indicated that increased provision of resource support will enhance service provider resource support facilitates the development and integration of consumers’ resources to better engage with provider’s relationships with consumers, including the building of trust and (behavioral) engagement with technological innovations (e.g. J.S. Ancker et al., 2011; J.S. Ancker & Kaufman, 2007; Cortis, 2012; Hillbert et al., 2012; M. Viswanathan & Sreekumar, 2017). These results also suggest that subsistence consumers’ behavioral engagement with technologies (e.g. patient portal) positively impacts on their wellbeing outcomes (H2). Past studies have often focused on the psychological benefits of engaging with eHealth technologies, mostly in a non-subsistence context, such as improved ability to track health information, and greater communications and collaborations with healthcare providers (Kruse et al., 2015; Sieck et al., 2018). This study contributes to this existing literature by showing that subsistence consumers' behavioral engagement with healthcare technologies like the patient portal (i.e. focal object) is more likely to occur when subsistence consumers integrate their individual operant resources such as skills, knowledge, and competencies. This further validates the importance of factoring in the distinct consumer resources within the subsistence marketplace context (Azmat et al., 2015; M. Viswanathan, 2017). This study also contributes to the literature by uncovering that the links between individual resource integration, behavioral engagement with wellbeing outcomes (J.S. Ancker et al., 2011; Dalrymple et al., 2018). This study contributes to this existing literature by showing that subsistence consumers’ behavioral engagement with healthcare technologies like the patient portal can lead to a better sense of control, confidence, and relatedness, all of which represent positive wellbeing outcomes. The results also indicate that patient portal behavioral engagement mediates the relationship between subsistence consumers' resource integration and wellbeing (H3). This implies that the link between individual resource integration and consumer wellbeing is more achievable when it is via their behavioral engagement with a focal technology, such as the patient portal. This further validates Davey and Grönroos’s (2019, p. 1) argument that “successful resource integration influences transformative outcomes at the actor level through wellbeing and mutual value creation”.

This study also contributes to the literature by uncovering that the links between individual resource integration, behavioral engagement with wellbeing, and wellbeing are dependent on three key variables that are particularly relevant to subsistence marketplaces: provider resource support (H4); subjective norms (H5); and medical mistrust (H6). Previous studies have suggested that service provider resource support facilitates the development and integration of consumers’ resources to better engage with technologies (e.g. Cortis, 2012). They have also indicated that increased provision of resource support will enhance service provider’s relationships with consumers, including the building of trust and (behavioral) engagement with technological innovations (e.g. J.S. Ancker et al., 2011; J.S. Ancker & Kaufman, 2007; Cortis, 2012; Hilbert et al., 2012; M. Viswanathan & Sreekumar, 2019). Yet none of these studies have empirically tested whether service provider resource support can influence the link between resource integration and wellbeing via the use of behavioral engagement-facilitated technologies among subsistence consumers. This study’s results have addressed this research gap by identifying that service provider resource support (H4) can strengthen the relationship between consumers’ resource integration and wellbeing via behavioral engagement-facilitating technology such as the patient portal.
In addition, subjective norms have been recognized as underpinning almost all daily life activities within subsistence marketplaces, including attitudes and behaviors toward healthcare technologies (Chikweche & Fletcher, 2010; Hasan et al., 2019; M. Viswanathan, 2017). This study provides further empirical confirmation of the role that subjective norms (H5) play in strengthening the positive relationship between subsistence consumer resource integration and wellbeing via their behavioral engagement. Lastly, medical mistrust has been identified as a major issue when it comes to subsistence consumer health decisions, largely

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**Fig. 2.** Graphical illustration of the moderated mediation effects A. Moderating effects of provider resource support B. Moderating effects of subjective norms C. Moderating effects of medical mistrust Note: The moderated mediation effect of consumers’ individual resource integration on subsistence consumers’ wellbeing at different levels of the a) providers resource support, b) subjective norm and c) medical mistrust are represented by the black solid line; 95% CI of the estimates are framed by the two dashed lines.
due to negative beliefs and attitudes toward health systems, and fear of differential treatment (Polonsky et al., 2018; M. Viswanathan & Sreekumar, 2019). This study’s results support this notion by showing the dampening effect of medical mistrust (H6) on the relationship between individual resource integration, behavioral engagement, and wellbeing. The next section discusses the managerial implications of this study’s results.

6.2. Managerial implications

This study provides valuable implications for those invested in alleviating the burden of poverty on consumer wellbeing in subsistence marketplaces (e.g. policymakers, NGOs, service providers). The significant direct and mediated relationships identified in this study inform policymakers and practitioners that subsistence consumers have the capacity to assimilate their individual resources to behaviorally interact with targeted engagement-enabled technologies, which also improves their wellbeing. This study also provides imperatives on how to make such technologies (e.g. the patient portal) more appealing for specific market segments, such as subsistence consumers. For example, service providers could ensure engagement-facilitating technologies are tailored to specific market needs, as done in this study’s pre-test phase, to make them more user-friendly. This could include incorporating illustrations and videos and using layman language.

