Digital Health Information Seeking in an Omni-Channel Environment: A Shared Decision-Making and Service-Dominant Logic Perspective

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ABSTRACT

The health service ecosystem traditionally has focused on unidirectional information flow from the health provider to consumer. However, this model fails to adequately engage consumers in their health decision-making to improve consumers’ wellness. Consumers’ health information seeking in today’s omni-channel information environment is a critical value co-creation activity that increases consumers’ engagement. Yet little is known about how consumers’ health information seeking is evolving the information flow pattern and resulting consequences on consumers’ health self-awareness. Our study closes this gap by exploring the effects of consumers’ health information seeking in an omni-channel environment and its influences on consumers’ health self-awareness. The results demonstrate the importance of helping consumers integrate informational inputs outside the service encounter to increase consumers’ engagement and conscious reflection on their well-being.

Keywords: value co-creation, service-dominant logic (SDL), shared decision-making (SDM), omni-channel, health information seeking
INTRODUCTION

Over the past decade, legislative actions and political discourse have intensified the attention paid to consumers’ wellness. Beyond increasing access to care, a primary focus of this debate has been how to reduce preventable chronic diseases (Makarem et al. 2014; Williams et al. 2010). Despite these efforts, data indicate obesity and other chronic health conditions remain prevalent (Flegal et al. 2012), resulting in substantially higher health care costs and negative health outcomes (Centers for Disease Control and Prevention 2017). Because of this, calls to action have been made by scholars and practitioners for research exploring ways to transform the health care service ecosystem to create superior consumer wellness (Anderson and Ostrom 2015; Anderson et al. 2013).

The conventional health care delivery model views the health provider rather than consumer as the central figure in health value creation (Pollard et al. 2015). Viewed in the context of health providers as experts, provider-patient health solutions have been primarily unidirectional in nature, with information flows initiated by health providers and then passed on to consumers (Wald et al. 2007). A paternalistic view of health providers as the sole medical authority decreases consumers’ involvement in the decision-making process (Joseph-Williams et al. 2014), limiting the effect on health value creation (Makarem et al. 2014). Unidirectional information flows appear even less effective when considering that providers spend relatively little time interacting with patients one-on-one (Légaré and Witteman 2013), leaving it up to consumers to reflect on how the prescribed decisions and recommendations may affect their personal well-being (Adkins and Corus 2009; Bublitz et al. 2013). A lack of shared decision-making (SDM) leads to less adherence to physician-recommended pro-health behaviors and lifestyle choices, limiting the impact on consumer well-being (Makarem et al. 2014; Seiders et al. 2015). Health care initiatives are thus needed in which consumers are active co-participants in creating and implementing personal wellness-enhancing solutions (Sweeney et al. 2015).

Viewed through service-dominant logic (SDL) theory, health value co-creation only occurs if consumers become active participants in managing their well-being, and particularly through ongoing information acquisition and exchange with their health providers prior to, during, and after health care
service encounters (McKinley and Wright 2014). SDM is thus a requisite condition for value co-creation, and has been shown to not only enhance desired health care outcomes, but to lower health care costs as well. Engaged consumers in the SDM process are also more likely to feel accountable for their health, adapt healthy lifestyle choices, and be more satisfied with their health services encounters (Glass et al. 2012).

A growing stream of research examines how physician-patient value co-creation is transforming the health service ecosystem away from provider-directed informational flows to information seeking practices in which consumers fully participate in their wellness-enhancing treatments and behaviors (McColl-Kennedy et al. 2017a). This interest has been driven in part by the emergence of the Internet and new omni-channel communication platforms that increase consumers’ informational access and empower their decision-making outside of the service encounter (Labrecque et al. 2013). Storbacka et al. (2016) contend that omni-channel information seeking and resource integration are foundational value co-creation elements in the service delivery process. Through information seeking, consumers increase their health knowledge, become more engaged in their health and wellness journey, and achieve improved health outcomes in conjunction with their health providers (Durand et al. 2014).

Despite the emerging omni-channel environment, research is lacking that collectively examines consumers’ information seeking via diverse omni-channel platforms (Pandey et al. 2013; Saghiri et al. 2017). For example, consumers increasingly have access to their health records via online portals, allowing consumers to conveniently exchange and review health information with their health providers (Otte-Trojel et al. 2014). Consumers that integrate digital trackers into their daily lives can more easily monitor their health status (Pandey et al. 2013), and therefore may increase their motivation to make conscious decisions to improve their well-being. Yet, little is known about the consequences of this information seeking on consumers’ health self-awareness as part of consumers’ evolving value co-creation roles (McColl-Kennedy et al. 2017b). As a result, research exploring consumers’ resource integration in this omni-channel environment is of increasing value (Storbacka et al. 2016). Furthermore,
empirical research that examines how consumers jointly participate with service providers to co-create value remains lacking (Vargo and Lusch 2017).

