CONFERENCE ARTICLE

DETERMINANTS OF DIGITAL HEALTH INFORMATION SEARCH (DHIS) BEHAVIOUR: EXTENDING UTAUT WITH HEALTHCARE BEHAVIOUR CONSTRUCTS

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ABSTRACT

INTRODUCTION:

As the availability of huge amounts of digital health information content increases, the popularity of Digital Health Information Search (DHIS) has increased. This paper explores the determinants that influence the intention to DHIS by the public by extending the UTAUT model with health behaviour constructs like health consciousness, attitude towards health information, and trust in DHI.

METHOD:

The instrument used in this study was created by adapting scales from previous studies. Survey forms were circulated through online platforms with the snowball sampling technique. With the 345 finalized sample, analysis was carried out, and structural equation modelling (SEM) is used for data analysis with the help of SPSS v.26 and AMOS v.26.

RESULTS:

Sample demographics show that 60% of the respondents have experience of 5 years in using smartphones, and 70% of respondents use the smartphone from 1 to 6 hours per day. We see that less time was spent on digital health information (DHI). For searching DHI, respondents use Google/other browsers and for sharing it, WhatsApp is the most used app. The reliability of scales was checked in SPSS, which resulted in Cronbach's alpha value greater than 0.7 for all scales. The hypothesis testing resulted in all the constructs showing a significant relationship. We see that performance expectancy, social influence, and trust in DHI showed a strong significant relation with the intention to DHIS.

CONCLUSION:

This study extends the literature in information systems adoption studies by adding a combination of the technology acceptance model with health constructs. Factors influencing the intention to DHIS are accessibility, influence from peers, and information reliability are more concerned. This study shows the importance and need for genuine DHI from valid healthcare providers, in which the creators of healthcare information, like government and private healthcare providers, have to be more conscious.

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KEYWORDS

digital health information, UTAUT, health consciousness, trust, attitude, health behaviour.

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INTRODUCTION

The use of the internet for various kinds of information searches has taken a great role in people's lives. Health is the most important factor during the pandemic, forcing many internet users to search for healthcare information online through different sources. The most important resources like digital technologies, internet availability, broadband connections, computers, and smartphones adoption to the public are creating the best sources for the digital health information [1]. The health information search in online has great attention during COVID-19COVID-19-19 and post COVID-19COVID-19-19, it continued with more effectiveness [2].

The ability and skill in finding and evaluating digital health information make it easier to maintain health individually and reduce the time of interaction with healthcare providers [3]. The interest for digital health information has increased with less efforts, minimum cost and time [4]. The Internet is a better source for searching and communicating health-related information like health issues and activities [5]

Healthcare providers started to provide digital health information available to the public through Facebook, YouTube, and websites [6], during COVID-19COVID-19-19 which played an essential role in the healthcare decisions of the public. Because of the developments in digital media, communication has increased the sharing of individual thoughts, images, videos, and emotions [7, 8, 9] has increased. People who have an active attitude and own involvement in their healthcare will effectively avoid diseases, maintain fitness, communicate with doctors, get the proper health guidance, and make the proper health decisions [10, 11]. There are different mentalities of people in different locations who are not equally copping with the technologies and their utilization, also they differ in their attitude towards their health and maintaining health activities [1]. So, in this context, we can observe different levels of adoption of digital health information search (DHIS). The data from internet searches says that people mostly searched about COVID-19COVID-19-19 symptoms, sanitisers, masks, and precautions during the COVID-19 pandemic [12, 13]. So, with this, we can conclude that digital health information search has taken a great leap during COVID-19 and post COVID-19.

Previous studies provided much information related to the adoption and usage behaviours of the health information, but there is no proper theoretical framework for it [14]. We have the technology adoption and theories that can help predict the DHIS behaviour. Unified theory of acceptance and use of technology (UTAUT) by Venkatesh et al. [15] is a technology acceptance theory that showed a unified theoretical framework for the Information Systems research. We combine the UTAUT with the Digital health information (DHI) research to get the systematic outcomes of determinants that influence the DHIS behaviour. The behaviour of DHIS must be equally studied with the technology acceptance behaviour. We explore the determents that influence the public DHIS behaviour and extend the UTAUT by adding Trust, health consciousness, and attitude towards health information (HI).

