

Article

Engagement in Healthcare Systems: Adopting Digital Tools for a Sustainable Approach

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Abstract: The rapid development of new technologies has created interesting and unexpected possibilities in e-health, and digital platforms have become widespread, connecting users, experts, and practitioners of the health world. This triggered our investigation into the relationship between the engagement platforms used by 293 doctors with various specializations, their satisfaction, and the dimensions of social sustainability in the healthcare sector. The research focused on professional interaction and its sphere of action in engagement platforms, defined as virtual contact points for exchanging information, thus increasing the co-creation of value between physicians and patients. In order to verify our hypothesis, a health digital platform called *paginemediche.it* was used, and the two dimensions of engagement and sustainability were considered, examining their causal relationship and evaluating their effects on physician loyalty in terms of the re-use of the digital platform by doctors. Our results, using a multiple linear regression analysis, showed that the social sustainability of the digital health platform was directly influenced by online engagement, generating a positive effect on physician loyalty. In particular, the human dimension of social sustainability proved to be decisive for the re-use of the platform.

Keywords: engagement platform; digital health; social sustainability

1. Introduction

The rapid development of new technologies has created numerous possibilities in e-health, by which healthcare can be delivered from a distance through information and communication technologies (ICTs). The term “e-health” refers to health services and simplified, updated health-related information provided by the Internet and related technologies [1].

The integration of these supports into healthcare aims to make care more patient-centered. This means promoting communication and collaboration between professionals and patients and includes a wide range of services such as, among others, electronic health records, computerized entries for physician’s orders, e-prescribing, consumer health information, etc. [2].

Within the United Nations Sustainable Development Goal (SDG) no. 3, sustainable development and healthcare monitoring are considered critical factors for guaranteeing well-being across all ages. Recently, interest in the use of the Internet for health-related purposes has increased significantly in the scientific community and in the public domain. Following these proposals, digital platforms have spread, connecting users, experts, and practitioners in the health world [3]. The purpose of this work was to analyze the relationship between the digital platforms used by doctors, their satisfaction, and, subsequently, some dimensions of social responsibility by evaluating stakeholder engagement. The epistemic hypothesis is that there is a positive relationship between online engagement and the

improvement of the perceived level of service sustainability through the role of mediation performed by the new sharing platforms.

Breidbach and Brodie [4], who integrated existing literature in marketing and service research, underlined the essential function of digital platforms in simplifying interaction, value co-creation, and engagement among stakeholders in service ecosystems. Thanks to their characteristics of interactivity, these platforms easily allow the co-creation of value among users, feeding virtuous circles that increase the loyalty of doctors, and the well-being of the subjects to whom the health services are directed.

In order to verify our hypothesis, a digital health platform was investigated. This functions mainly as an online forum in which doctors can answer questions from patients who are increasingly searching for online information. In addition to offering a data-driven medical service, the platform provides innovative services such as online reservations, digital therapies, and other forms of therapy. Registering with the online community allows patients to connect their own wearable devices and store their data such as weight, heart rate, sleep duration, etc. Moreover, they have access multimedia content such as health programs and digital therapy based on their interests and on the stored biometric parameters. Users can find the most suitable answers to their question within a database of more than 78,000 clustered “questions & answers” provided by doctors and through online interaction with about 8000 active and profiled doctors. Physicians can register with the platform, using an extensive suite of services for those who want to gain visibility, connect and engage with patients, and manage their practices.

Online platforms include an accurate profile with a personal and professional blog to actively contribute to online health information, a secured encrypted messenger to communicate directly with their patients, and customer relationship management (CRM) for the patients, which is linked to digital health services, such as “book a visit,” “send a patient kit,” and “suggest a digital therapy,” and private access to telehealth and telemedicine services. In addition to the numerous services that connect doctors and patients, the online platform is also used as a scientific comparison between experts and a professional updating tool.

Despite the increasing importance of online stakeholder engagement in practice, the academic debate remains in its infancy, especially regarding the role played by sustainability in social media [5,6]. Therefore, this research aimed to contribute to the literature by defining engagement and sustainability in their various dimensions, investigating their causal relationship, and evaluating their effects on loyalty when adopting online health platforms.

The present paper is structured as follows: In the next section, the theoretical background of the study is presented, reporting on the essential theoretical issues examined in the survey (Figure 1).

Then, the theoretical framework and methodology used in the survey are explained. Finally, the empirical results are reported, and the findings are discussed.