Furthermore, this study’s results in relation to the three moderators (service provider resource support, subjective norms, and medical mistrust) provide key imperatives for policymakers and service providers that are focused on subsistence marketplaces. First, it would appear that increasing provider resource support strengthens subsistence consumers’ individual resource integration and patient portal behavioral engagement, and improves their wellbeing. It is therefore recommended that healthcare service providers escalate their resource support, such as providing increased levels of information and technical support. In the context of this study, healthcare practitioners could ‘check in’ on how the patient is engaging with the portal during medical consultations, ensuring they understand the information and are meaningfully engaging with it.

Second, this study has identified that subjective norms (i.e. influence of friends, family, and peers) can enhance behavioral engagement and wellbeing levels among subsistence consumers. Thus, policymakers and service providers should leverage the strong social fabric that is particularly prevalent among subsistence communities (M. Viswanathan & Sreekumar, 2019), such as via a direct, interactive, and collaborative approach. For example, local government, NGOs, and healthcare service providers could immerse themselves in these community(s) by organizing and hosting face-to-face community education to demonstrate and communicate the benefits of a patient portal, including training them on how to use it. They could also provide community leaders with more extensive training and/or recruit them to help to positively influence widespread adoption and engagement of the portal (M. Viswanathan, 2017).

The results of this study have also identified that when there is a lack of medical trust among subsistence consumers, this weakens their likelihood of engaging with the technology (e.g. patient portal) and can thereby reduce their wellbeing. Fragmented health system delivery characterized by perceived mistrust of healthcare providers in subsistence marketplaces often impedes their engagement and participation in the health system (van der Heijden et al., 2019; M. Viswanathan & Sreekumar, 2019). This may be difficult for individual healthcare service providers to mitigate. Such a phenomenon has become more apparent during the current COVID-19 pandemic crisis, where the health systems of most developing countries are struggling to equitably offer health services to subsistence consumers. This will likely hinder their engagement with the health system (Mahmood et al., 2020). Thus, the building of trust of healthcare systems requires an integrated and targeted approach from a macro-level perspective, to authenticate and qualify healthcare service delivery including innovations, involving multiple key stakeholders (e.g. government bodies, healthcare providers, NGOs, tech companies, policymakers) (Mahmood et al., 2020; van der Heijden et al., 2019).

From a micro-level perspective, it is important for policymakers and healthcare service providers to directly learn about and include the voice of subsistence consumers. This may assist healthcare service providers and the healthcare system itself to deliver on strategies and tactics to mitigate any perceived medical mistrust among subsistence consumers. For instance, the consultative approach in the pre-test phase of this research made the participating consumers feel heard and valued. This consequently helped in the development and delivery of a customized patient portal app for subsistence consumers to engage with, leading to improved wellbeing outcomes. Such genuine behavioral engagement will not only help to ensure appropriate technological solutions are applied, but will also help to build stronger medical trust among subsistence consumers. To illustrate, with so many mixed messages circulating, the present COVID-19 pandemic crisis highlights the importance of digitally communicating (perceived) trustworthy public health messages that are able to reach the broader subsistence community. Furthermore, delivering on-site health services adhering to social distancing requirement, may pose a challenge for healthcare providers servicing subsistence consumers (Mahmood et al., 2020). Patient portals, therefore, can serve as both an authentic platform for the timely dissemination of public health messages during emergency health outbreaks, and enable the delivery of basic health services to the subsistence community, which is often hard to achieve.

7. Limitations and future research

Ingenbleek et al. (2013) contended that various predispositions can eventuate when undertaking research in subsistence marketplaces, including construct, method, and item biases. Several steps were subsequently undertaken in this study to mitigate such risks. For example, to mitigate any possible biases such as recall, social desirability as well as any issues arising from using only single-sourced/self-reported measures, this study used a broad array of subsistence consumers’ actual behavioral engagement with the patient portal app, which is an advantage in the context of this study. However, as with any type of social research,
this study is not without its limitations. For example, the data was collected from subsistence consumers in a healthcare service context, which may not be entirely generalizable to non-subsistence aspirants, middle- or higher-end consumer segments, and in other cultural contexts. Future research could therefore test whether this study's conceptual model holds in different cultural or non-subsistence marketplace contexts. Due to the nature of data confidentiality in a patient portal setting, assessing the actual contents that reflect the cognitive and emotional aspects of engagement with the patient portal app and their healthcare providers was not possible. Thus, it is suggested that in future research settings where users' comments are readily available such as social media engagement-facilitating platforms, can integrate an assessment of this subjective data (see for e.g. Fletcher-Brown et al., 2020, in press) to complement user-generated actual behavioral engagement data.

In addition, there might be other antecedents that could be applied to examine how consumers engage with technologies (e.g. L. Dessart, 2017), which future studies could investigate. Lastly, as engagement-facilitating technologies can influence consequences other than consumer wellbeing, it is suggested that future studies develop other dependent variables of interest such as consumer experiences with their healthcare service providers.

Appendix 1. Prototype visuals of the patient portal interface

English version
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