With this the objectives of this study are as follows:

1. To explore the theoretical outcomes of determinants affecting the DHIS behaviour
2. To examine the technology adoption model in the Healthcare communication research
3. To examine the health consciousness, trust, and attitude towards HI in DHIS behaviour

LITERATURE AND HYPOTHESIS DEVELOPMENT

PERFORMANCE EXPECTANCY (PE)
Performance expectancy is referred to as the public belief of utilizing a technology that can help his/her performance benefits [15]. Constructs, namely performance expectancy, have strongly proved that it is consistently the strongest predictor of behavioral intention [16]. The study of Hoque and Sorwar [17] on mHealth explained that performance expectancy has a positive effect on the behavior intention of the public on mHealth services [18, 19, 20].

H1. Performance expectancy is positively related to "intention to DHIS" (BI)

FACILITATING CONDITIONS (FC)
Facilitating conditions refer to how the individuals perceive that there should be some resources and skills to use the specific technology [15] earlier studies continuously refer that there should be both resources and skills for adopting the new technologies, especially in healthcare technologies like electronic medical technologies [21] and

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healthcare information technologies [22]. Studies found a positive relationship between facilitating conditions and technology use [23]. Hence, we framed a hypothesis that:

H2: FC is positively related to the intention to DHIS

SOCIAL INFLUENCE (SI)

Social influence refers to the individual's perception that their peers like family members, friends, and colleagues believe that he/she should use the technologies [15], earlier studies examined the social factors that influence technology adoptions and resulted in significant relation between social influence and the adoption of technologies specifically health-related technologies like health app usage [18] and mHealth. [17]. We, therefore, propose that:

H3: Social influence is positively related to intention to DHIS

HEALTH CONSCIOUSNESS (HC)

The persons with more health concerns and those who can be able to maintain their own health are known to be Health conscious. It refers to the extent an individual is able to maintain his/her own health [5]. There are studies that included health consciousness as the additional determinant in different technology models like UTAUT [18] and TRAM. Damberg [18] and Chen and Lin, [24] found that technology adoption constructs show more significant results when combined with health consciousness. Earlier studies found that health value is significantly related to anxiety and attitudes toward individuals' health behaviors [25]. Therefore, we hypnotize that:

H4: Health consciousness is positively related to intention to DHIS

ATTITUDE TOWARD HEALTH INFORMATION (AT)

Attitude is the extent to which consumers have an opinion, either positive or negative about behavior in adopting or usage of IT tools [26]. Attitude has been used across prominent models of IS/IT adoption and these models suggest that an individual's adoption intention is determined by their attitude toward using the IT or any new tools [27]. The previous studies in the healthcare IT adoption, excluded this attitude as the main construct [28].
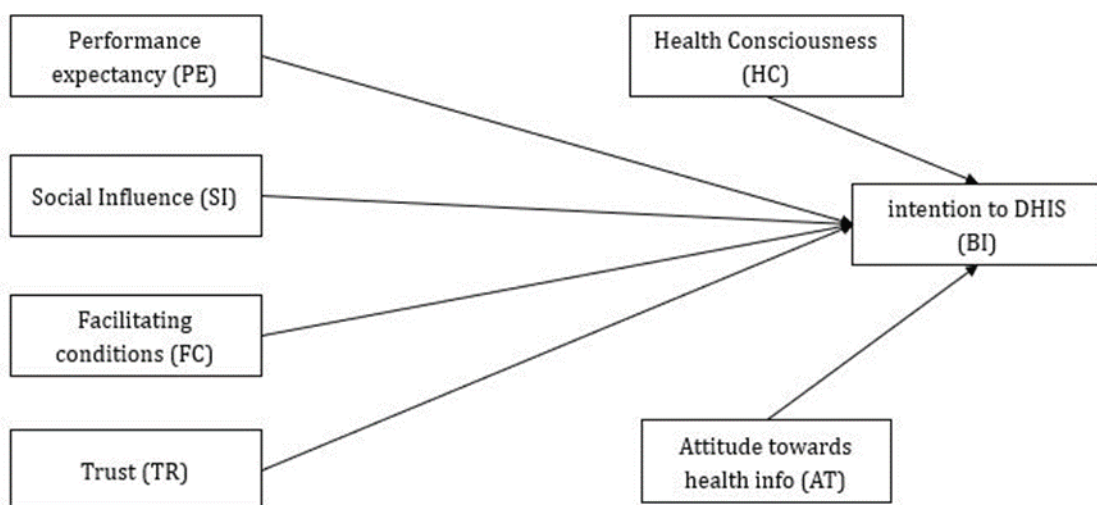
H5. Attitude towards health information will have a positive and significant influence on intention to DHIS