The purpose of our study is to explore the consequences of consumers’ omni-channel health information seeking on their health self-awareness – a precursor to improving consumers’ well-being (Adkins and Corus 2009). While research shows consumers increasingly have access to information from omni-channel sources (Saghiri et al. 2017), research is lacking that explores how these resources jointly impact consumers’ health self-awareness. Research is also lacking that explores what motivates consumers to integrate diverse omni-channel information sources, including sources where health marketers tend to have less control such as social media (Storbacka et al. 2016). Our study contributes to the transformative consumer literature by examining how health providers can activate consumers’ engagement in a SDM and omni-channel environment to enhance consumers’ health self-awareness (Anderson and Ostrom 2015; Anderson et al. 2013). First, the findings demonstrate health providers that support SDM enhance consumers’ health self-awareness by increasing consumers’ involvement in the SDM process. Second, consistent with value co-creation, health providers can enhance consumers’ self-awareness by encouraging consumers to seek out digital information in the emerging omni-channel environment. In particular, consumers become more mindful of their health status when motivated to seek out external digital health information. In combination, the findings contribute to the value co-creation literature by demonstrating how health providers can leverage consumer involvement in SDM to increase consumers’ concerns for their well-being.

LITERATURE REVIEW

Service-Dominant Logic (SDL)

Over the last decade, the SDL perspective has received increased attention as marketers seek ways to facilitate consumers’ value co-creation (Vargo and Lusch 2017). SDL indicates consumers jointly create value along with service providers (Vargo and Lusch 2004; Vargo and Lusch 2008). However, the emerging SDL perspective considers consumers to be the central actors in defining value created as a result of the service exchange (Grönroos and Ravid 2011; Grönroos and Voima 2013). SDL implies
marketers responsible for service design must consider how to incorporate processes that encourage service providers to support consumers’ value co-creation efforts (McColl-Kennedy et al. 2017a; Sweeney et al. 2015).

The quality of personal interactions between the service provider and consumer are thus a critical component in encouraging consumers’ involvement in value co-creation (Yi and Gong 2013). Yet, in an interpersonal service exchange ecosystem such as health care, this restricts service providers’ direct influence on value co-creation to the limited time spent during the service encounter (Grönroos and Ravald 2011). Service providers may extend their influence by directing customers to engage in value co-creation activities beyond the service encounter (McColl-Kennedy et al. 2017a). While a variety of co-creation activities exist, facilitating consumers’ information seeking enables consumers to participate in value co-creation by increasing consumers’ self-awareness within the service ecosystem (Grönroos and Voima 2013; Yi and Gong 2013). Therefore, service providers can enhance consumers’ value co-creation efforts by helping consumers integrate information from a combination of service provider and external resources (Grönroos and Ravald 2011). Although the SDL literature is growing, research is necessary that empirically examines the value co-created via resource integration (Vargo and Lusch 2017).

**Value Co-Creation & Consumers’ Well-Being**

The SDL perspective on value co-creation contends that consumer engagement in the health services delivery process is instrumental to maximizing value creation (Vargo and Lusch 2004; Vargo and Lusch 2017; Vargo and Lusch 2008). Consumers’ roles in the health care delivery process are evolving as consumers engage in co-creation activities and become more active participants (McColl-Kennedy et al. 2017b). Recent research highlights the positive benefits consumers’ value co-creation activities have on well-being (McColl-Kennedy et al. 2017a). Consequently, researchers are increasingly interested in ways to support consumers’ participation in value co-creation in order to transform health care delivery and positively affect consumers’ well-being (Anderson and Ostrom 2015).
Bublitz et al. (2013) show that increasing consumers’ deliberate reflection on their well-being may encourage consumers to engage in positive health behaviors. Consumers are more likely to adopt this requisite mindful approach to their health decisions when sufficiently motivated to consciously reflect on their health status (Gould 1988; Gould 1989). Yi and Gong (2013) suggest customers participate in value co-creation via information seeking/sharing and by developing strong interpersonal relationships with the service provider. Additionally, engaging consumers in critical reflection about their health status empowers consumers to be co-creators of their health decisions and improves health outcomes (Adkins and Corus 2009). This premise aligns with consumers’ evolving participation in health value co-creation activities, suggesting that encouraging consumers’ information seeking and critical reflection may strengthen involvement and affect well-being.

Information Seeking in the Omni-Channel Environment

Research on the omni-channel environment typically examines omni-channel from an organizational perspective given its potential to deliver consistent messaging and present a unified brand experience (Bell et al. 2014; Saghiri et al. 2017). Theoretically, omni-channel combines the principles of consistent messaging with the interactive use of multiple channels to enhance consumer engagement via a synchronized cross-channel experience (Cummins et al. 2016). Increasing consumer engagement represents a growing area of interest in the value co-creation literature (Vargo and Lusch 2017), including how it relates to omni-channel resource integration (Storbacka et al. 2016).

