





Review Article

Co-Creation in Health: A Scoping Review on Engagement Platform for Innovation

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Abstract

In order to meet the health needs of the population, with its complexities and diversities, it is necessary to search for new instruments and methodologies capable of providing answers to rapid changes in scenarios, as recently seen in the COVID-19 Pandemic, where the actors involved (society, government, companies, Science, Technology and Innovation institutes - ST&I institutes) joined forces towards a common objective: the solution to a global health problem. In view of this challenging scenario and the search for new management solutions in health, the objective of this article was to explore the world academic literature on the themes Platform of Engagement and Co-creation, in the period from 2012 to 2022, in order to know existing models and requirements of platforms that may be applicable for Co-creation in Health, as a tool and methodology capable of promoting the development of solutions that meet the needs of the Single Health System (SUS) and the Science, Technology and Innovation System (ST&I System). The methodology applied for this study was the review of the scope of the literature, in the area of health, in six scientific databases. Nineteen articles were selected that met the inclusion criteria in the research. The research results present practical models of engagement platforms used for co-creation, reinforcing the importance of applying the tool as a formalized space for value generation, through the integration of resources and interaction between people, enabling user engagement and encouraging engagement. innovation ecosystem. Among the essential requirements for a platform for co-creation, we highlight the necessary understanding of the engagement capacity of the actors involved in the innovation ecosystem. This study represents an investigation of the literature on the topics addressed, which, in addition to its expressive results, contributes to fostering new research in order to elucidate contemporary models that favor the constitution of Engagement Platforms for Co-creation in Health.

Keywords

Engagement Platform, Health Co-Creation, Value Co-creation, Engagement, Innovation

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1. Introduction

The COVID-19 pandemic, declared by the World Health Organization in March 2020 as a public health emergency of international importance, further weakened the Brazilian health system, strengthening the difficulties already present in medical and hospital care [1]. This scenario contributes to the urgent search for solutions aimed at strengthening the Single Health System (SUS) in the universal guarantee of public health, with rapid and effective responses in services capable of responding to the current demands of the population, health crises, epidemics, and pandemics.

Hospitals play a leading role in the dynamics of service innovation, as they bring together specialized resources, and modern and dense technologies, which enable innovations in the institutional, technological, and management dimensions [2].

In health services, many professionals are involved in user care processes, with different knowledge, expertise, and professional practices, where from the interactions between people, new knowledge is generated daily. It is understood that the main source of value generation in health services is people and that, when motivated and directed towards a common purpose, they are able to transform institutional strategies and plans into value, during the execution of their work processes, applying standards, artifacts, and available technologies.

The difficulty in capturing and promoting knowledge and *insights* generated by health professionals during the performance of their activities and incorporating them into the research and innovation ecosystem is a challenge that we believe is a strategic asset for institutions, to stimulate innovation capacity.

In the recent scenario of a global pandemic and attention to the financial sustainability of public health systems, encouraging the innovation ecosystem becomes vital for the survival of the SUS. Thus, the search for new management strategies that allow the collaboration and engagement of the parties involved in the health system (society, government, companies, ST&I institutes) for the co-creation of valuable solutions for society was the need identified for the development of this research.

2. Theoretical Framework

According to Cohen *et al.* [3], the term Co-creation emerged from the publication of the article "Co-opting customer competence" in 2000, authored by C.K. Prahalad and Venkat Ramaswamy, in the field of management and marketing which would serve as the foundation for the publication of the book "The future of competition: co-creating unique value with customers", released in 2004 [4].

Prahalad & Ramaswamy [5], in the article "Co-creation experiences: the next practice in value creation", explain the process of value Co-creation as an asset for companies to seek

growth and differentiation in business, through the change of unilateral vision focused on the product or service for the interaction and cooperation between the parties involved in the service provision process, creating personalized co-creation experiences, generating value for organizations and users.

Co-creation can be understood as a method, process, or service [6-8]. It can be employed in the public sector, society, business, and universities [9, 10]. One of the main characteristics of co-creation is the value of collaboration with different *stakeholders*, the creation of a collaborative platform, and the involvement of stakeholders in different innovation processes [11, 12].

