

# Health-care marketing in an omni-channel environment

Health-care  
marketing

## Exploring telemedicine and other digital touchpoints

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### Abstract

**Purpose** – Consumers have increased access to digital health tools such as social media, websites and marketer-controlled platforms for information sharing. Telemedicine (TM) represents an emerging omni-channel touchpoint for consumers to exchange information and inform health decision-making at a time and place of their choosing. While TM offers great potential, consumer adoption has been slower than expected. This paper aims to investigate attitudinal factors that influence adoption and usage of TM within consumers' omni-channel decision-making environment.

**Design/methodology/approach** – Surveys from 869 patients were analyzed using multiple linear regression to examine the relationships between health decision-making, TM access benefits and omni-channel touchpoints (social media, website and internal health digital channels usage) on TM usage likelihood.

**Findings** – Attitudinal constructs related to TM's benefits including access and health decision-making have the strongest impact on future TM usage. The study also empirically demonstrates a link between consumers' omni-channel information seeking and TM usage.

**Research limitations/implications** – Increasing consumers' involvement across omni-channel touchpoints has an additive effect on perceived benefits for engaging consumers in using digital offerings like TM. Future research is needed that examines the interrelationships on consumers' health decision-making across generational cohorts and the post-adoption effects of digital service offerings.

**Practical implications** – Omni-channel touchpoints such as TM provide new opportunities to enhance shared decision-making. However, marketers need to adopt strategies that accommodate consumers' evolving omni-channel preferences for access and information exchange to synergize digital service offerings with interpersonal touchpoints.

**Originality/value** – This study integrates shared decision-making, technology acceptance and omni-channel marketing literature to explore TM acceptance and usage within the context of consumers' omni-channel decision process.

**Keywords** Services marketing, Decision-making, Health-care, Integrated marketing communications, eServices

**Paper type** Research paper

### Introduction

The health service ecosystem is in a state of transition, moving away from the traditional physician-based delivery model toward a greater focus on how patients and providers co-create health and wellness (Dahl *et al.*, 2019). The paradigm shift in how patients and care providers jointly seek out, process, and make health and wellness decisions is driven in part



by advancing technologies and platforms that allow for health-care at a distance (Dahl *et al.*, 2018). Consumers are thus taking greater control of their care decisions through the rapidly increasing number of internet and omni-channel communication platforms that are becoming available, and how the usage of such communication channels empower their decision-making outside of the service encounter (Labrecque *et al.*, 2013).

In many ways, advancing omni-channel information seeking of health resources and their integration are foundational value co-creation elements in the service delivery process (Dahl *et al.*, 2018). In addition to the benefits marketing technologies have for engaging consumers in mindful health-care choices, this engagement and greater access to digital information are essential elements for improving health-care quality and reducing costs (Chérez-Ojeda *et al.*, 2018; Sweeney *et al.*, 2015). According to the American Medical Association, digital health encompasses a “broad scope of tools that engage patients for clinical purposes; collect, organize, interpret and use clinical data; and manage outcomes and other measures of care quality” (American Medical Association, 2018). Digital health tools include electronic medical records, patient portals, digital health information seeking, telemedicine, mobile health, wearables (e.g. Fitbit), remote monitoring tools, among others. Through digital health tools, access and exchange of health information are no longer limited to the doctor’s office. It is now possible to transfer and exchange information through available digital health systems (Peng *et al.*, 2014). With health-care systems focused on improving care delivery and patients’ engagement in their wellness, digital tools have taken center stage to accomplish these goals (Dahl *et al.*, 2019; Lupton, 2013).

The most recent advancement in digital health tools is in the area of telemedicine (TM). TM offers patients the ability to be seen by health-care providers through audio and video capabilities remotely using a smartphone, tablet, or computer. Although in its infancy, research has shown that TM patients have a positive view of TM and are open to making it a regular part of their care delivery in the future (Albert *et al.*, 2015). Patients also acknowledge that a key benefit of TM is that it offers them the opportunity to engage in health service interactions with their providers anytime and anywhere (Butcher, 2016; Hickson *et al.*, 2015; Margolius and Bodenheimer, 2010). While there are evident benefits for patients, the TM concept has posed challenges for health-care organizations and has had a slow adoption rate by patients (Whitten *et al.*, 2007). For example, there have been concerns expressed by both physicians and patients over quality of care issues (Hickson *et al.*, 2015). Moreover, with TM, physicians must rely in part on patients’ self-reporting, digitally or via phone, of their symptoms, which could inadvertently lead to incorrect diagnosis or mismanagement of a situation if not communicated correctly (Roettl *et al.*, 2016).