Niederdeppe et al. (2007) describe consumers’ active efforts to acquire specific health information as health information seeking. Consumers that engage in health information seeking can enhance their decision-making, leading to better health outcomes (Rains 2014). The emergence of new omni-channel platforms allows consumers to seek out health information from a variety of interpersonal and digital platforms (Saghiri et al. 2017). The rise of digital media requires that marketers first acknowledge consumers’ evolving channel preferences (Bell et al. 2014), and adjust information flow patterns to help consumers seamlessly integrate health information from multiple channels and platforms.
into the value co-creation process (Storbacka et al. 2016). Health providers that enable consumers’ health information seeking across omni-channel platforms may thus enhance consumer engagement in value co-creation activities and improve health outcomes (McColl-Kennedy et al. 2012; Sweeney et al. 2015). However, research is necessary that explores the resulting information flows and the impact on consumers’ critical reflection on their health status as part of the SDM process (Yadav and Pavlou 2014).

Figure 1 presents a conceptual model of the omni-channel information environment where consumers may turn for health information. Labrecque et al. (2013) note consumers’ increased access to information channels not directly under the marketers’ influence is shifting the balance of power and thus empowering consumers’ decision-making. We propose health providers retain greater control over information shared via interpersonal communications and the health providers’ digital presence. Interpersonal communications include the personal interactions that occur during the service encounter or via phone conversations. The providers’ digital presence comprises the service providers’ websites and consumers’ e-health records accessed via an online health portal (Otte-Trojel et al. 2014). These two digital information sources represent platforms the service provider has the most control over the information flow (Saghiri et al. 2017; Storbacka et al. 2016). Finally, external digital information sources signify digital platforms where health providers have less control over the information shared. In the context of this study, these fragmented external digital information sources include health/wellness apps, blogs, digital videos, forums, and social media where information is user-generated and/or produced/shared by outside organizations (Adams 2010; Baird and Nowak 2015).

MODEL DEVELOPMENT AND HYPOTHESES
The SDL perspective predicts that both provider and external digital resource inputs are important to enhancing customer value co-creation (Grönroos and Raval 2011). Consistent with omni-channel marketing, consumers are likely to utilize information obtained across omni-channel platforms (Saghiri et al. 2017). However, what is less clear is how these resources jointly influence consumers’ reflection on their health awareness. As shown in figure 2, our study addresses this gap by examining consumers’
health information seeking within the omni-channel environment and resulting influence on consumers’ health self-awareness. Our model encompasses consumers’ health awareness in an omni-channel environment. Consistent with value co-creation, our model explores how consumers’ health information seeking enhances consumers’ deliberative reflection on their health, leading to health self-awareness. We first define health self-awareness, and then discuss the hypothesized relationships leading to health self-awareness.

**Health Self-Awareness**

Health self-awareness reflects consumers’ mental orientations or conscious thoughts and concerns regarding their health status (Gould 1988; Gould 1989; Hong 2011; Hong 2009). Consumers engaged in reflective thinking about their health synthesize all available information to learn more about their health status and make informed decisions (Bublitz et al. 2013). Consumers with heightened awareness of their health status tend to be more cognizant of their wellness needs, increasing their ability to integrate relevant information into the value co-creation process (Adkins and Corus 2009). Highly aware consumers also are more likely to identify and reduce behaviors that negatively influence health outcomes (Frosch and Elwyn 2014). In combination, this elevated self-awareness increases internal motivation to engage in decisions that help maintain a healthy lifestyle (Moorman and Matulich 1993).

**Direct Antecedents to Health Self-Awareness**

**Physicians’ SDM-Orientation and Health Self-Awareness:** Effective SDM requires consumers and health providers share their respective preferences, concerns, and other information to inform the health decision-making process (Stiggelbout et al. 2015). Health providers that encourage this collaborative exchange foster a shared attentional focus that enhances consumers’ interpersonal communications with their providers (Epstein and Gramling 2013). Consistent with patient-centered care, ascertaining consumers’ preferences and concerns helps tailor information and treatment options to meet consumers’ unique wellness needs (Makoul and Clayman 2006). As a result, stronger interpersonal communications with health providers can enhance consumers’ health knowledge (Stacey et al. 2014) and increase
consumers’ critical reflection on their health (Adkins and Corus 2009). For example, Anderson and Funnell (2010) suggest that physicians’ SDM-orientation increases patients’ capacity for critical thinking about their health, leading to more informed diabetes self-management.

**H1: Physicians’ SDM-orientation will be positively associated with health self-awareness.**

**Health Accountability and Health Self-Awareness:** Beyond physicians’ SDM-orientation toward empowering patients, Anderson and Funnell (2010) indicate that increasing the effectiveness of health self-management requires consumers be actively involved in making informed decisions. Consumers’ health accountability signifies consumers’ active involvement and sense of responsibility for managing their well-being (Hibbard and Greene 2013). Highly involved consumers tend to engage in more deliberate information processing consistent with critical reflection of one’s health status (Petty and Cacioppo 1986). Consumers that are highly engaged in the decision-making are also more likely to be active participants in value co-creation that leads consumers to synthesize and integrate relevant information (Storbacka et al. 2016). These highly motivated consumers are more likely to carefully evaluate available information (Bublitz et al. 2013; Hibbard et al. 2007) and contemplate the impact of health decisions in relationship to their health status (Adkins and Corus 2009).