The approach to creating value based on the co-creation process relies on the interaction and engagement of individuals to exchange experiences. For an organization to generate value for its users, the essential condition must be the engagement of people.

Organizations must innovate in "experience environments" that enable a diversity of co-creation experiences, through a flexible "experience network" that allows individuals to co-build and personalize their experiences [4].

The formalization of engagement platforms as one of the current methodological practices for generating value in production or service processes, for adaptation, improvement, or innovation, has been addressed both in the academic and the business world. Its application aims to promote co-creation *by stakeholders* and also allows them to organize themselves to co-create in a systemic way [13].

Despite the growing interest in engagement platforms, conceptual discussions about the nature of platforms as sites of exchange remain elusive [14].

Therefore, the purpose of the study is to explore the scientific literature to identify frameworks, models, and requirements of engagement platforms in health services as a tool for co-creation, engaging community members towards a common goal.

In this way, we seek to understand models and requirements necessary for the design of the engagement platform capable of fostering the generation and capture of potentially innovative ideas in health services, identifying and translating the demands of society for incorporation into the health innovation ecosystem.

3. Materials and Methods

The study involves conducting the literature review by the scoping review methodology, described by Arksey & O'Malley [15] and updated by Levac *et al.* [16]. The authors Arksey and O'Malley [15] developed a methodological framework for the scoping review based on 5 steps, in a detailed and documented way, allowing the study to be replicated by other researchers.

It should be noted that the methodological search did not use an artificial intelligence algorithm.

In this sense, a study protocol was developed to identify and understand the most relevant studies addressing the topics in the last 10 years. The initial purpose was to seek in the selected articles an understanding of the concepts and scientific evidence on practices, methods, characteristics, models, and requirements applied to an engagement platform in the value co-creation process, and when possible, what results were achieved, and the value generated for society.

The mnemonic "PCC" (population, concept, and context) was developed as a guide to build a clear and meaningful title and establish inclusion criteria for the scoping review, as described below:

- 1) *Population*: Health Services
- 2) *Concept*: Co-creation and Engagement Platform
- 3) *Context*: Innovation

Phase 1 of the protocol identified the initial question that guided the scoping review: What engagement practices among healthcare professionals are presented in the literature for value co-creation? And what are the models and essential requirements for an engagement platform for value co-creation in health?

The databases chosen for the research and extraction of the primary studies were: Pubmed, Scopus, Scielo, Web of Science, Lilacs, and Embase.

We used the following inclusion criteria to select the studies:

- 1) research target population: health services;
- 2) description of engagement practices among professionals;
- 3) engagement platform models and/or requirements;
- 4) context to be considered: health innovation;
- 5) relevant articles for the understanding of the concepts related to the topics.

For exclusion criteria, we standardized:

- 1) articles that do not add value to the research questions and understanding of the topics;
- 2) duplicate articles and articles without full text;
- 3) application areas of the studies not related to health.

In *phase 2* of the protocol, identification of relevant studies, it was necessary to structure the research matter in logically organized keywords, defined as search *string*, to start the search in the chosen databases.

"OR" connectives were used to link similar terms. Keywords, relevant synonyms, and associated truncations have been established for the two concepts, as follows:

Engagement Platform: "work engagement" OR "employee engagement" OR "workplace engagement" OR "worker participation" OR "staff participation" OR "engagement platforms"

Co-creation: cocreation OR "co-creation" OR "co creation" OR "value cocreation" OR "value co-creation" OR "value co creation" OR "cocreation process" OR "cocreation processes" OR "cocreation of value" OR "cocreation collaborative" OR

"value co-creat*" OR "value cocreat*" OR "value-co-creat*."

The search criteria used for all bases include:

- 1) period: from January 2012 to December 2022;
- 2) languages: Portuguese, English, Spanish;
- 3) type of document: review articles and systematic reviews, full and free text;
- 4) identification of studies: descriptors and keywords present in the title/abstract or in the abstract, according to the criteria of each database.

Based on the result obtained in the identification of the articles, the screening and selection process was established to verify the previously established inclusion and exclusion criteria, characterizing *phase 3*.

In *phase 4*, data mapping was carried out where, for each selected article, a full review of the content was carried out in order to list categories of analysis of engagement platforms for value co-creation in health.