TRUST (TR)

Trust is the extent to which he/she is willing and confident in the tool and IT to be used; earlier studies exposed the role of trust in different concepts like banking and digital transactions [29]. As we know, health information is essential and trust in the health information which is shared and to be shared is more essential [30]. When the individual trusts the digital health information from providers, and if it is reliable from valid healthcare providers, they intend to search the health information digitally. Thus, we proposed the hypothesis:

H6. Trust is positively related to the intention to DHIS.

FIGURE 1: PROPOSED MODEL - VARIABLES RELATING TO INTENTION TO DHIS

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RESEARCH METHODOLOGY

This empirical study is conducted with the primary data collected from the Indian population who search for healthcare information on the internet. We conducted an online survey with a questionnaire in Google Forms. We received 400 responses, from which 345 responses were finalized for the analysis. The discarded responses were with incomplete information of demographics and behaviour items. In the Investigation of UTAUT, SPSS (v. 26) is the most used software tool in the analysis process, different researchers also use AMOS (v. 26) Graph. Numerus of studies on the decision of sample size suggests that the size of the sample can range from 5 to 10 times of the items used in the study scale is suitable. With the hypothesis derived from literature a research model is proposed as set out in the Figure 1, which shows the relations between different variables and intention to DHIS.

This study conducted under the ethical standards of the institutional Ethics Committee (University of Hyderabad) (UH/IEC/2021/160) and informed consent was provided to the participants and the participation was made voluntary.

QUESTIONNAIRE DESIGN AND VARIABLE MEASUREMENTS

The instruments in this study were taken from previous studies to assure the validity of the outcomes. Items of the performance expectancy (PE), social influence (SI) and facilitating conditions was measured with items taken from Venkatesh et al. [15]. The health consciousness and attitude towards health information (AT) items were adapted from Dutta-Bergman [5], items that measure the trust (TR) are taken from Deng, Liu, & Hinz, [26]. Final questionnaire consisted of two parts. The first part is the information of respondent's demographics and their intentions towards the DHIS. The second part consists of the statements designed to validate the respondent's intentions on determinants of DHIS. Statements were measured on the five-point Likert scale, score ranging from 1 = "strongly disagree" to 5 = "strongly agree"

DATA ANALYSIS

Structural equation modelling (SEM) statistical technique was used to test the proposed model, SEM is the best suitable to test for UTAUT models as recommended by social science researchers. we used Kaiser-Meyer-Olkin (KMO) test to test the sample adequacy, and the result value we got was 0.854, indicates that the sample is adequate. We applied Harman's single factor technique in order to investigate the common method, according to the data, for a single factor, the total variation is 40%, which is below the threshold value of 50%. The variance inflation factor (VIF) value was noted below the 3.3 limit [31], indicating that common bias does not exist in this study.

