Identifying Relevant Stakeholders in Digital Healthcare

Nipa Nasrin Sultana, Alam Mehnaz, Haque Md Sanaul

Identifying Relevant Stakeholders in Digital Healthcare

Nasrin Sultana Nipa[1,6], Mehnaz Alam[2,7], Md Sanaul Haque[3,4,5,8]

[1]Department of Computer Science,
University of Memphis, Memphis, USA
[2]Department of Development Studies,
Bangladesh University of Professionals,
Dhaka, Bangladesh
[3]Research Unit of Medical Imaging, Physics
and Technology, University of Oulu, Finland
[4]Department of Software Engineering, LUT
University, Lappeenranta, Finland
[5]gameCORE Research Centre, Institute of
Technology Carlow, Carlow Ireland

[6]nnipa@memphis.edu

[7]mehnaz.alamdcc@gmail.com

[8]md.haque@oulu.fi

Abstract. In recent times, considerable attention has been given to digital services, mainly digital healthcare, i.e., health and well-being applications and services by health organizations, practitioners, and researchers. One of the significant challenges for today's digital health and well-being applications and services is that they are not sustainable and focusing less on relevant stakeholders. However, to the best of our knowledge, little is known about relevant stakeholders in the digital health and well-being applications and services, precisely identifying them using an appropriate method. This paper seeks to define and identify the relevant stakeholders in the digital health and well-being applications and services. A literature review is conducted based on relevant articles on stakeholders within the health domain. Hence, the narrative synthesis literature review approach has been used with a combination of the Bryant model of stakeholder-issue interrelationship. We identified relevant stakeholders who may build a better future to enhance the efficacy of the digital health and well-being applications and services in the long run and suggested a future study on value propositions.

Keywords: Relevant stakeholders, digital healthcare, narrative synthesis literature review, Bryant model, sustainability.

1   Introduction

The United Nations Sustainable Development Goals: goal three is intended to "ensure healthy lives and promote well-being for all ages" [1]. In the modern operating environment of work, various actors need to collaborate to build a successful occupational digital healthcare. These

multiple actors with apparent interests ('stakes') in the work and operations within a workplace are known as stakeholders [2].

Nowadays, services for all stakeholders cover the broad area of the new IT and its utilization which we call the "digital service", mixing knowledge with technology. Deploying digital services in supporting health and well-being is expanding rapidly. Thousands of digital health and well-being applications and services for the users are accessible. An example, Teveyshelppi: A digital telephone mediated free healthcare service for LähiTapiola personal insurance customers in Finland. It is expected that various advanced digital services, i.e., digital health and well-being applications and services, will be readily available in the future. But not all these services are fulfilling stakeholders' value expectations or preferences.

Out of 196 countries, 78 countries expense more than 7% of total GDP (Gross domestic product) in healthcare costs, which covers the delivery of health and well-being applications and services [3]. The digital health and well-being applications and services are struggling to focus on stakeholders' needs and preferences, particularly relevant stakeholders. It means digital health and well-being services are not relevant stakeholders' oriented even though it costs a high budget. Involving users and communities is essential to improve digital healthcare [4].

Moreover, researchers [5] examined that healthcare service providers face difficulties in improving the performance of digital health and well-being applications and services. Collaborating with relevant stakeholders to work to create value is still a challenge [6]. Considering the obstacles mentioned earlier, involving the relevant stakeholders, and focusing on their needs may bring positive aspects for the sustainable development of digital health and well-being applications and services. This leads to the research question:

- *To what degree relevant stakeholders can be identified, and who are the relevant stakeholders in digital healthcare?*

To answer the question, we proposed a technique and identified relevant stakeholders, which is based on a narrative synthesis review of literature on relevant stakeholders' topic of interest and adopting Bryant model of stakeholder-issue interrelationship. The results of this study could support adding an advantage to digital health and well-being applications and services involving the relevant stakeholders.

2   Relevant stakeholders

The term "Stakeholder" was formed based on the word Stockholder in 1960 [7]. It was suggested that in the process of decision making of publicly held, contemporary corporations and other parties are present to have the "stake". Stanford Research Institute introduced the term "stakeholders" in 1963, but Freeman [8] developed the stakeholder concept by defining stakeholders as the team or group of members or an individual in an organization, and this organization's performance is affected by stakeholders, for example, consumers, suppliers, creditors, competitors, employees, communities, incubators, financial institutions, government, universities, and research institutes etc. Moreover, Philips and his colleagues, in their work [9] identified a few internal stakeholders or primary stakeholders (customers, suppliers, employers, shareholders or financiers, and communities or dropping competitors) and added external stakeholders or secondary stakeholders (NGOs, governments, environmentalists, critics, media, and others). Our study named the users and other stakeholders as the "relevant stakeholders" due to their relativity in the digital health and well-

being applications and services. Stakeholders help organizations to save time, effort and integrate resources [10], and it is, therefore, important to find other stakeholders who are related to achieve the objectives.