Phase 5 sought to gather, summarize, and report the data. The results were recorded in a summary table in Excel®, of all selected articles, containing: the database, title of the article, year, country of origin of the main author, author(s), journal of publication, and a summary of the strategic information. This database provided data necessary for mapping the year and region of publication, stratification of the articles included by scientific basis, and main information for the discussion of the research findings.

4. Results

The result of *phase 2* of the protocol, the identification of relevant studies, was represented graphically, with 495 studies identified, as shown in Figure 1.

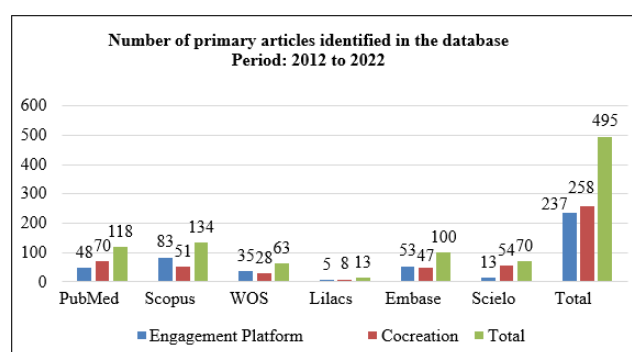


Figure 1. Result of the research conducted in the databases in the period from 2012 to 2022.

The main database to guide the duplication of articles was Scopus, as it contained the largest absolute number of results (n=134). All articles in this database were initially assessed by means of the title and abstract. In cases where the evaluation of the title and abstract was not sufficient to apply the inclusion and exclusion criteria, a more detailed content analysis

was performed to understand the relevance of the information and thus indicate inclusion in the research. Those that did not provide evidence of their contribution to understanding the topics or answering the research questions were classified as ineligible.

The same screening and selection process was applied to the other articles, resulting in: 179 duplicate articles, 292 excluded articles, 24 selected articles, and 19 included in the research, as shown in [Figure 2](#).

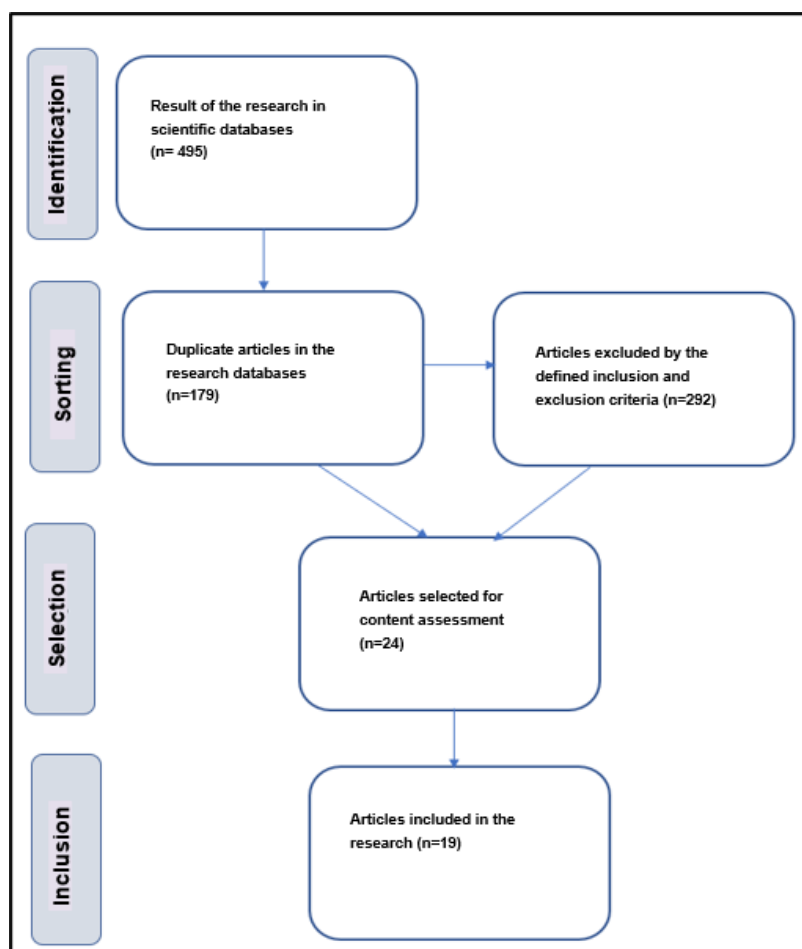


Figure 2. Flow of identification, sorting, selection, and inclusion of articles.