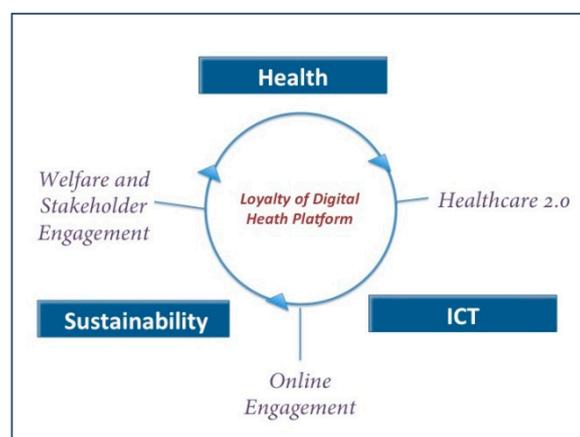


Figure 1. Main issues and scientific topics.

2. Literature Review

Technological advancements have deeply modified the nature of consultations in healthcare. The role of patients is gradually shifting away from acquiescent or silent participation and beginning to reflect a need to gather information and make their own decisions [7]; the broad diffusion of digital platforms has also influenced this shift [8–10]. Osei-Frimpong et al. [11] highlighted how online tools including blogs, patient forums, scientific online communities, etc., have a fundamental role in the health of an individual and the healthcare system as a whole [12,13], considering that the active participation of patients is crucial to the improvement of medical performance and clinical treatments [7,14].

Today, in any business context, public or private, the advantages of more directly involving stakeholders (customers, clients, suppliers, or partners) and creating value by identifying their needs and providing effective solutions are widely recognized [15,16]. Similarly, companies operating in the health world follow a systemic approach [17,18] involving doctors and patients and adopt new, highly customized technology in order to more actively engage their stakeholders and explore how to co-create value for all online actors. The recent adoption of online communities [13,19] fosters the exchange of information between both health professionals and patients [2]; therefore, increasing co-created value [20] through stakeholder engagement.

The engagement concept was introduced more explicitly to better define frameworks of “social legitimacy,” “corporate social responsibility,” and “long-term sustainability” [21] in an attempt to understand and explain, both qualitatively and quantitatively, the kind of relationship that exists between an organization and its stakeholders [22]. Hence, organizations now know that they must identify their needs to satisfy their expectations. From a broader perspective, sustainable development means moving towards engagement, rather than limiting their approaches to the resolution of conflicts deriving from different expectations [23]. Stakeholder engagement is generally seen as the process that involves individuals and groups who influence the activities of a company or who are affected by it [24], and is ultimately about relationships [22,25]. Nevertheless, stakeholder engagement can be examined from the point of view of organizations that involve stakeholders to identify and satisfy their need and also to generate wide and sometimes spontaneous networks of mutual responsibility through relationships [26,27]. The broad nature and relevance of stakeholder engagement issues have been confirmed by the different aspects investigated in the literature. The study focused on social media engagement [28] and the object of the study orbited around engagement platforms defined in terms of physical or virtual contact points to promote the exchange of resources, and, thus, the co-creation of value among participants [29]. Engagement platforms operate in service ecosystems that identify the limits within which the stakeholders move. In these contexts, they interact to share information in any space or time permitting the co-creation of value [30–32]. In several online communities, the engagement is a participatory social process [33,34] that goes beyond customers to other stakeholders, involving different kinds of partners [35–38], making them participants in business management, sharing information, and engaging in dialogue [27].

Across this wide breadth of online communities, digitalized health platforms of engagement have become increasingly common. Here, the actors (doctors, practitioners, experts, etc.) are seen not only as mere stakeholders but as operant resources in the process of service co-creation, by means of their direct effect on other resources [33].

The online engagement, essential for the effectiveness of a community, is a construct comprising three dimensions: emotional, behavioral, and cognitive dimensions [29,39]. Hence, social media can produce elevated levels of engagement in the consumers and improve the knowledge and emotional involvement of the users [32]. The relationship between engagement in social media and loyalty was investigated by means of the social interaction value [40,41], showing the importance of information sharing and social connections to motivate the use of engagement platforms [42].

This correlation can be further analyzed with regard to social sustainability as perceived by users. The issue of promoting sustainability in digital health platforms has not been adequately investigated

in the literature, but the method used as a reference for hospitals could inspire digital services. Some authors have stated that the principles and indicators of a hospital's sustainability and its social dimension are shaped by criteria encompassing humanization, comfort [43–45], and spatial distribution. Although the literature does not propose a singular definition of social sustainability [46,47], it refers to the human area of sustainability [48] and takes into consideration the fact that everyone must have the chance to live a complete existence in terms of intellectual, emotional, spiritual, and physical health [49]. Therefore, Hussain et al. [49] highlighted how social sustainability is becoming a key objective in healthcare. This is because, while on the one hand, healing patients is the main purpose of healthcare service supply chains, it is equally important to provide access and opportunities to learn about prevention and well-being. Even though the available literature reveals the importance of the social aspect of sustainability in healthcare, there is still a lack of theoretical and empirical studies on these issues regarding engagement platforms.