Despite TM’s initial promising results, notable research gaps exist in the literature. First, researchers have not fully examined patients’ attitudes towards TM usage. Previous studies have focused mostly on demographics (Virji *et al.*, 2006) and skill level factors that affect TM perceptions (Karnoe *et al.*, 2018). There is thus an opportunity to establish key attitudinal constructs that describe key patient attitudes towards TM, and particularly as they relate to the health-care decision-making process (Hickson *et al.*, 2015). Second, previous research has not fully captured the factors that influence future usage of TM (Roettl *et al.*, 2016). Although there is well-developed research in technology adoption models, there is relatively little research on understanding usage of TM as it relates to the unique interaction with the patient as a consumer (Hafeez-Baig and Gururajan, 2010). Lastly, previous research has made little attempts to link TM usage to other forms of digital health. Varieties of complementary digital channels exist, including patient portals, provider and external websites (e.g. WebMD), social media platforms, and mobile health monitoring devices (Dahl *et al.*, 2019). Given that TM is in its early stage of adoption, and the fact that virtually all

health-care providers will offer some form of TM in the future, research is warranted that increases our understanding of the factors that lead to its adoption (Rahimi *et al.*, 2018).

In this paper, we investigate the future usage likelihood of TM through the lens of three theoretical constructs. First, research has shown that patients more fully engaged in their health decisions, with or without physician interaction, show greater attitudes and usage of digital health channels (Dahl *et al.*, 2019). We thus integrate literature from the health involvement and shared decision-making literature. Second, because digital health channels offer patients potential adoption-related benefits, we inform our hypotheses via the technology acceptance model (TAM). Finally, because health-care delivery, as with a multitude of purchase contexts, is made through personal and digital media interfaces, we explore TM acceptance and future adoption likelihood as part of an omni-channel decision process.

### Literature review

The definitions and terminology used to describe TM health services vary through the literature and in industry. In many cases, TM and telehealth are used interchangeably. In other situations, telehealth is an umbrella term covering many types of digital health services. Although TM is used to describe the specific use of audio and video for a remote appointment, in this study, we define telemedicine as *a platform that allows patients to be seen by health-care providers from any location using a smartphone, tablet, and/or computer with audio and video capabilities*. TM appointments begin with the patient inputting their symptoms into a health system symptom checker module. The module will then determine if the symptoms fit the criteria for a TM appointment. If the symptoms do align with the health system's TM service offering, the patient will begin their audio and visual appointment with a health professional.

Studies show that digital tools like TM show strong promise for the future of health-care delivery (Hickson *et al.*, 2015). Research has examined and found applicable care delivery opportunities and usages of TM across departments, specialties, and systems (Adamson and Bachman, 2010). Initial studies hypothesized that telemedicine could offer health systems a competitive advantage over other health systems (Williams and Whittier, 2007). As patients' expectations regarding technology-based care have increased (Shrank, 2017), TM is no longer just a potential for competitive advantage; it is becoming a service offered by most health systems (Vatnøy *et al.*, 2017). The traditional model of care delivery required patients to receive care on the health provider's timeline and location. In contrast, the new digital health model of care under which TM operates places emphasis on patients' timelines and the location of their choice.

Although there is promise for the potential use of TM, there are many challenges that are slowing the implementation by health-care systems and adoption by patients (Roettl *et al.*, 2016). Research has uncovered issues that have negatively impacted usage of TM, including: quality concerns (Padman *et al.*, 2010), security issues (Saigi-Rubió *et al.*, 2016), reimbursement challenges (Newton, 2014), technology skill levels (Dünnebeil *et al.*, 2012), provider buy-in (Whitten *et al.*, 2007), health literacy (Hickson *et al.*, 2015), among others. TM's results have varied for departments and individual providers, putting in question patient quality of care (Christensen, 2018). As a consequence, while some patient adoption exists, most patients either have not heard of TM and if they have, place a relatively low priority on using it (Zanaboni and Wootton, 2016; Dahl *et al.*, 2018, 2019).