**H2: Health accountability will be positively associated with consumers’ health self-awareness.**

**Digital Information Seeking and Health Self-Awareness:** Health information seeking includes consumers’ active efforts to seek out relevant health information (Niederdeppe et al. 2007). Consistent with the elaboration likelihood model and information processing, as consumers engage in more information seeking, they are more likely to develop a deeper understanding of their health situation (Petty and Cacioppo 1986). For example, Bolton et al. (2015) indicated consumers gain a better understanding of weight-related information and are able to more easily recognize relevant information as they engage in extensive digital information seeking. Notably, consumers’ information seeking provides additional context for information shared during the health service encounter (Sommerhalder et al. 2009), thereby increasing consumers’ deliberate consideration of all available information (Bublitz et al. 2013).
While consumers’ lack of access to digital health resources can contribute to uninformed decision-making and result in more adverse health outcomes (Wei et al. 2011). Therefore, consumers that increase health information seeking may enhance their health self-awareness.

**H3: Provider digital information seeking will be positively associated with health self-awareness.**

**H4: External digital information seeking will be positively associated with health self-awareness.**

**Indirect Paths to Health Self-Awareness**

**Physicians’ SDM-Orientation and Health Accountability:** Consumers need to be sufficiently engaged in value co-creation activities to maximize well-being (Sweeney et al. 2015). Establishing a collaborative decision-making environment with two-way communication between consumers and their health providers is critical to increasing patient engagement and adherence (Hardyman et al. 2015; Stiggelbout et al. 2015). As part of the SDM process, health providers can enhance consumers’ health accountability by ascertaining what is important to consumers (Levinson et al. 2010), encouraging patient input (Epstein and Gramling 2013), and holding consumers responsible for their health behaviors (Brownell et al. 2010). Physicians’ SDM-orientation can thus support patients and activate their involvement in co-creating value via informed decision-making (Anderson and Funnell 2010). Conversely, health providers may diminish patient engagement by ignoring patients' inputs (Wald et al. 2007) or underestimating consumers’ desired involvement in SDM (Légaré and Witteman 2013).

**H5: Physicians’ SDM-orientation will be positively associated with health accountability.**

**Physicians’ SDM-Orientation and Health Information Seeking:** Consistent with SDL, value co-creation in health care service delivery occurs via collaborative decision-making involving both the provider and informed health consumers (Vargo and Lusch 2004; Vargo and Lusch 2008). SDL indicates supporting consumers’ information seeking is critical to this value co-creation process (Grönroos and Ravald 2011; Storbacka et al. 2016). Recent research notes the value in facilitating consumers’ information seeking across the omni-channel information environment into the service ecosystem (Saghiri et al. 2017; Storbacka et al. 2016). Inviting consumers to seek out and share information during the service encounter intensifies engagement (Epstein and Gramling 2013), and nurtures a shared attentional focus that
enhances consumers’ comprehension (Sommerhalder et al. 2009). This collaborative orientation is therefore an important precursor to increasing consumers’ efforts to integrate informational resources (Sweeney et al. 2015). Finally, health providers may empower consumers’ health decision-making by steering consumers to credible and personally relevant information sources that enhance consumers’ understanding of their health conditions (Baird and Nowak 2015).

H6: Physicians’ SDM-orientation will be positively associated with provider digital information seeking.  
H7: Physicians’ SDM-orientation will be positively associated with external digital information seeking.

Health Accountability and Health Information Seeking: Consumers’ involvement is a foundational element to resource integration (Storbacka et al. 2016). Consumers that feel a stronger sense of responsibility for their health are likely to increase health resource integration and be motivated to take actions that improve their health outcomes (Hardyman et al. 2015; Sweeney et al. 2015). For example, McColl-Kennedy et al. (2012) show that as consumers feel more accountable, they are more likely to conduct extensive information searches beyond interpersonal communications with providers. Consumers motivated to actively manage their health outcomes are more likely to utilize a variety of omni-channel information sources such as e-health records, social media, and mobile apps (Otte-Trojel et al. 2014; Pandey et al. 2013). Therefore, consumers will seek out both types of digital health information when actively engaged in the value co-creation process.

H8: Health accountability will be positively associated with provider digital information seeking.  
H9: Health accountability will be positively associated with external digital information seeking.