RESULTS

DEMOGRAPHICS

For sample demographics, Table1 illustrate that 45.8% of the respondents were female and 54.2% were male, 44.1% of the respondents were in the age range from 22 to 25 years. We observed that 60% of the respondents have experience in using a smartphone for more than 5 years; time spent on smartphone was that 70% spend 1hour to 6 hours per day. When we asked respondents about their time spent on one DHIS, we see that 43% of the respondents spend 15 minutes and 33% spend 30 minutes on one DHI. As there are many sources to get DHI, we see that 50.7% of the respondents use the Google/other browser and 27.7% use YouTube for DHIS, and we see only 12.9% use healthcare apps for DHIS. When the respondents feel that the DHI is good for communicating, they use different sources to share it. 65% of respondents use WhatsApp to share health information with their friends or family members.

TABLE1: DEMOGRAPHIC INFORMATION

		Frequency	Percent
Gender	Female	158	45.8
	Male	187	54.2
Age (in years)	18 - 21	65	18.8
	22 - 25	152	44.1
	26 - 29	57	16.5

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	30 - 33	35	10.1
	34 and above	36	10.4
Education	10 + 2	16	4.6
	Graduation	139	40.3
	Post-graduation	175	50.7
	Ph.D.	15	4.3
Experience in Phone usage	Less than 1year	6	1.7
	1year	12	3.5
	2years	26	7.5
	3years	28	8.1
	4years	66	19.1
	5years and more	207	60
Time Spend on one Health Information	15minutes	149	43.2
	30minutes	115	33.3
	1hour	45	13
	1 - 2hours	20	5.8
	3hours and more	16	4.6
Time spent on Phone per day	less than 1hour	18	5.2
	1 - 3hours	121	35.1
	4 - 6hours	121	35.1
	7 - 9hours	63	18.3
	10 - 12hours	20	5.8
	more than 12hours	2	0.6
Medium used to search HI	Google/another browser	298	50.70
	YouTube	163	27.70
	Facebook	43	7.30
	Any healthcare app	76	12.90
	Other (Instagram, Dailyhunt, Inshorts, local news apps, TOI)	8	1.40
Medium used to share HI	WhatsApp	311	65.10
	Text messages	58	12.10
	Social Media (FB Instagram Twitter etc.)	94	19.70
	Other (e-mails and WOM)	15	3.10

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MEASUREMENT MODEL

Composite reliability (CR), Cronbach's alpha (α) and average variance extracted (AVE) tests were performed to assess the reliability and convergent validity. Every item had a loading of more than 0.7. [32]. All of the item loadings are listed in Table 2. The literature suggests that item loading between 0.6 and 0.7 is appropriate. Table 3 shows the reliability of the measurement items as determined by α, CR, and AVE at the construct levels. The results show that α and CR scores are higher than the proposed 0.70, and AVE values are higher than the 0.50 threshold, indicating that the acceptable convergent validity.

To test the discriminant validity in this study, we employed Heterotrait Monotrait ratio of correlations (HTMT). HTMT.85 is the best suitable test to indicate the issue of discriminant validity in the study context. [33], we did this test in AMOS v.26 software using the plugin "Master Validity Tool" [34]. HTMT values between every construct are below the threshold 0.85 as shown in Table 4, indicating that constructs in this study form the requisite discriminant validity.

TABLE 2: FACTOR LOADINGS FOR EACH ITEM OF THE VARIABLES

Item	Performance Expectancy	Social Influence	Health Consciousness	Facilitating conditions	Trust	Behavior Intention	Attitude
PE1	0.76						
PE2	0.827						
PE3	0.705						
SI1		0.845					
SI2		0.858					
SI3		0.887					
HC3			0.709				
HC2			0.812				
HC1			0.736				
FC1				0.672			
FC2				0.75			
FC3				0.772			
TR3					0.882		
TR2					0.883		
TR1					0.863		
BI1						0.838	
BI2						0.721	
BI3						0.82	
AT4							0.786
AT3							0.657
AT2							0.697
AT1							0.734
AT5							0.796
AT6							0.708

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TABLE 3: CR, AVE AND SCALE RELIABILITY VALUES FOR THE MEASUREMENT MODEL