*Omni-channel touchpoints in health-care*

Omni-channel touchpoints provide a mechanism for marketers to deliver consistent messaging and engage consumers via the consumers' most desired platforms (Cummins *et al.*, 2016). The explosion of omni-channel touchpoints and shifting balance in consumer power across these touchpoints necessitate that marketers identify ways to engage consumers via different platforms throughout the consumers' involvement in health decision-making (Bell *et al.*, 2014; Storbacka *et al.*, 2016). Health consumers have come to expect seamless experiences in the care delivery process, regardless of the touchpoint they use to gather information about their health, communicate with their health-care provider, or seek care through. Accordingly, health marketers need to leverage omni-channel touchpoints to deliver consistent messaging and service experiences.

Engaging health consumers via a variety of interpersonal and digital touchpoints has benefits for both the marketer and consumer. Health-care marketers are likely to see benefits from omni-channel touchpoints, including greater patient satisfaction and loyalty (Manser Payne *et al.*, 2017). Health-care organizations may also experience increased efficiency in resource utilization as part of the patient care process as consumers adopt digital platforms for appointment scheduling, health provider communications, and care delivery through TM, among other touchpoints. Care delivered through TM provides consumers on-demand care, when and where it is convenient for them to access a health provider's expertise (Zhang *et al.*, 2015). Consumers increased access to health information also activates greater involvement and conscious reflection about their health decisions (Dahl *et al.*, 2019), and leads to improved health outcomes (Sweeney *et al.*, 2015; Dahl *et al.*, 2018).

Despite the growing importance of omni-channel touchpoints, marketing efforts that effectively engage consumers in health decision-making across a growing number of touchpoints including through TM remain lacking (Dahl *et al.*, 2019). In this study, we explore the relationship between consumers' usage of three different digital touchpoints and their likelihood of using TM. First, consumers' social media health information usage represents a growing digital touchpoint where consumers have greater control over health information sharing compared to the health provider. Information shared on social media often is consumer-generated and heavily relies on consumer-to-consumer sharing. Second, consumers increasingly turn to a multitude of health-related websites outside their health provider (website health information usage) such as WebMD and other online symptom checkers to make decisions about whether or not to seek a medical opinion or to seek additional information either before or after a health-care visit (Haluzza *et al.*, 2017; Zhang *et al.*, 2017). Finally, we also explore omni-channel touchpoints that are under the direct control of the health marketer (internal health digital channels) including the health provider's website, social media pages, and electronic health records.

*Omni-channel touchpoints and empowering consumers' health decision-making*

A core tenet of today's health-care ecosystem is delivering patient-centered care that engages and empowers consumers to be involved throughout a shared decision-making (SDM) care process (Grande *et al.*, 2014). Consumers who feel empowered by their health provider via SDM are more likely to express care preferences, relevant concerns, questions, and other information (Politi *et al.*, 2013). Importantly, SDM results in improved treatment decisions and quality of care while reducing health-care costs (Grande *et al.*, 2014). Research shows that consumers' involvement in health decision-making is associated with information seeking across a variety of digital health touchpoints (Dahl *et al.*, 2019). TM and other emerging digital touchpoints can help facilitate information gathering and sharing by both patients and physicians that are critical to improving health outcomes. Health-care

marketers that engage consumers via their preferred communication channels and provide seamless information sharing by both patients and physicians may increase consumers' efforts to take action on physicians' recommendations (Sweeney *et al.*, 2015), thereby improving consumers' health decision-making and other health outcomes (Dahl *et al.*, 2018).

### *TM adoption research*

The Technology Acceptance Model (TAM) has been one of the leading theories utilized to understand the intention to use digital health tools such as TM (Rahimi *et al.*, 2018). TAM proposes that an individual's behavioral intention to use an IT system is influenced by two beliefs: perceived usefulness and perceived ease of use. Perceived usefulness is defined as the extent to which a person believes the technology system will enhance their job or benefit them (Davis, 1989). Perceived ease of use is expressed as the extent to which the person believes the use of the IT system will be free from effort (Davis, 1989). While TAM has provided a basic framework to study TM, the complex nature of health-care decision-making requires more comprehensive models (Rahimi *et al.*, 2018). TM research using TAM has included variables such as subjective norms (Chau and Hu, 2002), trust (Su *et al.*, 2013), facilitators (Asua *et al.*, 2012), compatibility (Gagnon *et al.*, 2011), self-efficacy (Rho *et al.*, 2014), trust in provider (Roettl *et al.*, 2016) and habit (Gagnon *et al.*, 2011). Rahimi *et al.* (2018) argue that TAM as a framework does not fully capture the nature of TM usage and adoption. While TAM does provide insights and understanding into aspects of patient adoption, it does not encapsulate the full multi-faceted and relational nature of TM decision making (Greenhalgh *et al.*, 2015). Research is thus needed that examines consumers' TM usage and adoption while considering attitudinal constructs beyond the TAM framework that are part of consumers' omni-channel health decision-making.