3. Theoretical Framework

The research model proposed in this study (Figure 2) examined and combined four analysis perspectives: (a) engagement in health engagement platforms, (b) social sustainability in health engagement platforms, (c) satisfaction, and (d) physician loyalty. In logical terms, the underlying hypothesis is that engagement, cognitive, affective, and behavior during the use of a health engagement platform exerts a positive influence on the perception of the platform's efforts to be socially sustainable, and that such a predisposition, in turn, constitutes a significant predictor of the intention to use the platform again in their professional work for the support of patients, both in terms of positive word of mouth feedback and frequency of digital platform use.

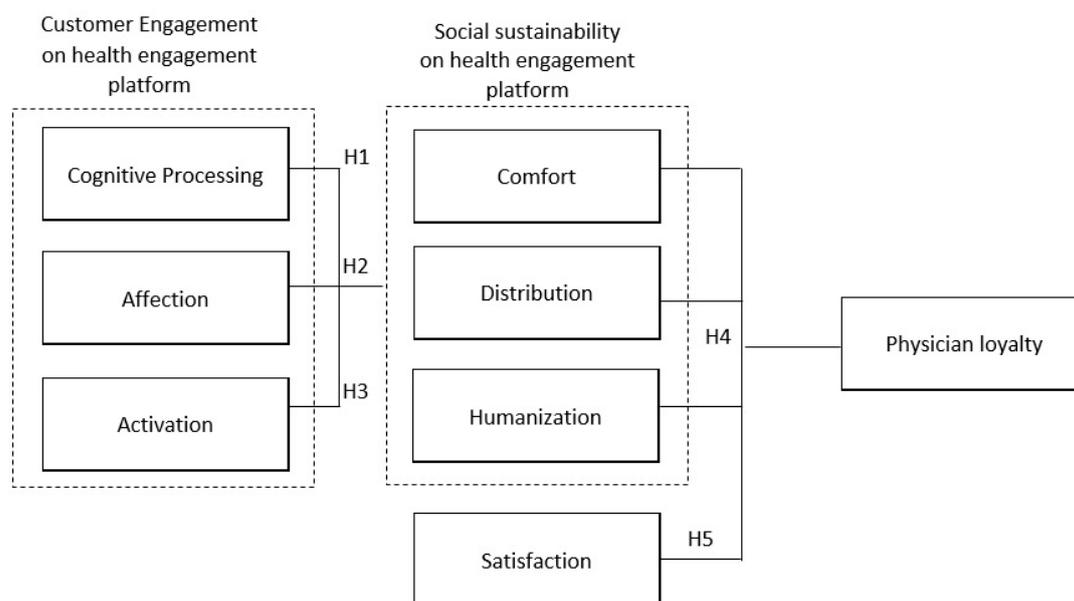


Figure 2. Research model and hypotheses.

From a theoretical point of view, the model relates four categories of constructs, based on the four aforementioned analysis perspectives:

- (a) Customer engagement in health engagement platforms defined as touch points that allow individuals to integrate resources and co-create value with each other and the firm beyond purchase [4,29,32,50], and identified through the cognitive component, which referred to the cognitive processing activated by the customer of the brand/organization during the consumer/brand interaction [51]; the affective component refers to the degree of affection that the consumer has for the brand in the consumer–brand/organization interaction [51], and the

behavioral component is defined as the time, energy, and effort that a consumer spends on the brand/organization during the consumer–brand interaction [51].

- (b) Social sustainability is defined as a genuine and credible long-term engagement in all business activities that are lived with consciousness and responsibility [52]. In this paper, we adapted the social sustainability scale used by Capolongo et al. [53] and Buffoli et al. [45] to measure social sustainability in health engagement platforms. This construct is identified through the “distribution” component (which considers the efficiency of the access paths and distribution of health engagement platform), the “comfort” component (which considers the online health environment through qualitative data such as quality and usefulness of information, inclusiveness of information), and the “humanization” component (regarding the relationship between the patient and doctors, social aspects, safety and security, collaboration, and wellness perception in the engagement platform).
- (c) User satisfaction is referred to “as a customer’s overall evaluation of the performance experienced with an engagement platform and is viewed as a consequence of customer engagement within the engagement platform” [32].
- (d) Physician loyalty in the engagement platform context, defined not only as retention, but also “as behavioral intention to continuously use engagement platforms with their present service providers as well as their inclinations to recommend this tool to others” [32] (p. 692). In the following sub sections, the research hypotheses are detailed and the theoretical assumptions underlying the relationships between the analytical constructs are described.