Previous research highlighted the importance of identifying stakeholders [11][12]. A stakeholder identification methodology was implemented over two phases in transdisciplinary research [11]. First phase was a design phase where the researchers worked with other researchers involved in the same project to develop a tool to identify stakeholders in the second phase of implementation. They then worked with the case study leaders to confirm their interests and skills were accounted for. The resultant tool such as a questionnaire was then implemented by case study leaders with the help from the central researcher of the project [11].

Others identified stakeholders generally in healthcare IT projects but not deliberated a method to define and identify relevant stakeholders of digital health and well-being applications and services. In their work [12], Nilsen and his colleagues have employed longitudinal qualitative and interpretive methodological approach in their research to design the case study to find stakeholders. For the stakeholder analysis, an analytical framework has been applied to define different aspects (decisions-making fields, roles, and levels) of stakeholder's participation in healthcare decision-making [13]. However, to the best of our knowledge, little is known about relevant stakeholders in the digital health and well-being applications and services, precisely identifying them using appropriate method and techniques.

3   Method

Our approach in identifying relevant stakeholders in digital healthcare might be one effective method for sustainable digital health and well-being applications and services. The approaches applied are a combination of the narrative synthesis literature review and integrating Bryant model [14] of stakeholders-issue interrelationship. We categorized of relevant stakeholders' identification process as a set expressed by,

- Relevant stakeholders in digital healthcare = {Narrative synthesis literature review + incorporation of Bryant model}

3.1   Narrative synthesis literature review

The literature search presented in this study was performed using conference and journal papers in the context of relevant stakeholders and health-based information systems. A narrative literature review search was conducted using the online repository systems: ACM digital library, science direct, web of science, Scopus, and EBSCO Database. Additionally, we scanned the reference lists of selected articles (snowballing). We searched for literature using the combination of search terms "stakeholders", "relevant stakeholders", and "stakeholders and digital healthcare". The second literature search specifically targeted the conference and journal papers in the context of health-based information systems. The second search had been conducted using web addresses dealt with health and well-being conference proceedings and journal papers. Relevant titles and abstracts on English literature were reviewed, published between January 2007 and January 2021. This review search was started at the beginning of August 2020 and finished at the end of January 2021.

Eligibility criteria

Articles were included in this systematic review if the abstract or title showed the results of original research studies related to stakeholders and healthcare services and related approaches. Electronic citations, including accessible abstracts of all articles recovered from the search, were selected by one author to choose articles for full-text review. From the initial search, duplicates were eliminated. However, publication and language bias has been analysed during the search process of the article election. Nevertheless, full texts of possibly relevant studies were examined to ascertain eligibility for inclusion. In the following Table 1, inclusion and exclusion criteria for the studies are listed.

Table 1. Criteria for inclusion and exclusion of studies

Criteria	Inclusion	Exclusion
Time period	Jan 2007 – Jan 2021	Before 2007
Language	English	Other languages
Type of studies	Primary studies	Reports, commentaries, letters
Aim: to identify relevant stakeholders	Literature points out possible stakeholders	Literature does not cover

Subsequently, we summarized the main outcomes and key results. The variances were set by consensus. Finally, a narrative synthesis literature review of studies that meet the inclusion criteria was conducted. We used reference management software MENDELEY (Windows 10 Version 1803) to categorize and store the literature.

Data extraction and synthesis

The data extraction in the form of a framework was applied to summarize the study results. The literature was deliberated and synthesized into themes after the data extraction. To synthesize the findings of the studies, a narrative synthesis was performed. We decided that a narrative synthesis literature review establishes as the fit instrument to synthesize the findings of the studies. This was done due to the choice of different studies that were incorporated in this narrative review. The findings from the search resulted in eight unique literature studies (Fig. 2). These eight literature studies revealed that researchers had identified some relevant stakeholders in the health and well-being applications and services.