### **Model and hypothesis**

Empowering consumers to be engaged in health decision-making is critical to improving health outcomes (Sweeney *et al.*, 2015). Research shows self-aware consumers are more likely to be in tune with their health information needs and thus better at deciphering and using different digital resources (Nijman *et al.*, 2014). Those engaged in SDM also feel more capable of navigating the health-care system (O'Hair *et al.*, 2003). Although research exploring consumers' perceptions of empowered decision-making in a TM context is lacking, consumer involvement tends to be a strong predictor for seeking and using digital health resources. For example, research shows consumers' motivated to actively manage their health outcomes are more likely to use digital health portals (Otte-Trojel *et al.*, 2014). Consumers who feel more engaged in decision-making are willing to put greater effort into synthesizing and integrating relevant resources (Sweeney *et al.*, 2015). We thus hypothesize that consumers more involved in their health-care decision-making process will be more likely to use TM services:

- H1.* Health-care decision-making involvement is positively associated with the likelihood of using TM services.

Marketing literature cites access to care and information as a top benefit sought by patients when using digital health tools (Hickson *et al.*, 2015). Further, research reveals that improved access to care is central to why many patients and providers engage with TM (Bodenheimer and Pham, 2010). Improved access to care via TM allows patients to receive care in a time and place that is convenient for them (Zhang *et al.*, 2015). This includes improved timeliness of care (Nijland *et al.*, 2009), increased access to providers

(Butcher, 2016), decreased interruption into daily activities to receive care, and ability to receive care remotely (Martin *et al.*, 2012). Digital health advancements have transitioned health-care from pure on-site service delivery to a menu of digital health-care options (Kucuk, 2016). The expanding options of digital health tools have increased patients' expectations for immediate access to health-care services, information and results (Hansen and Okuda, 2018). Patients value the choice to be seen when and where they want (Webb, 2016). TM studies using the TAM framework have found that perceived usefulness, or benefit for the patient, is integral to understanding usage (Rahimi *et al.*, 2018). Research also confirms that from the patients' points of view, convenient access to care ranks as a top benefit sought by patients (Roetli *et al.*, 2016). Further, research finds that increased access to care is the key relative advantage that offers value to the patient through TM over traditional care (George *et al.*, 2012). Therefore, this study posits that when patients perceive they will have increased access to care, they will be more likely to use TM:

*H2.* Perceptions of access to health-care are positively associated with the likelihood of using TM services.

Researchers have shown an increased interest in exploring the connection between digital touchpoints and digital services (Anderson *et al.*, 2016; Ramaswamy and Ozcan, 2018). TM provides consumers with a digital-enabled care delivery platform that often includes real-time communication with a health provider. However, research is lacking that explores the relationships between consumers' usage of other digital touchpoints and consumers' TM usage (Dahl *et al.*, 2019). Consumers increasingly seek to integrate digital health resources to enhance decision-making and improve their health outcomes (Dahl *et al.*, 2018). Consumers' active efforts to utilize digital health resources such as social media, health websites and health portals may also contribute to consumers' health literacy and digital self-efficacy (Zhang *et al.*, 2017). As consumers feel more comfortable using different digital health resources, they may also feel greater self-efficacy for using TM for health-care visits. Therefore, we posit that consumers' usage across each of the three digital health information touchpoints will be positively associated with using TM:

*H3.* Social media health information usage will be positively associated with likelihood to use telemedicine.

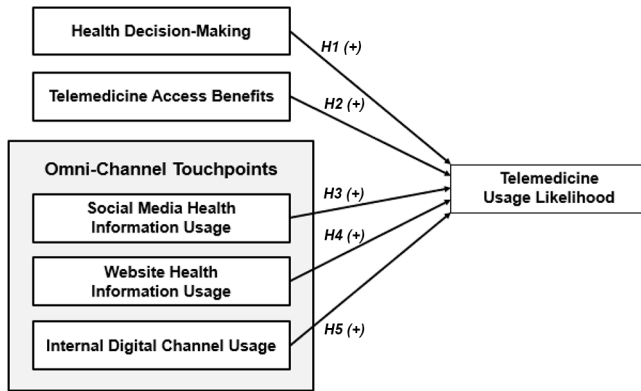
*H4.* Website health information usage will be positively associated with likelihood to use telemedicine.