3.1. Influence on Social Sustainability of Engagement in Digital Health Platforms

The literature demonstrates that there is a *connection* between social sustainability and engagement. For Rogers (2005), engagement is the key element for a sustainable/resilient society [54]. The author applied the social sustainability indicators of Max-Neef et al. (1991) to demonstrate that cohesive communities where people learn together, participate, and share information and knowledge are more likely to be successful [55]. ICT can help a firm to incorporate sustainability and engage stakeholders. In this sense, the new digital engagement platforms can be considered as an ecosystem in which users co-create value through collaboration and participation with each other [56]. Although the literature has highlighted the importance of engagement platforms in sustainability [57,58], activated by organizations through processes of co-creation of value between users, platform managers, and stakeholders, at present, the role of engagement in digital health engagement platforms in social sustainability mechanisms has not yet been investigated. In particular, studies combining these two assets (user engagement and social sustainability) in the health context are still lacking in the literature. Studies on this topic have focused exclusively on the effects of the profiling systems of doctors (Physical Profiling System, PPS) and their impact on cost and performance [59]; other studies have investigated the impact of internet consultation and the use of blogs and forums on patient health and their intention to take care of themselves [60–62]. The importance of ICT-mediated knowledge is now being studied in the healthcare area. Some studies have investigated the processes that are activated in the digital engagement platforms, noting that the co-creation of value turns out to be a determining element of its effectiveness and determining the participation of the actors involved [4,63]. In general, engagement platforms that encourage the co-creation of value are considered as tools of sustainability. Recently, studies have proposed models where the processes of involvement between actors in the social, environmental, and economic system favor virtuous models based on sustainable behaviors [57], and in which the relational and experiential sphere are the key elements for the achievement of economic growth and human well-being. Already, Aquilani et al. [57] have emphasized the strategic role of value co-creation platforms for the occurrence of sustainable processes based on the real needs of all stakeholders involved. Therefore, stakeholder engagement, information, transparency, and the co-creation of value in the relationship between stakeholders have recently been considered as factors and criteria of sustainability [58]. Additionally, in the health context, the sharing of information and

co-creation of knowledge are becoming important aspects for an improvement in the quality of life of patients, and follow an approach that Adams [60] calls a “health goal-oriented approach.” With the digital information age, knowledge management and the reliability of data have become a strategic resource, so, today, we are witnessing the increasing use of engagement platforms generated by private organizations as tools for managing information and relationships with patients in socially sustainable environments. The digital health engagement platforms can be considered as tools of co-creation of value thanks to the possibility of sharing and co-creating useful information between patients and physicians. In light of these considerations, our framework assumed a link between the three components of engagement within the health engagement platform and the three dimensions of social sustainability. The hypotheses proposed were derived from the results of the studies that suggest the existence of close interrelationships between the co-creation of value in the health engagement platform and the perception of socially sustainable platforms in the medium- and long-term [57,58].

Hypothesis 1 (H1). *Cognitive processing has a positive relationship with the three dimensions of social sustainability (comfort, distribution, and humanization). That is, the greater the degree of interest the physician has or wishes to have in interacting with the health engagement platform, the greater the social sustainability perception of the engagement platform will be.*

Hypothesis 2 (H2). *The Affection dimension has a positive relationship with the three dimensions of social sustainability (comfort, distribution, and humanization). That is, the stronger the feelings of a physician related to using or interacting with colleagues or patients on a health engagement platform, the stronger the perceived social sustainability will be.*

Hypothesis 3 (H3). *Activation has a positive relationship with the three dimensions of social sustainability. That is, the stronger the enhancement of the consumer’s level of energy, effort, and time spent on an engagement platform, the stronger the perception of social sustainability will be.*