3.2   Adopting Bryant model

To analyze the results of relevant stakeholders, we integrated the Bryant model to the identified eight pieces of literature studies (Fig. 2). Stakeholders differ according to their issues of interest [15]. As relevant stakeholders have related issues and these stakeholders are interlinked to each other. Bryant depicted a stakeholder-issue interrelationship diagram [14] where different issues connect a group of stakeholders, and then these stakeholders are defined as relevant stakeholders. Therefore, we examined whether these relevant stakeholders from the eight literature studies define the Bryant model, such as whether they are connected

based on similar topics of interest in digital health and well-being applications and services. We found out that these relevant stakeholders are directly or indirectly interlinked to each other.

Relevant stakeholders can be primary stakeholders or secondary stakeholders, or both if they are relevant and related to achieve their objectives. Stakeholders differ according to their issues of interest [15]. They can have related issues, and they can be interlinked to each other. Bryant depicted stakeholder-issue interrelationship diagram [14]. On the diagram, stakeholders' interests have been indicated by arrow signs and stakeholders interlinked by issues or important topics to discourse, e.g., value and value related actions in the digital health and well-being applications and services.
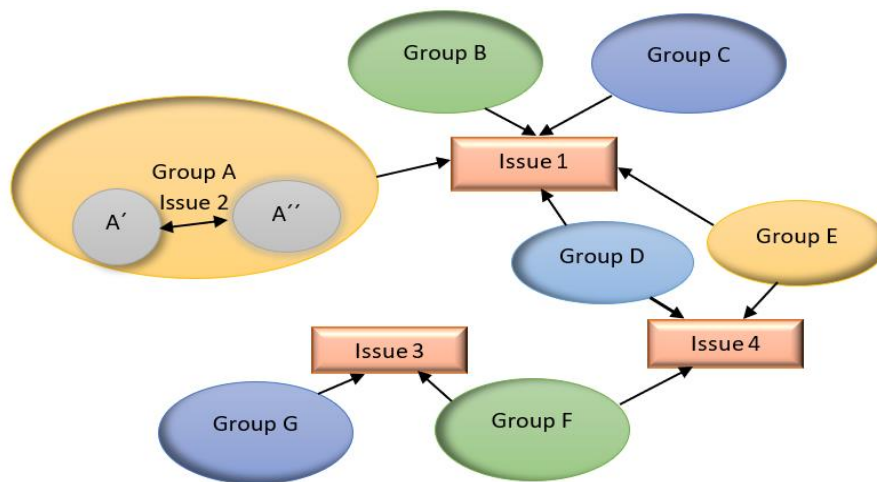

Fig. 1. The connection of relevant stakeholders through the lens of Bryant model

Figure 1 represents the stakeholder-issue interrelationship, and seven stakeholder groups (Group A, Group B, Group C, Group D, Group E, Group F, Group G) are interlinked by four issues (Issue1, Issue 2, Issue 3, Issue 4). Group A has two members (A' and A"), and they are connected by issue 2, i.e., they have similar topics to discuss. Issue 1 is surrounded by Group B, C, D and E due to similar topic approaches of the group stakeholders. On the other hand, Group F is connected with Group D and E by issue 4. Group F and G are connected by issue 3. The above diagram describes the relationship among a group of stakeholders associated with the key issues or topic and the member of groups. When different issues connect a group of stakeholders, these stakeholders are defined as relevant stakeholders. Relevant stakeholders might be involved in any subjective matter. They can be identified if and only if their issues of interest are focused on values and value-related actions, such as whether these stakeholders co-create value in the digital health and well-being applications and services.

4   Results

The findings from searching resulted in eight unique literature studies of relevant stakeholders, which are presented below.

- Researchers mentioned the relevant stakeholders as patients or users, families of patients, health professionals (clinicians and nurses, employees), health institutions

and organizations, payer and authorities [10].

- Researchers listed stakeholders as acceptors, providers, supporters, and controllers [16].
- Others identified patients, clinicians, nurses, residents, interns, specialists, physicians, and administrators as the key stakeholders [17]. Value has been described in digital health and well-being applications and services by considering the relevant stakeholders: patients, employers, providers, payers, and manufacturers [18].
- Relevant stakeholders are listed as clinicians, nurses, employees, patients, and other parties engaged in digital health applications and services [19].
- Scholars coined out relevant stakeholders as patients, surgical, radiation, gynecologic, medical oncologists, nurses, dieticians, social workers, care coordinators, mental health professionals, nurses, practitioners, physician assistants, behavioral therapists, and other physicians' extenders [20][21].
- Later, others identified stakeholders as patients, families, clinicians, healthcare facilities, researchers, policy actors, payors and purchasers, employees, vendors, suppliers, distributors, small-to-medium enterprise applications and services developers and consultants [22].