*H5.* Internal health digital channels usage will be positively associated with likelihood to use telemedicine.

### Methodology

From our review of the literature, five constructs related to TM were identified and included in our model shown in Figure 1:

- (1) health decision-making;
- (2) telemedicine access benefits;
- (3) social media health information usage;
- (4) website health information usage; and
- (5) internal health digital channels usage.



**Figure 1.**  
Telemedicine usage model

We use multiple regression to examine the relationships between these five constructs and telemedicine usage likelihood.

*Sample and procedure*

Data were collected in conjunction with a rural Midwestern hospital. The sampling frame consisted of email addresses of patients within their health service program who use the hospital as their primary source of care and have a primary care physician at that hospital. This excluded patients who may have used hospital services once, yet live outside of the service area. This resulted in a total of 8,000 patients with a current email address. A drawing for 20 digital blood pressure devices was used as an incentive for completing the survey. After three waves, a total of 950 responses were collected (11.9 per cent response rate). Of these, 869 had complete and usable responses. Demographic characteristics of the respondents are shown in [Table I](#).

Demographics	%
<i>Gender</i>	
Male	31
Female	69
<i>Age</i>	
<34	8.6
35-44	12.3
45-54	15.4
55-64	24.7
65+	39.0
<i>Children living in household</i>	
Yes	22.6
No	77.4
<i>Education</i>	
High School/GED or less	31.8
Associate or College Degree	49.3
Master's Degree or Higher	18.9

**Table I.**  
Demographics

*Measures*

Two analyses were conducted before data collection to assess the quality of the survey instrument. First, after an initial advisory committee meeting, 11 health-care administrators/directors responded to an online forum asking them to identify key constructs and potential questions. Second, the qualitative results from the online forum, along with the literature, were used to create a pilot survey. The initial survey contained 70 items representing the five dimensions identified in the literature review, plus a set of other constructs and health questions which were not used in the current analyses. A total of 225 people participated in the pretest survey. Factor analyses and reliability results were used to select the final survey questions.

The final TM survey was then administered to patients who had a primary care provider at the hospital. The survey contained 25 independent variable statements, four future usage likelihood of telemedicine services dependent variables, and four demographic variables (gender, age, whether have children in the household, and education). To assess dimensionality, the 25 items representing the five constructs were subjected to an exploratory factor analysis using Varimax rotation. All of the items loaded as expected and were consistent with the loadings found in the pretest. Cronbach's reliability scores were then calculated for each of the constructs. The total variance explained was 72.8 per cent. Four of the construct reliabilities had high coefficient alpha scores ( $\alpha = 0.95, 0.95, 0.95, 0.83$ ). The only exception was Internal Digital Health Channel Usage ( $\alpha = 0.65$ ), which is acceptable for exploratory research given it is only a three-item scale with high inter-item correlations (Hair *et al.*, 2006). Factor loadings and reliability scores for each of the measures are reported in Table II and descriptive statistics are shown in Table III.

The constructs were measured as follows:

*Independent variables*

- *Health decision-making*: seven-item agreement scale (1 = strongly disagree to 5 = strongly agree;  $\alpha = 0.96$ ). Adapted from Dahl *et al.* (2019).
- *Telemedicine access benefits*: original seven-item agreement scale (1 = strongly disagree to 5 = strongly agree;  $\alpha = 0.95$ ).
- *Social media health information usage*: five-item usage scale (1=never to 5 = frequently;  $\alpha = 0.85$ ). Adapted from Dahl *et al.* (2018, 2019).
- *Website health information usage*: three-item item usage scale (1 = never to 5 = frequently;  $\alpha = 0.85$ ;  $\alpha = 0.83$ ). Adapted from Dahl *et al.* (2018, 2019).
- *Internal health digital channels usage*: (three-item item usage scale (1 = never to 5 = frequently;  $\alpha = 0.65$ ). Adapted from Dahl *et al.* (2018, 2019).