3.2. Social Sustainability and Engagement in Physician Loyalty

Authoritative scholars of scientific research in the health field such as Professor Umberto Veronesi [64] have long advocated the greater relevance of the social dimension of sustainability in the healthcare environment [45]. A relationship between social sustainability and stakeholder loyalty was highlighted by Baumgartner and Ebner [52]. The author affirmed that social sustainability “aimed to positively influence all present and future relationships with stakeholders” (p. 80). The implications of the implementation of social sustainability processes mostly relate to participation, knowledge, and sharing. In the literature, three types of consequences of social sustainability are recognized: Sharing information (sustainability of the customer value co-creating process); solidarity and more knowledge as a form of personal richness and expression of sustainability in the organizational environment; and, finally, “customer learning” [58]. These results have also been expressed by Garces et al. [65], who hoped for a change in the welfare culture toward co-responsibility that engaged both private and public sectors for the wellness of society. In this regard, the author talked about co-social sustainability to mean sustainability that sees the participation of all, but also of processes of social responsibility created together with all of the actors involved. A sustainable platform is able to explain the relationships between organizations and stakeholders [66]. Effectiveness and efficiency of services offered by profit and non-profit organizations and public institutions are an opportunity for the personal development of community members [67,68]. In this context, physician engagement activities represent a chance for personal development and for the protection of health patients. Although doctor engagement is a compelling issue in the health sector, the literature on the role played by the social sustainability of social media on physician behavior-based CRM performance in this context is still lacking. Kohli et al. [59] did, however, bring to light the benefits of customer relationship management in the health system such as hospital quality and profitability or improvement in physician performance.

The authors studied the benefits of e-platforms for the performance of physicians through the use of information management systems, demonstrating a strengthening of the relationship with doctors, improvement in the efficiency of clinical operations, and simultaneously of patient satisfaction. In light of what has just been said, it is possible to hypothesize that accessible platforms created to support physicians in their role of protecting and sustaining patient health are able to create a virtuous circle that is based on a return to using the platform and in positive word of mouth feedback that virtually translates into well-being for all stakeholders.

Hypothesis 4 (H4). *Social sustainability in health engagement platforms has a positive relationship with physician loyalty.*

It is also possible to argue that the platforms of engagement in this sense help and support this new mechanism of self-regulation of welfare processes with the aim of adapting, supporting, and facilitating the correct and circular disclosure of information in a way that reduces costs and is accessible for patients and doctors. Currently, the literature on customer engagement platforms demonstrates the link between platform use, satisfaction, and customer loyalty [32,50,69]. In particular, it has been shown that the emotional dimension of engagement has an effect on the return to use of the platform, on its word of mouth feedback, and on its fidelity [32,50,68,70]. In the literature on engagement platforms and service management, what has been demonstrated is a mediating role of satisfaction with regard to customer engagement and customer loyalty [68,70,71]. For Bowden [67,68], satisfaction permits the transition from a calculative commitment to enduring brand commitment during the engagement process. Earlier studies have confirmed the importance of satisfaction as the main factor affecting the customer engagement in the value co-creation and consequently, customer loyalty [32,72,73]. Therefore, we can affirm the following hypothesis:

Hypothesis 5 (H5). *Physician loyalty has a positive relationship with physician satisfaction.*

4. Methodology

Measurement Development

To detect the effectiveness of a digital health engagement platform in supporting doctors in their relationships with their colleagues and patients, an online survey was used to collect data on GPs' engagement with *paginemediche.it*, a digital health engagement platform. Data were collected from a random sample of 293 doctors who had used the engagement platform services. The participants gave their evaluation by means of 7-point Likert scale (from 1 = definitely disagree, to 7 = definitely agree). In order to ensure content validity, we adapted items from previous studies. Items measuring the physician engagement construct were modified from Hollebeek et al. [51]. The items measuring satisfaction and physician loyalty were taken from Wang et al. [74]. Finally, the items measuring the social sustainability of engagement platforms were adapted from Capolongo et al. [53] and Buffoli et al. [45]. The reliability of the entire online questionnaire survey, assessed by calculating the Cronbach alpha coefficient, was very satisfactory at >80. From these measurements of GPs' engagement in engagement platforms, user satisfaction, physician loyalty, and social sustainability, we calculated the overall indexes using the calculation of the average for each construct (see Table 1).

A multiple linear regression analysis was used to estimate the main effects of three dimensions (cognitive processing, affection, activation) of health engagement platforms (independent variables) on social sustainability and on physician loyalty (dependent variables). Moreover, we measured the mediating effect of satisfaction on physician loyalty. Each dependent variable was estimated by means of the regression model. In the final models, there were no multi-collinearity concerns between the independent variables because all of the measurements (VIF and Tol.) were well within the accepted cut-off thresholds (Field, 2009). To collect data in August 2018, we put information regarding our research objectives online to invite participants. The online survey was addressed to customers who

had an account on a health engagement platform. Mail was sent to the GPs registered on the health digital platform. For easy access to the survey page, a link to the online survey was added to the text that presented the goal of the research. Moreover, a message stating that the answers would be used only for research was placed before the link to the survey. In two months, we collected 293 responses.

Table 1. Descriptive statistics for independent and dependent variables ¹.