Provider and External Digital Information Seeking: Service providers increase value co-creation by facilitating consumers’ information seeking beyond informational inputs supplied by the service provider (Grönroos and Ravald 2011). Although empirical research is lacking that examines the information flow patterns across omni-channel sources (Storbacka et al. 2016), a directional relationship may exist due to information asymmetry (Kareklas et al. 2015). Consumers tend to view information from health providers as more credible and relevant to their specific health condition (Hesse et al. 2005). Consequently, consumers may turn to providers’ digital presence first. Health providers may also use
their digital presence as an information hub that directs consumers to relevant external resources (Baird and Nowak 2015). Consistent with the SDL premise, we propose consumers’ usage of health providers’ digital platforms may encourage consumers’ external digital information seeking by referring consumers to relevant resources.

H10: Provider digital information seeking will be positively associated with external digital information seeking.

MATERIALS AND METHODS

Sample and Procedures
We used a stratified random sampling process to select a representative sample of census blocks from the primary service area of a health care system in the Midwest U.S. Over 300 consumers located within the primary service area of a health care system completed the door-to-door survey. A trained survey field team visited each household within the census block sample over a four-week period. The field team visited households that did not answer the door on the initial visit a second time before leaving a self-addressed reply envelope for the household to complete the survey and return via the mail at their convenience. Overall, 310 usable responses from households with a primary health provider were obtained (24.6% response). Archival analysis indicated the study’s respondent profile matched prior community health surveys and aligned with the census population data for the service area (see Table 1).

<<INSERT TABLE 1 HERE>>

Measures
We used a multi-stage process to develop the survey and related measures. First, an advisory committee of health administrators, health providers, and community representatives provided qualitative input on relevant question items. Second, a review of the information seeking and omni-channel literature informed the development of survey items measuring consumers’ information seeking. Third, we reviewed the SDL literature to identify constructs and measures related to the consumer-health provider relationship. Finally, administrators and health providers reviewed the survey measures to ensure their
appropriateness. In combination, the scale items (see Table 2) were adapted from the existing literature to the context of consumers’ general health/wellness and validated via a confirmatory factor analysis (CFA).

- **Physicians’ Shared Decision-Making (SDM) Orientation:** Four-item scale adapted from Kriston et al. (2010) measuring a consumer’s perception of his/her health provider delivering patient-centered care.

- **Health Accountability:** Two-item scale adapted from Hong (2011; 2009) measuring an individual’s personal responsibility for managing his/her health.

- **Digital Health Information Seeking:** Two separate constructs measuring an individual’s frequency of using health information from providers’ digital presence (two items) and external sources (five items). Although the seven items are original in nature, a review of the literature helped identify specific digital health information sources in the omni-channel environment. Scale points were adapted from Borrero et al. (2014).

- **Health Self-Awareness:** Three-items measuring a consumer’s mental orientation or conscious thoughts, reflections, and concerns regarding their health status (2011; Hong 2009).

<<INSERT TABLE 2 HERE>>

**Measurement Model**

We used AMOS 23 to conduct the CFA and validate the measurements. Although the CMIN/DF was less than the suggested value of 3.0, the overall Chi square statistic of the measurement model was significant ($\chi^2 = 117.621$, 89 df, CMIN/DF = 1.322, $p < .05$). However, the significant p-value may be a result of the large sample size. The other model fit statistics suggested a good model fit including the GFI (.956), AGFI (.933), CFI (.990), NFI (.961), and RMSEA (.032) (Hu and Bentler 1999). Each of the individual item loadings was significant ($p < .001$) and the completely standardized solution for all items ranged from .585 to .929, with 14 of the 16 above the preferred 0.7 guideline (Mathwick and Rigdon 2004). The average variance extracted value (AVE) was .661, and each construct had an AVE > .5 meeting Fornell and Larcker’s (1981) convergent validity criterion. Finally, the coefficient alpha for each scale was above .746 (Cortina 1993). Table 3 provides relevant descriptive statistics.
RESULTS

We conducted full path analysis of the structural equation model using AMOS 23, with each survey item allowed to load on its related latent construct. Although the Chi square statistic was significant, this may be due to the sample size ($\chi^2 = 117.621, 89$ df, CMIN/DF = $1.322, p < .05$). Therefore, we relied on other model fit statistics to determine if the structural path model provided a satisfactory fit to test the theorized relationships. The GFI (.956), AGFI (.933), CFI (.990), NFI (.961), and RMSEA (.032) all met the minimum threshold requirements and indicate the model satisfactorily fits the data (Hu and Bentler 1999). Finally, we tested alternative models by varying the order of latent constructs, reversing directional paths, and adding/eliminating paths. None of the alternative models performed as well as the original model or aligned better with theory (Blunch 2008).

Overall, seven of the ten hypothesized relationships were significant and in the hypothesized positive direction. Additionally, one relationship was significant, but negative. Table 4 provides the structural model parameter estimates, while Figure 3 shows the reduced model with significant pathways.

Direct Effects. Two of the four direct effects on health self-awareness were positive and significant as hypothesized. Health accountability (H2: $\beta = .304, p < .001$) and external digital health information seeking (H4: $\beta = .141; p < .05$) both had positive, direct relationships with consumers’ health self-awareness, supporting H2 and H4. However, the relationship from physicians’ SDM-Orientation (H1: $\beta = -.068, p > .05$) and provider digital information seeking (H3: $\beta = -.128; p > .05$) to health self-awareness were not significant. Therefore, H1 and H3 were not supported.