*Dependent variables*

Respondents indicated how likely they would be to use TM services in the future to four statements (1 = very unlikely to 5 = very likely): Use telemedicine if offered by your current provider, Use telemedicine from any health provider, Switch to a provider offering telemedicine if your current provider didn't offer, and Use telemedicine if offered by the client health-care organization (name removed for confidentiality). The four items were summed, and the mean likelihood score was calculated ( $\alpha = 0.95$ ; mean = 2.83).



Construct	Measure and questions	Loading
Health decision-making ( $\alpha = 0.96$ ) variance explained = 21.8% Overall mean = 3.53	Make patients more self-aware of their health needs	0.845
	Increase patient involvement in their health decisions	0.833
	Make patients more responsible for their overall health	0.824
	Help patients better understand their overall health	0.816
	Improve patient-provider shared decision-making	0.773
	Provide patients greater control over their health-care	0.769
Telemedicine access benefits ( $\alpha = 0.95$ ) Variance explained = 21.6% overall mean = 3.62	Help patients manage chronic conditions	0.634
	Allow patients to receive care when they need it	0.732
	Reduce the need to visit the ER/urgent care for minor issues	0.727
	Reduce the need to miss work/school to receive care	0.725
	Make it easy to communicate with health providers	0.717
	Simplify the appointment scheduling process	0.696
	Improve my access to primary care providers	0.684
	Improve my access to specialty care providers	0.669
Social media health info ( $\alpha = 0.85$ ) Variance explained = 11.8% overall mean = 1.60	Online health/wellness community or forum	0.807
	Asked others on social media about your symptoms	0.779
	Social media sites that share health/wellness info	0.756
	Health/wellness blogs	0.677
	Health/wellness videos on YouTube or other sites	0.619
Website health info ( $\alpha = 0.83$ ) Variance explained = 10.0% overall mean = 2.36	Online symptom checkers (i.e., WebMD)	0.808
	Other health/wellness websites	0.805
	Other health providers' websites (i.e., Mayo Clinic)	0.762
Internal digital health info ( $\alpha = 0.65$ ) Variance explained = 7.5% overall mean = 2.33	My health provider's website	0.802
	My health provider's social media	0.730
	Electronic health records/online health portal	0.610
Total variance explained = 72.8%		

**Table II.**  
Constructs, factor loadings and reliability

## Regression results

A multiple regression analysis was conducted using factor scores as independent variables, and the mean TM usage likelihood score as the dependent variable. Gender, age, education, and whether the respondent had children living in the household (parental status) were included as control variables. As shown in Table V, each of the five telemedicine constructs were significantly related to future usage likelihood, and in the hypothesized direction. In terms of relative impact, Telemedicine Access Benefits had the greatest impact (Std  $\beta = 0.43$ ,  $t = 16.46$ ,  $p < 0.001$ ), followed closely by Health Decision-Making (Std  $\beta = 0.39$ ,  $t = 15.09$ ,  $p < 0.001$ ). Significant relationships were also found for each of the digital health

	Measures and questions	Mean	SD
<b>Table III.</b> Descriptive statistics for independent variables	Health decision-making		
	Make patients more self-aware of their health needs	3.45	0.83
	Increase patient involvement in their health decisions	3.53	0.84
	Make patients more responsible for their overall health	3.47	0.87
	Help patients better understand their overall health	3.45	0.83
	Improve patient-provider shared decision-making	3.58	0.85
	Provide patients greater control over their health-care	3.55	0.83
	Help patients manage chronic conditions	3.68	0.83
	Telemedicine access benefits		
	Allow patients to receive care when they need it (within an hour)	3.70	0.82
	Reduce the need to visit the ER/urgent care for minor issues	3.81	0.89
	Reduce the need to miss work/school to receive care	3.74	0.85
	Make it easy to communicate with health providers	3.72	0.83
	Simplify the appointment scheduling process	3.60	0.83
	Improve my access to primary care providers	3.59	0.86
	Improve my access to specialty care providers	3.53	0.87
	Social media health info		
	Online health/wellness community or forum	1.49	0.91
	Asked others on social media about your symptoms	1.31	0.78
	Social media sites that share health/wellness info	1.80	1.1
	Health/wellness blogs	1.76	1.1
	Health/wellness videos on YouTube or other sites	1.80	1.1
	Website Health Info		
	Online symptom checkers (i.e. WebMD)	2.50	1.3
	Other health/wellness websites	2.34	1.2
Other health providers' websites (i.e. Mayo Clinic)	2.24	1.3	
Internal Digital Health Info			
My health provider's website	2.16	1.2	
My health provider's social media	1.42	0.86	
Electronic health records/online health portal	3.40	1.3	