Index	M	DS	Min	Max
Cognitive processing	4.45	1.36	4.07	4.84
Affection	3.76	1.54	3.58	4.24
Activation	3.48	1.52	3.63	3.56
Satisfaction	4.63	1.32	4.46	4.74
Physician loyalty	4.61	1.41	4.59	4.78
Comfort	5.16	1.17	5.09	5.22
Distribution	5.06	1.15	4.81	5.26
Humanization	4.95	1.20	4.85	5.12

¹ To assess the items, we used a 7-point semantic differential scale (from 1 = definitely disagree to 7 = definitely agree).

5. Results

5.1. Descriptive Analysis of Sample

Table 2 reports the descriptive statistics of the sample. Of the 293 participants, 56% were females, 44% were males, and 96.9% were aged up to 46 years old. Most of them were adults with varied specializations (see Table 2).

Table 2. Descriptive statistics of the respondent characteristics.

Variable		Count	%
Gender	Female	56	19
	Male	239	81
Age	<25	0	0
	25–35	5	1.7
	36–45	4	1.4
	46–55	41	13.9
	56–65	144	48.8
	>65	101	34.2
Use of engagement platform	<1	14	4.7
	1 year	29	9.8
	2 years	32	10.8
	>2 years	220	74.6
Physician's qualification	General medicine	33	11.3
	Pediatrics	26	8.9
	Surgery	19	6.5
	Cardiology	19	6.5
	Gastroenterology and endocrinology	14	4.8
	Psychiatry and psychotherapy	13	4.4
	Neurology	12	4.1
	Geriatrics	7	2.4
	Gynecology	9	3.1
	Others	111	37.9
	Cell empty	30	10.2

5.2. Effect of Engagement Dimensions on Social Sustainability and Loyalty

A multiple regression was performed to evaluate the relationship between user engagement, social sustainability, and the mediating effect of satisfaction and social sustainability on user loyalty to platforms. Table 3 displays the standardized-b regression coefficients, R^2 , and F statistics following

the entry of the engagement platform variables that contribute significantly to social sustainability, user satisfaction, and physician loyalty, respectively. User engagement dimensions were regressed on social sustainability dimensions (Models 1, 2, and 3). Finally, user engagement dimensions, social sustainability, and satisfaction were regressed on physician loyalty (Model 4) (see Table 4). We controlled for gender and age. The significance of the F shows that both the multiple coefficients were widely significant. All regression models were significant and explain a substantial amount of variance as can be seen by the high R^2 (squared multiple correlation). As for the interpretation of the single coefficients of regression, the results showed that cognitive processing and activation were the independent variables that had the greatest impact on all of the dimensions of social sustainability while the affection dimension had its greatest impact only on the distribution and humanization dimensions of social sustainability.

Table 3. Backward multiple regression results for the engagement platform and sustainability ².

Model 1 *			Model 2 **			Model 3 ***			
Comfort			Distribution			Humanization			
Standardized Coefficient	t	Sig.	Standardized Coefficients	t	Sig.	Standardized Coefficients	t	Sig.	
(Constant)	7.932			8.447			7.724		
Cognitive processing	0.512	6.537	0.000 ***	0.405	5.180	0.000 ***	0.365	4.791	0.000 ***
Affection	0.117	1.278	0.202	0.228	2.493	0.013 **	0.266	2.998	0.003 ***
Activation	0.128	1.734	0.084 *	0.131	1.775	0.077 *	0.156	2.168	0.031 **
Age	0.009	0.221	0.825	0.019	0.431	0.667	0.009	0.223	0.824
Gender	-0.021	-0.491	0.624	-0.050	-1.151	0.251	-0.049	-1.172	0.242
Adjusted R ²	0.507		0.508			0.535			

² Note: * $R = 0.71$; $R^2 = 0.515$; $F = 61.00$; $p < 0.01$; ** $R = 0.719$; $R^2 = 0.517$; $F = 61.33$; $p < 0.01$; *** $R = 0.737$; $R^2 = 0.542$; $F = 68.06$; $p < 0.01$.

Table 4. Backward multiple regression results for the engagement platform, sustainability, satisfaction, and behavior-based CRM performance ³.

Model 4 ****			
Physician Loyalty			
	Standardized Coefficients	t	Sig.
(Constant)		0.195	
Cognitive processing	-0.015	-0.240	0.811
Affection	0.257	3.747	0.000 ***
Activation	0.080	1.389	0.166
Age	-0.013	-0.413	0.680
Gender	0.014	0.432	0.666
Comfort	0.120	1.474	0.142
Distribution	0.048	0.495	0.621
Humanization	0.157	1.993	0.047 **
Satisfaction	0.310	4.571	0.000 ***
Adjusted R ²	0.734		

³ Note: **** $R = 0.882$; $R^2 = 0.742$; $F = 90.576$.