	CR	AVE	Scale Reliability (α)
PE	0.809	0.587	0.806
SI	0.898	0.746	0.898
HC	0.797	0.568	0.810
FC	0.776	0.536	0.778
TR	0.908	0.768	0.907
BI	0.837	0.632	0.835
AT	0.873	0.534	0.869

TABLE 4: HTMT ANALYSIS FOR THE DISCRIMINANT VALIDITY

	PE	SI	HC	FC	TR	BI	AT
PE							
SI	0.744						
HC	0.444	0.313					
FC	0.689	0.526	0.415				
TR	0.704	0.736	0.228	0.497			
BI	0.806	0.756	0.367	0.625	0.835		
AT	0.659	0.421	0.774	0.523	0.362	0.503	

STRUCTURAL MODEL

Before investigating the proposed hypotheses, the structural model fit indices were tested in AMOS (v.26) using the plugin "Model Fit Measures" [35]. Previous studies suggest a combination of comparative fit index (CFI) >0.95 and also standardized root mean square residual (SRMR) <0.08. To further solidify evidence, add the root-mean-square error of approximation (RMSEA) <0.06". The overall chi-square (CMIN) for the structural model was 477.295 with DF = 231 and CMIN /DF = 2.066. The (CFI) was 0.951 and the RMSEA was 0.056; these results shown in Table 5 provide strong evidence for proposed model's good fit.

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The significance of the proposed hypothesis was tested in AMOS and shown in Figure 2 the results which are in Table 6 indicate the strong significant effect of performance expectancy, social influence and trust (TR) on intention to DHIS (*** p < 0.001), which supports Hypotheses H1, H3 and H6. Impact of facilitating conditions on intention to DHIS was significant as per the analysis (* p < 0.050) that supports Hypothesis H2. The health conciseness and attitude toward health information are significantly affects intention to DHIS (** p < 0.010), supporting hypotheses H4 and H5. This study shows that PI, FC, SI, HC, AT, TR are positively influencing the intention to DHIS.

TABLE 5: MODEL FIT MEASURES FOR THE STRUCTURAL MODEL

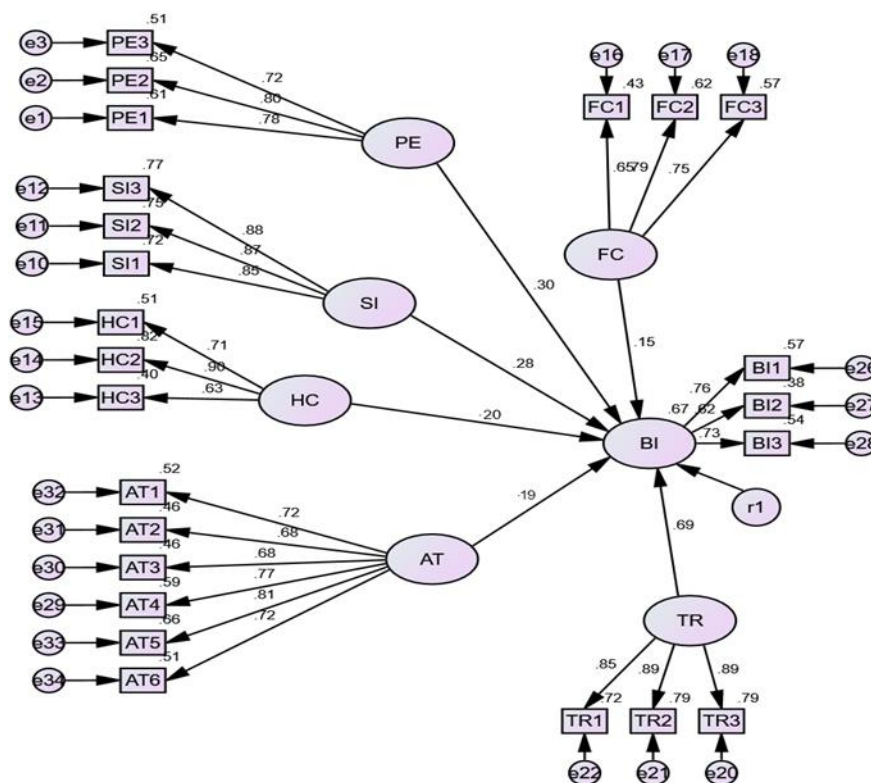| Measure	Estimate	Threshold	Interpretation
CMIN/DF	2.066	Between 1 and 3	Excellent
CFI	0.951	>0.95	Excellent
SRMR	0.053	<0.08	Excellent
RMSEA	0.056	<0.06	Excellent
PClose	0.092	>0.05	Excellent