Indirect Effects. Five of the six hypothesized indirect pathways were supported, with an additional surprising result. First, two of the three indirect paths from physicians’ SDM-orientation were supported. The physicians’ SDM-orientation had a positive path to health accountability (H5: $\beta = .374; p < .001$) and provider digital health information seeking (H6: $\beta = .237; p < .001$) supporting H5 and H6. Surprisingly, the indirect path from physicians’ SDM-orientation to external digital health information seeking was significant, but negative (H7: $\beta = -.226; p < .001$). Therefore, H7 was not supported. Second, both
hypothesized indirect paths from health accountability were significant. Health accountability had a positive pathway to provider digital health information seeking (H8: $\beta = .183; p < .05$) and external digital health information seeking (H9: $\beta = .161; p < .05$), supporting H8 and H9. Combined, these two indirect paths indicate as consumers become more involved in their health decision-making they seek out both types of digital health information. Finally, the indirect path from provider digital health information seeking to external digital health information seeking was significant and positive (H10: $\beta = .613; p < .001$). Therefore, H10 was also supported.

**DISCUSSION**

Transforming the health service ecosystem to actively engage consumers to adopt a mindful approach to their health decision-making is imperative to improving health outcomes (Anderson and Ostrom 2015; Anderson et al. 2013). SDL’s value co-creation perspective represents a paradigm shift for the health care industry that traditionally has viewed the health provider as the core actor in health value creation (Hardyman et al. 2015). Our study outlines that the remnants of this conventional health service model need to evolve to engage consumers in conscientious health decision-making. The increased availability of omni-channel information platforms further compels this change as consumers become more empowered in their decision-making (Labrecque et al. 2013; Saghiri et al. 2017).

Our study contributes to a growing stream of research demonstrating the value of engaging consumers in co-creation activities to improve consumers’ wellness (McColl-Kennedy et al. 2017a; McColl-Kennedy et al. 2017b). Although different co-creation activities exist (Sweeney et al. 2015), we focus on examining consumers’ information seeking given resource integration’s importance to value co-creation (Storbacka et al. 2016). Our findings contribute to the literature in three ways. First, we demonstrate that physicians’ efforts to promote a SDM-conducive environment are not sufficient to motivate consumers’ mindful reflection on their health status. Second, we provide evidence that facilitating consumers’ external information seeking is critical to maximizing value co-creation. Finally, we offer initial evidence of the evolving information flow patterns in the omni-channel information environment from providers’ digital to external digital information sources.
Examining the reduced model (see Figure 3), we show that the physicians’ SDM-orientation does not directly affect consumers’ conscious reflection on their health status. As noted earlier, influencing consumers’ critical reflection during the value co-creation process is crucial to improving decision-making and well-being (Adkins and Corus 2009). While unexpected, our finding corroborates research that suggests efforts to engage consumers in SDM have mixed effectiveness (Légaré and Witteman 2013). Our findings further demonstrate health providers need to go beyond supporting SDM to establish strong interpersonal relationships with consumers and hold them accountable for their health behaviors. In doing so, health providers may be more likely to fully motivate consumers to consciously reflect on their health status when presented with new information or when making lifestyle choices that have consequences on their well-being (Bublitz et al. 2013).

Our study also provides evidence of the importance of encouraging consumers’ digital information seeking and offers initial insights on the information flow patterns. Consumers increasingly have access to a variety of omni-channel health information platforms (Saghiri et al. 2017; Storbacka et al. 2016). Consumers may access resources from the providers’ digital presence and external sources to enhance their health knowledge and comparatively evaluate information shared during the SDM process (Durand et al. 2014). Our findings lend support to the SDL premise that motivating consumers to seek out external information is critical to enhancing consumers’ attentional focus on their health status, thereby extending the health providers’ influence (Grönnroos and Voima 2013). Meanwhile, encouraging consumers’ integration of providers’ digital resources only indirectly influences health self-awareness when the providers’ digital presence directs consumers to seek out external sources. Health marketers may wish to further leverage this information flow from provider to external digital by endorsing relevant external information sources on the providers’ digital platforms (Baird and Nowak 2015).

Unexpectedly, we found a significant, negative relationship between physicians’ SDM-orientation and external digital information seeking. Perhaps this reflects the fact health providers that foster SDM with their patients tend to value evidence-based informational inputs (Pollard et al. 2015). Beyond discouraging external information seeking, health providers may diminish consumers’
engagement by dismissing consumers’ sharing of external informational inputs (Clayman et al. 2016). Our unexpected finding also appears to align with research noting health providers’ traditionally have held skeptical views toward online health information (Adams 2010). It might also indicate a more complex process than currently conceptualized with additional factors influencing consumers’ external information seeking. In order to transform the health service ecosystem and increase consumers’ engagement, this may require efforts to enhance both parties’ digital health value perceptions. Research exploring how health providers and consumers form value perceptions of these omni-channel platforms may enhance our understanding for how providers can facilitate resource integration.