H1 and H3 were supported by the results while H2 was in part supported by the results. In fact, while the “cognitive processing” and “activation” dimensions of physician engagement had a positive relationship with all of the three dimensions of social responsibility, the “affection” dimension was positively connected only with the efficiency/access of the content on the health engagement platform (distribution dimension) and with the positive perception of a collaboration between patients and doctors (humanization dimension). Regarding the relationship between user engagement in engagement platforms, social sustainability, and satisfaction on customer loyalty, not all of the dimensions had an impact on future physician behavior. The results of Model 4 ($R^2 = 0.742$) demonstrated the significant influence of affection, satisfaction, and humanization on physician loyalty.

H4 was partially verified. In fact, while humanization had an effect on physician loyalty, the other dimensions of social sustainability in the health engagement platform (comfort and distribution) did not have any effect on the re-use of the health digital platform. Finally, H5 was supported. In fact, the results demonstrate a relationship between satisfaction and loyalty; in the health engagement platform, the more the GP was satisfied, the more they were stimulated to continue to use the platform with patients. Figure 3 illustrates the factors affecting physician loyalty. Emotional engagement and digital health platforms that facilitate dialog between doctors and patients foster the doctors' satisfaction and the GP's intention to use the digital platform again. This result is consistent with the recent literature on customer engagement in engagement platforms. Moreover, this result confirms the mediating role of satisfaction and emotions in behavior-based CRM performance. It also affirms the importance of the humanization of an engagement platform for the intention to use a health engagement platform in the future and for the physician's behavior beyond the platform use (such as word of mouth feedback).

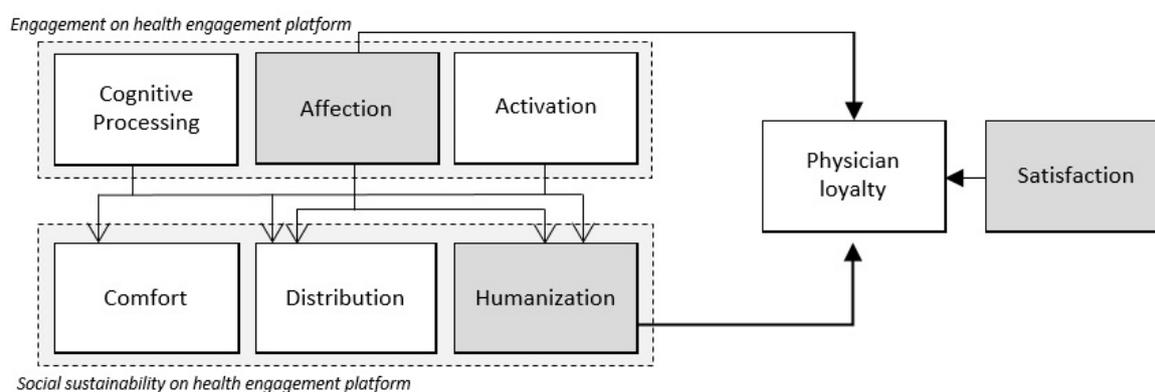


Figure 3. Factors affecting physician loyalty.

6. Discussion

The main objective of this work was to provide further knowledge on the role of engagement platforms and their influence on social sustainability through the proposal of an integrated model that included involvement in engagement platforms, social sustainability, satisfaction, and customer loyalty, and we investigated these interrelations within the health environment. To the best of our knowledge, no study has proposed an integrated vision and applied it to a concrete case. In fact, previous studies have analyzed these dimensions separately or have investigated the relationship between social sustainability and engagement in theoretical terms. In addition, the relationship between health engagement platforms and social sustainability has also not been fully explored. Finally, social sustainability, although it has been tackled in the offline field [45,53], has not yet been measured in the context of social media.

From the results obtained, it has emerged that social sustainability is directly influenced by engagement in the health digital platforms. In other words, the three dimensions of engagement have an effect on the components of social sustainability, except for the affective dimension of engagement that does not exert any influence on the need to find information on the platform or on the perception of the variety of information and its usefulness (comfort dimension). These results indicate that physicians using these platforms are encouraged to enrich their expertise in healthcare, explore the platform, increase their knowledge, share it with others and their patients, mainly thanks to the capacity of the engagement platform to solicit the affective, cognitive, and behavioral dimensions. The affective component affects not only the perception of the variety and distribution of the content on the platform, but also the possibility of the platform to ensure the safety and protection of patients and the treatment of health issues. Moreover, this dimension, together with satisfaction, has an effect on the intention to re-use the platform, thus, confirming previous studies [32].