FIGURE 2: STRUCTURAL MODEL WITH SIGNIFICANT VALUES

TABLE 6: HYPOTHESES SIGNIFICANT VALUES FOR PROOSED HYPOTHESES

			P	Significance
BI	<---	PE	.000	***
BI	<---	FC	.022	*
BI	<---	SI	.000	***

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			P	Significance
BI	<---	HC	.009	**
BI	<---	AT	.009	**
BI	<---	TR	.000	***

*p<0.050   **p<0.010   ***p<0.001

DISCUSSION

The admiration of digital health information has increased because of the availability of the different and huge quantities of online information with less effort and minimum cost and time. Previous studies concentrated on collecting the information related to specific constructs [17], but we also incorporated the information about the mediums used for DHIS and DHI share in this study. As we see in the observations, many people are into the usage of smartphones and the internet for healthcare information. google/other browser is the medium used by most people to search for health information, and YouTube takes the next place. Healthcare apps users are very few in finding healthcare information. Most people are using WhatsApp to share the health information with their peers. The individual spends time on health information is very less, leading to incomplete knowledge of the health issues. As we see in previous studies, there are few studies that involved a technology acceptance model in health information studies [25]., There are very few studies that involved health-related constructs in the technology acceptance studies in healthcare [28].

In this study health consciousness, trust on DHI and attitude towards the DHI are showing statistically significant the same as the original constructs of UTAUT. While searching for DHI reliability and accessibility of the internet and the DHI playing the main role in DHIS intention, social influence is highly significant in relation to DHIS intention, which means family members or friends more influential people in searching for DHI. Individuals' health consciousness is driving them to search for health information on the internet and develop their knowledge of health issues. The positive or negative opinions on healthcare information and trust involved in the online health information develop the intention of DHIS. Limitations of this study was observed in two ways. The first one is the study consists more of young age respondents and future study can be done with dotage population also. The second is the selection of determinants can be increased towards usage of DHI. The study also suggests the extension with usage behavior of DHI and social media influence as determinants.

CONCLUSION

The first contribution of this study is to incorporate health-related constructs into the technology adoption model, which adds to the literature. This study gives a rich understanding of DHIS by knowing what sources are used to search and share DHI and how much time people spend on DHI.

This study suggests that healthcare app developers should increase the availability of health information in their healthcare apps. Individuals should also know more about any health issue and get valid and reliable information from trusted healthcare providers.

This study highlights the impact of health consciousness, attitude towards health information, and trust on DHIS behavior.

These findings accentuate the need for genuine digital health information that values the trust of the public and notifies digital health information creators like health experts and government health providers to consider the health behaviors of the public while creating the digital health information. This study suggests that researchers should adopt the health behavior constructs in their studies of healthcare technologies adoption. With the influence of family and friends, an individual shows interest in digital health information in learning about health issues and solutions. It is essential to check whether the provided health information is from reliable sources.

MANAGERIAL IMPLICATION

The study provides a direction for assessing human behavior regarding searching for healthcare information. Human behaviors are essential for designing health care

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apps and information platforms, which need to be taken care of during the commissioning of any services relating to health care, particularly in the health information domain. The DHIS is the predominant issue for which managers have to focus more on advancing the dissemination of information on the digital platform, which must align with the health care needs of the people. Factors like trust and quality of information play an important role for the viewers; hence managers have to be conscious of these parameters to penetrate the market.

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