Consistent with SDL and value co-creation, our findings indicate that motivating and facilitating consumers’ omni-channel information seeking is important. Specifically, health providers need to motivate consumers to seek out external digital informational inputs to fully activate consumers’ awareness of their health status. Transforming the health service ecosystem to facilitate consumers’ involvement in SDM and external information seeking is thus critical to engaging consumers to deliberatively consider health decisions in relation to their health status (Adkins and Corus 2009). The limited time spent with consumers during the service encounter suggests health providers and policymakers may need to assist consumers in evaluating and integrating relevant information outside the service visit (Grönroos and Voima 2013). Structuring health providers’ omni-channel presence to account for this resource integration pattern is warranted (Storbacka et al. 2016).

In order to facilitate consumers’ access to digital information resources, health marketers should expand the digital resources available to patients on health providers’ websites, social media pages, and online health portals. Additionally, physicians should identify appropriate external digital resources for patients during service encounters and share relevant links via the providers’ enhanced digital presence. More research is necessary to better understand how to motivate and facilitate consumers’ access to both types of digital health information to reinforce consumers’ health awareness including understanding barriers and motivating factors from physicians’ perspectives.
Although our study contributes to the literature in a number of ways, it has limitations. We focus our model on the perceptual measure of health self-awareness, which signifies the consumers’ critical reflection on their health status. Although our model offers initial insights on the consequences of consumers’ digital health information seeking, this needs further exploration. In particular, research which examines how the different omni-channel platforms may interact and the resulting consequences on health decision-making and health outcomes are of value (Storbacka et al. 2016; Sweeney et al. 2015). Our research also highlights the complex interrelationships of the physicians’ SDM-orientation and suggests additional research is necessary to identify how health providers and health consumers co-create value. Yi and Gong (2013) indicated consumers actively participate in value co-creation when engaging in information seeking and information sharing as part of a SDM process. Our research suggests physicians play an integral role in facilitating these co-creation activities by encouraging and empowering patients’ SDM participation, thus leading to greater patient activation and ultimately greater self-awareness. Future research should explore the process through which marketers can create shared attentional focus between health providers and consumers’ value perceptions of digital informational inputs. Finally, the sample used the primary service area of a health care system that may not be representative of more diverse, urban settings. Research that extends this model to different settings may therefore be of value. Additionally, research that explores how integrating consumers’ usage of the omni-channel information environment differs based on specific chronic conditions will help health providers and policymakers identify how to influence consumers’ mindful reflection when these conditions are present.
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Figure 1. Health Information Seeking in the Omni-Channel Information Environment

- Health/wellness blogs
- Social media sites that share health/wellness info
- Online health/wellness community/forum
- Online health/wellness videos on YouTube/other sites
- Health/wellness app on a mobile device

- Personal interactions during service encounter
- Phone conversations with service provider

- Service provider’s website
- Consumers’ e-health records
Figure 2. Omni-Channel Marketing & Co-Created Health Awareness

Interpersonal Communications

Physicians’ SDM-Orientation

H5 (+)

H7 (+)

H8 (+)

Health Accountability

Omni-Channel Digital Health Information Seeking

Provider-Related Digital Health Use

H6 (+)

H10 (+)

External Digital Health Use

Co-Created Health Awareness

H1 (+)

H3 (+)

H4 (+)

H2 (+)

H9 (+)
<table>
<thead>
<tr>
<th>Table 1. Respondent Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td>Rural</td>
</tr>
<tr>
<td>Urban</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>18–24</td>
</tr>
<tr>
<td>25–34</td>
</tr>
<tr>
<td>35–44</td>
</tr>
<tr>
<td>45–54</td>
</tr>
<tr>
<td>55–64</td>
</tr>
<tr>
<td>65+</td>
</tr>
<tr>
<td><strong>Annual Household Income</strong></td>
</tr>
<tr>
<td>&lt;$25,000</td>
</tr>
<tr>
<td>$25,000–34,999</td>
</tr>
<tr>
<td>$35,000–49,999</td>
</tr>
<tr>
<td>$50,000–74,999</td>
</tr>
<tr>
<td>$75,000+</td>
</tr>
<tr>
<td><strong>Highest Level of Education</strong></td>
</tr>
<tr>
<td>High school degree/GED or less</td>
</tr>
<tr>
<td>Associate’s/Bachelor’s degree</td>
</tr>
<tr>
<td>Master’s degree or higher</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
</tr>
<tr>
<td>Caucasian</td>
</tr>
</tbody>
</table>
Table 2. Measurement Items