	Telemedicine usage likelihood statements (overall mean = 2.83)	Mean	SD
<b>Table IV.</b> Dependent variable descriptive scores	Use telemedicine if offered by your current provider	3.3	1.3
	Use telemedicine from any health provider	2.9	1.3
	Switch to a provider offering telemedicine if your current provider didn't offer telemedicine	1.9	1.0
	Use telemedicine if offered by (client hospital)	3.2	1.4

channels, including Web Site Health Information (Std  $\beta = 0.22$ ,  $t = 8.4$ ,  $p < 0.001$ ), Social Media Health Info (Std  $\beta = 0.18$ ,  $t = 7.3$ ,  $p < 0.001$ ) and Internal Digital Health Info (Std  $\beta = 0.16$ ,  $t = 6.24$ ,  $p < 0.001$ ). Age was negatively related to future usage likelihood (Std  $\beta = -0.07$ ,  $t = -2.0$ ,  $p < 0.05$ ), while education was positively related (Std  $\beta = 0.06$ ,  $t = 1.96$ ,  $p < 0.05$ ). Gender and parental status were not significant.

### Discussion

The transforming health service ecosystem is re-shaping the patient-provider relationship (May, 2015). Research points to the paradigm shift of service delivery through digital tools increasing patients' engagement and role in value creation (Dahl *et al.*, 2018). Our study explores the digital health decision-making process and attitudinal factors that influence

TM usage. Further, we examine the role of omni-channel touchpoints supporting engagement and improved digital care delivery through TM.

*Theoretical contributions*

Our study contributes to the growing stream of research exploring the value of engaging patients through digital health tools (Chérrez-Ojeda *et al.*, 2018; Dahl *et al.*, 2018, 2019). First, we provide evidence that the perceived adoption-benefits that patients receive through TM motivate their usage. Second, we explore the potential impact TM may provide to encourage patient engagement and shared decision-making. Finally, we link omni-channel touchpoints to TM usage through social media platforms, external health websites and internal health marketer-controlled digital channels.

Consistent with TAM literature, our study finds that perceived adoption-benefits are central to understanding usage of digital tools (Rahimi *et al.*, 2018). The relative importance of the adoption-benefit access aligns with previous health literature suggesting access is a top consumer priority (Roettl *et al.*, 2016). The emerging omni-channel health touchpoints offer patients greater access to professional care removing traditional barriers related to geographical distance, time, and travel costs (Butcher, 2016). As a result, care offerings delivered through digital health touchpoints position health-care organizations as patient-centered in their approach to service delivery (Greenhalgh *et al.*, 2015). Traditional care models emphasized the provider as the central value creator, requiring patients to receive care in the manner, time, and location determined by the provider. The paradigm shift in digital care places the patient at the center of value creation encouraging usage in a manner most beneficial to patients’ needs (Vargo and Lusch, 2016) and increasingly aligns with consumers’ omni-channel behaviors in retail and other marketing contexts. Our findings suggest that future research should explore other adoption benefits that influence patient usage and value determination of digital health tools. Other TAM elements such as compatibility (Gagnon *et al.*, 2011), self-efficacy (Rho *et al.*, 2014), habit (Gagnon *et al.*, 2011), care uses and other benefits should also be explored.

Research suggests that digital health tools empower patients to improve their health behaviors and outcomes (Dahl *et al.*, 2018). Our study extends this research, providing evidence that perceived benefits related to personal health involvement and engagement opportunities through TM positively influences usage. Digital health touchpoints, like TM, offer patient–physician collaboration and aligns with health-care reform initiatives advocating for greater consumer involvement in their health and wellness (Hibbard *et al.*, 2015). Care delivery innovations, like TM, that improve consumer access and involvement have the opportunity to improve health outcomes and reduce inefficiencies in the health-care ecosystem. Much remains unknown about how consumers’ decision-making may evolve

Constructs and control variables	Std $\beta$	<i>t</i> -value	Sig
Health decision-making	0.39	15.09	0.001
Telemedicine access benefits	0.43	16.46	0.001
Social media health info	0.18	7.13	0.001
Website health information	0.22	8.40	0.001
Internal digital health info	0.16	6.24	0.001
Age	-0.07	-2.00	0.05
Highest level of education	0.06	1.96	0.05

Note:  $F = 82.04, p = 0.001, R\text{-Sq} = 0.471$

**Table V.**  
Multiple regression results

while using TM post-adoption. Our findings provide empirical evidence that demonstrates the relationship between decision-making involvement and consumers' interest in TM. Future research should continue to examine how digital health touchpoints contribute to shared decision-making and enable consumers to take active roles in health value co-creation (Dahl *et al.*, 2018). Research is also needed that explores the antecedents and consequences of consumer involvement through TM.