5 Discussion

Based on narrative synthesis literature review and integrating Bryant model of stakeholders-issue interrelationship [14], the study's main findings are presented in Fig. 2.
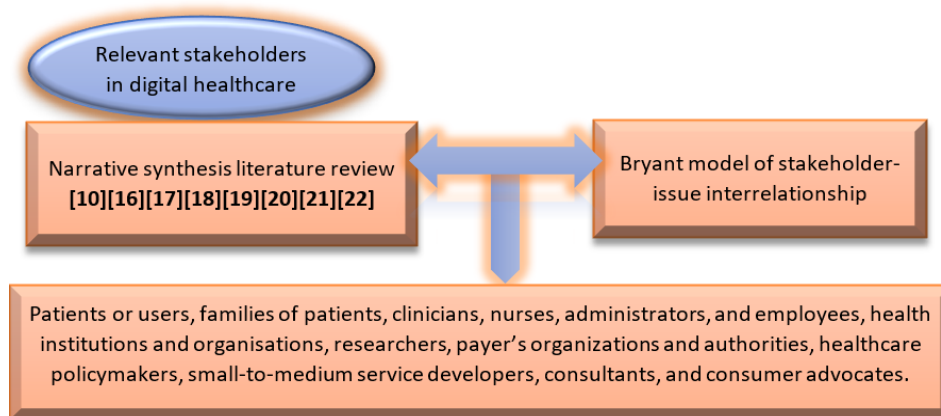

Fig. 2. The proposed technique of identifying relevant stakeholders in digital healthcare.

Figure 2 represents our technique of identifying relevant stakeholders. The identified relevant stakeholders are patients or users, families of patients, health professionals (clinicians, nurses, administrators, and employees), health institutions and organizations, researchers, payers' organizations and authorities, health care policymakers, health care facilities, small-to-medium service developers and consultants, and consumer advocates. However, this is not to say that this is the end of relevant stakeholders in digital healthcare. In upcoming years, more research should be conducted to add more of them to the list.

To co-create value, value propositions convey users and other stakeholders' solutions, i.e., by involving relevant stakeholders in one body network [23]. Thus, value propositions are a potential approach [24] for sustainable digital health and well-being applications and services. These relevant stakeholders can add value to identify the key value propositions [24] for digital healthcare research, particularly in the context of developing countries.

To avoid human error and to reduce time and effort, the literature search could have been conducted using an AI-based online literature review and data extraction search machine such as irish.ai. Though this was a limitation due to not having a licensed or registered AI-based searching tool; and using an AI-based tool is a new approach which the authors and researchers of the present study might have found challenging to implement. Our identified relevant stakeholders in digital healthcare are limited to literature, and expert validation (such as in-depth interviews) is not involved.

This is a work-in-progress paper. Further study needs more attention on the extract version of these key relevant stakeholders to underline their value for different digital healthcare applications and services. In future, expert validation of pertinent stakeholders of digital healthcare should be performed. Focusing on future expert validation, an impact framework can be proposed. This framework can be focused on the sustainable development of digital health and well-being applications and services. As examples, involving relevant stakeholders and design thinking for sustainable solutions [25][26].

6   Conclusion

This paper was aimed to identify relevant stakeholders in digital healthcare, i.e., digital health and well-being applications and services. This was conducted by proposing a method followed by the Bryant model and narrative synthesis review of literature based on their topic of interest and recommendation from the literature study. We also believe that digital healthcare applications and services providers and other relevant stakeholders will work together to provide quality and efficient service to users to boost digital health and well-being applications and services.