**Physicians’ Shared Decision-Making Orientation**  $\alpha = .954$

My health provider… (1=Strongly Disagree to 5=Strongly Agree)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Informs me of different options for improving my health</td>
</tr>
<tr>
<td>2.</td>
<td>Works with me to make health-related decisions</td>
</tr>
<tr>
<td>3.</td>
<td>Encourages me to take an active role in my health decisions</td>
</tr>
<tr>
<td>4.</td>
<td>Empowers me to make decisions related to my health</td>
</tr>
</tbody>
</table>

**Health Accountability** (1=Strongly Disagree to 5=Strongly Agree)  $\alpha = .880$

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I work hard to participate in my health decisions</td>
</tr>
<tr>
<td>2.</td>
<td>I put a lot of effort into making good health decisions</td>
</tr>
</tbody>
</table>

**Provider Digital Health Information Seeking**  $\alpha = .750$

How often do you use each of the below for health/wellness purposes? (1=Never to 5=Frequently)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My health provider’s website</td>
</tr>
<tr>
<td>2.</td>
<td>Electronic/online health records</td>
</tr>
</tbody>
</table>

**External Digital Health Information Seeking**  $\alpha = .864$

How often do you use each of the below for health/wellness purposes? (1=Never to 5=Frequently)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Health/wellness blogs</td>
</tr>
<tr>
<td>2.</td>
<td>Social media sites that share health/wellness info</td>
</tr>
<tr>
<td>3.</td>
<td>Online health/wellness community or forum</td>
</tr>
<tr>
<td>4.</td>
<td>Health/wellness videos on YouTube or other sites</td>
</tr>
<tr>
<td>5.</td>
<td>Health/wellness app on a mobile device</td>
</tr>
</tbody>
</table>

**DV = Health Self-Awareness** (1=Strongly Disagree to 5=Strongly Agree)  $\alpha = .746$

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I’m very self-conscious about my health</td>
</tr>
<tr>
<td>2.</td>
<td>I think about my health a lot</td>
</tr>
<tr>
<td>3.</td>
<td>I’m concerned about my health all the time</td>
</tr>
</tbody>
</table>
Table 3. Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Physicians’ SDM Orientation</th>
<th>Health Accountability</th>
<th>Provider Digital</th>
<th>External Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians’ SDM-Orientatio</td>
<td>3.88</td>
<td>0.73</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Accountability</td>
<td>3.92</td>
<td>0.78</td>
<td>.343**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provider Digital</td>
<td>2.22</td>
<td>1.19</td>
<td>.267**</td>
<td>.227**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>External Digital</td>
<td>1.91</td>
<td>0.96</td>
<td>.027</td>
<td>.205**</td>
<td>.487**</td>
<td>1</td>
</tr>
<tr>
<td>Health Self-Awareness</td>
<td>3.38</td>
<td>0.73</td>
<td>.015</td>
<td>.283**</td>
<td>.159**</td>
<td>.159**</td>
</tr>
</tbody>
</table>

**Significant at p < .01.
*Significant at p < .05.
### Table 4. Tests of the SEM Path Hypotheses

<table>
<thead>
<tr>
<th>Hypotheses and Paths</th>
<th>Std. β Coefficient</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct Paths to Health Self-Awareness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1</td>
<td>Physicians’ SDM-Orientation → Health Self-Awareness</td>
<td>-.068</td>
<td>-0.975</td>
</tr>
<tr>
<td>H2</td>
<td>Health Accountability → Health Self-Awareness</td>
<td>.304</td>
<td>4.245</td>
</tr>
<tr>
<td>H3</td>
<td>Provider Digital → Health Self-Awareness</td>
<td>-.128</td>
<td>-1.755</td>
</tr>
<tr>
<td>H4</td>
<td>External Digital → Health Self-Awareness</td>
<td>.141</td>
<td>2.032</td>
</tr>
<tr>
<td><strong>Indirect Paths to Health Self-Awareness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H5</td>
<td>Physicians’ SDM-Orientation → Health Accountability</td>
<td>.374</td>
<td>6.079</td>
</tr>
<tr>
<td>H6</td>
<td>Physicians’ SDM-Orientation → Provider Digital</td>
<td>.237</td>
<td>3.281</td>
</tr>
<tr>
<td>H7</td>
<td>Health Accountability → Provider Digital</td>
<td>.183</td>
<td>2.485</td>
</tr>
<tr>
<td>H8</td>
<td>Physicians’ SDM-Orientation → External Digital</td>
<td>-.226</td>
<td>-3.518</td>
</tr>
<tr>
<td>H9</td>
<td>Health Accountability → External Digital</td>
<td>.161</td>
<td>2.493</td>
</tr>
<tr>
<td>H10</td>
<td>Provider Digital → External Digital</td>
<td>.613</td>
<td>7.461</td>
</tr>
</tbody>
</table>

Notes: $\chi^2 = 117.621$; d.f. = 89; GFI = .956; AGFI = .933; CFI = .990; NFI = .961; RMSEA = .032.
Figure 3. Reduced Path Model

Notes: **Significant at p < .001. *Significant at p < .05. Dashed lines indicate non-significant paths.