Finally, our results provide empirical evidence that there is a positive relationship with health consumers' usage of omni-channel touchpoints and TM usage. Previous research has explored this relationship with other digital offerings (Anderson *et al.*, 2016; Ramaswamy and Ozcan, 2018), but not within the TM context. Consumers increasingly have access to health omni-channel touchpoints as they navigate health information seeking and care decision making (Dahl *et al.*, 2018). Research suggests that as consumers use omni-channel health resources, their engagement with their health and comfort level with technology-based care increases (Zhang *et al.*, 2017). Our findings lend support to research pointing to omni-channel touchpoints increasing patients' interest and engagement in digital health tools. Specifically, we provide evidence that consumers' usage of social media health information, website health information, and internal health digital channels impacts the usage of TM. These results further demonstrate the changing health ecosystem, which revolves around digital tools and care delivery. Marketers need to understand that consumers increasingly will prefer marketing touchpoints that align with consumers' desired decision-making environments. Further research should examine more comprehensive frameworks exploring the antecedents and interrelationships of omni-channel touchpoints and TM usage.

#### *Managerial implications*

Our findings suggest omni-channel touchpoint usage heightens consumers' desire for other digital health tools (Ramaswamy and Ozcan, 2018). When health organizations include digital care into their care delivery strategy, it allows for increased consumer involvement in decision-making and motivates health/wellness improvements (Dahl *et al.*, 2018). Our results indicate that patients are interested in digital tools such as TM when they believe TM service delivery offers an opportunity to increase their role in health decision-making.

Given the role other omni-channel touchpoints have on influencing consumers' usage of TM, health marketers should create strategies to encourage consumer adoption of a variety of omni-channel health touchpoints. Unfortunately, the health-care ecosystem often remains skeptical of many of these touchpoints and may deter rather than support consumers integrating the full array of digital health resources that would improve decision-making and health outcomes (Dahl *et al.*, 2019).

Marketers should also strive to create synergy across omni-channel offerings (Manser Payne *et al.*, 2017), as the omni-channel landscape is increasingly part of the care delivery experience and consumers' decision-making processes. Health organizations need to remove silos that may prohibit the integration of care delivery across both omni-channel and traditional environments (Cummins *et al.*, 2016). Health providers and marketers need to develop omni-channel marketing strategies to ensure content, messaging and information sharing aligns with care delivery. In the modern health landscape, patients prioritize convenience, efficiency and cost (Shrank, 2017). Digital touchpoints, like TM, provide patient access benefits not possible through traditional care delivery. Our study finds evidence the TM access benefit highly influences TM usage. As a result, marketers should emphasize the patient benefits that various digital tools offer to encourage consumer engagement and usage.

### Limitations and future research

While our study contributes to the literature in a number of ways, it has limitations that offer opportunities for future research. First, our sample's ages skew towards an older population. While this reflects the distribution of ages at a Midwestern health-care system, it does not offer a full comparison of generational attitudes. In alignment with previous research, our results demonstrate that age significantly impacts attitudes toward usage of digital health tools (Adamson and Bachman, 2010; Albert *et al.*, 2011; Mehrotra *et al.*, 2013). However, our research does not uncover how age impacts other perceptions and attitudes toward TM. Future studies should further explore generational differences in attitudes toward digital health tools. Second, our study examines the cross-sectional perceptions of patients. Patient attitudes toward TM may change after several service encounters. Research is needed investigating the longitudinal attitudes toward TM post-usage. Future studies should also examine loyalty and patient satisfaction in the TM context. Finally, our study empirically tests the direct impact of adoption-benefits, health decision-making and omni-channel behaviors on TM usage.

While our results provide strong evidence for these direct relationships, research suggests that TM usage is complicated and multi-faceted (Rahimi *et al.*, 2018). Future studies should explore more comprehensive frameworks examining the interrelationships of attitudes toward TM, and particularly research that investigates how increased usage impacts engagement, improved service delivery and identifies user characteristics that influence why and how often TM is used.

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