The “humanization” dimension of social sustainability was also proven to be a determining factor in doctors’ future behavior and therefore assumes a mediating role between the involvement processes and the subsequent intention to continue using the platform. This is consistent with the increasing awareness of doctors towards greater participation in the health and well-being of their patients [75]. The influence of satisfaction on the user’s loyalty suggests that a positive experience on the engagement platform, especially when it stimulates the affective dimension and sensitizes the correct patient care, incentivizes the re-use of the platform, triggering a virtuous process that nurtures knowledge and consequently the well-being of patients. This result is consistent with the recent literature [32,67,68] on the factors affecting loyalty, among which the satisfaction and emotional engagement of the participant seem to trigger positive word of mouth. Furthermore, this paper advanced the study on social sustainability in the health context by combining two assets, engagement and social sustainability, that have yet to be investigated in practice. The results of this study have allowed us to verify what Aquilani et al. [57] affirmed by demonstrating the role played by relationships and experiences on the engagement platform in human well-being. Nevertheless, compared to all of the studies that affirm the importance of engagement for sustainability [56–58,65,66], the results of our research also suggest that the emotional dimension of engagement and the presence of certain attention to the patient and their well-being (humanization of the digital platform) facilitates a virtuous process that nurtures the satisfaction and the continued use of the platform by physicians. In this sense, our results are consistent with the recent approach to healthcare between academics, public institutions, and research centers that are more and more orientated toward the “model hospital” project initiated by the former Italian Minister of Health, Umberto Veronesi in 2000, which aimed to make hospitals increasingly more humanized places [75]. These early results are a demonstration of a new direction in health digital platforms toward humanization and affection. While cognitive and behavioral engagement act on the perception of the sustainability of the platform, the affective and human dimensions of the platform and the satisfaction of using the digital platform encourage GP participation.

Moreover, this paper confirmed the importance of CRM in the health system. While other authors [59] have studied the benefits of e-platforms on the performance of physicians using ICT, our study explored the factors affecting the GPs’ behavior based on the social sustainability perception of digital platforms and on the engagement dimensions activated by participation in the health digital platform. In this way, we have advanced the study of social sustainability and its importance in customer relationship management.

Limitations

Although the measurement scales that have been used have all been validated in the management literature, the social sustainable scale was adapted by health studies that measured social sustainability in hospitals; nevertheless, it is a valuable aid to understanding sustainability even in digital environments, which has been little explored in the literature. In the future, it would be useful to conduct an in-depth investigation into sustainability in digital health environments as a whole as well as attempt to investigate the environmental and economic dimensions that were not explored in this study. Finally, this study only took a small sample of users into consideration, and reported the results of the interaction with only one engagement platform. In the future, it may be useful to explore more engagement platforms and perhaps consider the patient’s point of view and not just that of the doctors as was done in this work.

7. Conclusions

Social sustainability in healthcare systems by means of digital engagement platforms remains a challenging and prospective topic. Engagement in ecosystems where users co-create value through collaboration and information sharing encourages virtuous models based on sustainable behaviors [76]. The engagement of physicians in digital health engagement platforms positively influences perceptions

of the platform's efforts to be socially sustainable. The more physicians that are engaged on digital platforms, the more they will desire a sustainable platform.

Physician engagement, and in particular, the distribution and comfort dimensions, are important for the perception of the sustainability of the platform. Nevertheless, some evidence suggests that the emotional component affects the intention to re-use the digital platform. This can limit the conditions in which the digital health engagement platform is successful, with success requiring affection and humanization.

Just as the importance of the emotional elements and sensory perceptions of patients during hospitalization has been highlighted [76], so digital health services require humanization and care in relational factors, which have been widely studied in the marketing of services and in different definitions of sustainability [77].

It is, therefore, possible to think of sustainable digital communities as ecosystems where the co-creation of value, through listening to the needs of the other, becomes the process that supports and defines the goals of the sustainable digital community. For this reason, we agree with Garcés Ródenas and Sanjosé [64], who state that co-social responsibility assumes its full implementation in the case of platforms for digital involvement. A sustainable digital platform facilitates customer learning and personal enrichment, and supports the sharing of information as a broader and more complete expression of social sustainability.

On an empirical level, this work provides some implications of interest both for companies operating in the health and pharmaceutical sector and for policymakers involved in actions to ensure the health of patients. With regard to the former, since engagement platforms seem to be a valuable aid for updating physicians and are useful tools for interacting with patients, these companies could make their platforms more socially sustainable and should focus on the emotional and human dimension to increase the frequency of use of the platform. For policymakers, this work suggests considering health engagement platforms as a valuable aid for patient awareness practices, but also as an incentive for prevention campaigns that can be guaranteed through the involvement of doctors.

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