References

1. UN.: Goal 3: Ensure healthy lives and promote well-being for all at all ages. United Nation Report. (2019) UN webpage, https://www.un.org/sustainabledevelopment/health/, accessed on 2021/04/22.
2. Auvinen, A.: Understanding the Stakeholders as a Success Factor for Effective Occupational Health Care. (2017). doi: 10.5772/66479.
3. World bank report.: Health expenditure total GDP. (2013) world bank webpage, http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS, accessed on 2021/21/22.
4. KPMG.: Creating new value with patients. KPMG homepage, (2014) https://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/what-works/creating-new-value-with-patients/Documents/creating-new-value-with-patients.pdf, accessed on 2021/ 02/22.
5. Chakraborty, S. & Dobrzykowski, D.: Examining value co-creation in healthcare purchasing: a supply chain view, Business: Theory and Practice, 15(2), pp.179-190 (2014)
6. Boyer, K. K., & Pronovost, P.: What medicine can teach operations: What operations can teach medicine. Journal of Operations Management, 28(5), 367-371 (2010)
7. Goodpaster, K.: Business Ethics and Stakeholder Analysis. Business Ethics Quarterly, 1(1), 53-73. doi:10.2307/3857592 (1991)
8. Freeman, R.E.: Strategic management: A stakeholder approach. Marshfield, MA: Pitman (1984)
9. Philips, R. A., Freeman, R. E., & Wicks A.: What Stakeholder Theory Is Not. Business Ethics

Quarterly 13(4), (2003). doi:10.2307/3857968

10. Gronroos, C. & Vioma, P.: Critical service logic: making sense of value creation and co-creation. Acad. Mark. Sci. 41 (2), pp.133–150 (2013)

11. Leventon, J., Fleskens, L., Claringbould, H. et al.: An applied methodology for stakeholder identification in transdisciplinary research. Sustain Sci 11, 763–775 (2016). https://doi.org/10.1007/s11625-016-0385-1

12. Nilsen, E.R., Stendal, K. & Gullslett, M. K.: Implementation of eHealth Technology in Community Health Care: the Complexity of Stakeholder Involvement. BMC Health Services Research, Article number: 395 (2020)

13. Chambers M., Storm M. (2019) Resilience in Healthcare: A Modified Stakeholder Analysis. In: Wiig S., Fahlbruch B. (eds) Exploring Resilience. SpringerBriefs in Applied Sciences and Technology. Springer, Cham. https://doi.org/10.1007/978-3-030-03189-3_14

14. Bryant, J.: The Six Dilemmas of Collaboration: Inter-Organizational Relationships as Drama, Chichester, England: John Wiley and Sons (2003).

15. Bryson, A.: What to do when stakeholders matter: Stakeholder identification and analysis techniques, Public management review, 6(1), pp. 21-53 (2007)

16. Mantzana, V.M., Themistocleous, M., & Irani, V. M: Identifying healthcare actors involved in the adoption of information systems, European Journal of Information Systems 16 (1), pp. 91-102 (2007)

17. Macloed, D. & larke, N.: Engaging for success: enhancing performance through employee engagement, London: Office of Public Sector Information (2009)

18. Yong, P.L, Olsen, L. & McGinnis, J. M.: Value in healthcare: Accounting for Cost, Quality, Safety, Outcomes, and Innovation, National Academy of Sciences, Washington D.C. (2010)

19. Epstein, R. M & Street, R. L.: The Values and Value of Patient-Centered Care, Annals of Family Medicine, 9(2) (2011)

20. Keith A. Joiner, & Robert F. L.: Evolving to a new service-dominant logic for health care, Innovation and Entrepreneurship in Health (2016)

21. HTA Core Model report. (2014). HTA webpage, www.hiqa.ie/HTAGuidelinesStakeholder Management, accessed on 2021/04/21

22. Petersen C, Adams SA, & DeMuro, PR.: mHealth: Don't Forget All the Stakeholders in the Business Case. Med 2 0. 4(2):e4. (2015)

23. Gummesson, E.: Customer centricity: reality or a wild goose chase? European Business Review Vol. 20 No. 4, pp. 315-330 (2008)

24. Haque, M. S., Arman, A., Kangas, M., Jämsä, T., & Isomursu, M.: Towards value propositions for persuasive health and well-being applications. In: Maglaveras N., Chouvarda I., de Carvalho P. (eds) Precision Medicine Powered by pHealth and Connected Health, ICBHI 2017. IFMBE Proceedings, 66, 217–221. Springer (2018). https://doi.org/10.1007/978-981-10-7419-6_36.

25. Haque, M.S.: Persuasive mHealth Behavioural Change Interventions to Promote Healthy Lifestyle. University of Oulu Graduate School. University of Oulu, Faculty of Medicine. University of Oulu, Faculty of Information Technology and Electrical Engineering. Medical Research Center Oulu. Oulu University Hospital (2020)

26. Haque, M.S., Kangas, M. & Jämsä, T.: A persuasive mHealth behavioral change intervention for promoting physical activity in the workplace: feasibility randomized controlled trial, JMIR Formative Research, Vol. 4 No. 5, p. e15083 (2020). doi: 10.2196/15083.