Out of the 19 articles selected for inclusion, the stratification by the database was represented in [Figure 3](#).

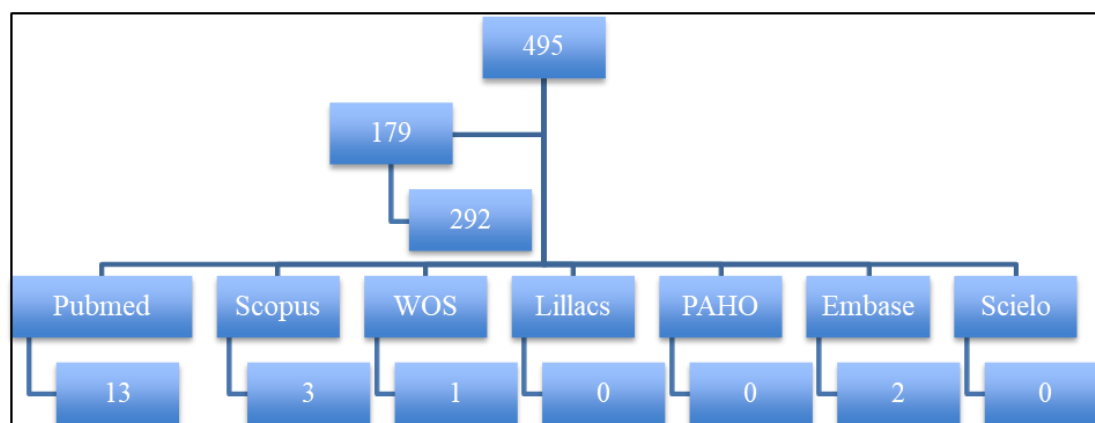


Figure 3. Stratification of articles included in the search by database.

Initially, the studies included in the research were assessed in relation to the year of publication and the country of origin of the main author. There is a trend in the increase in the number of publications over the period evaluated, which shows the growing interest of researchers worldwide in the topics covered. In Figure 4, there is a gradual growth of

publications from the year 2020, with 3 articles published, reaching a level of 6 articles in 2021 and 4 articles in 2022. We can consider that, for the purposes of this research, approximately 68% of the articles included were published in the last 3 years, 2020 to 2022, boosting the relevance of the topic today.

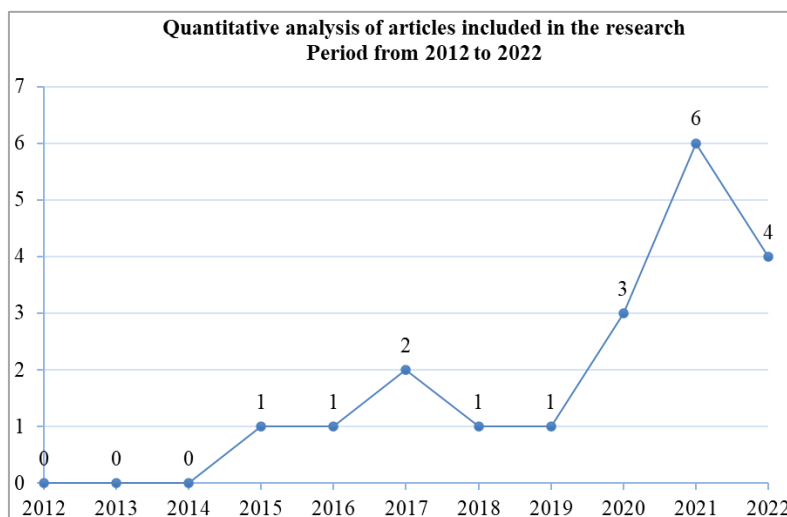


Figure 4. Result of the research conducted on the databases in the period from 2012 to 2022.

The mapping of the countries of origin of the main author (Figure 5) was important to verify if there is a greater concentration of studies in a certain region or if there is a worldwide interest of researchers in relation to the topics of "engagement platform" and "co-creation".

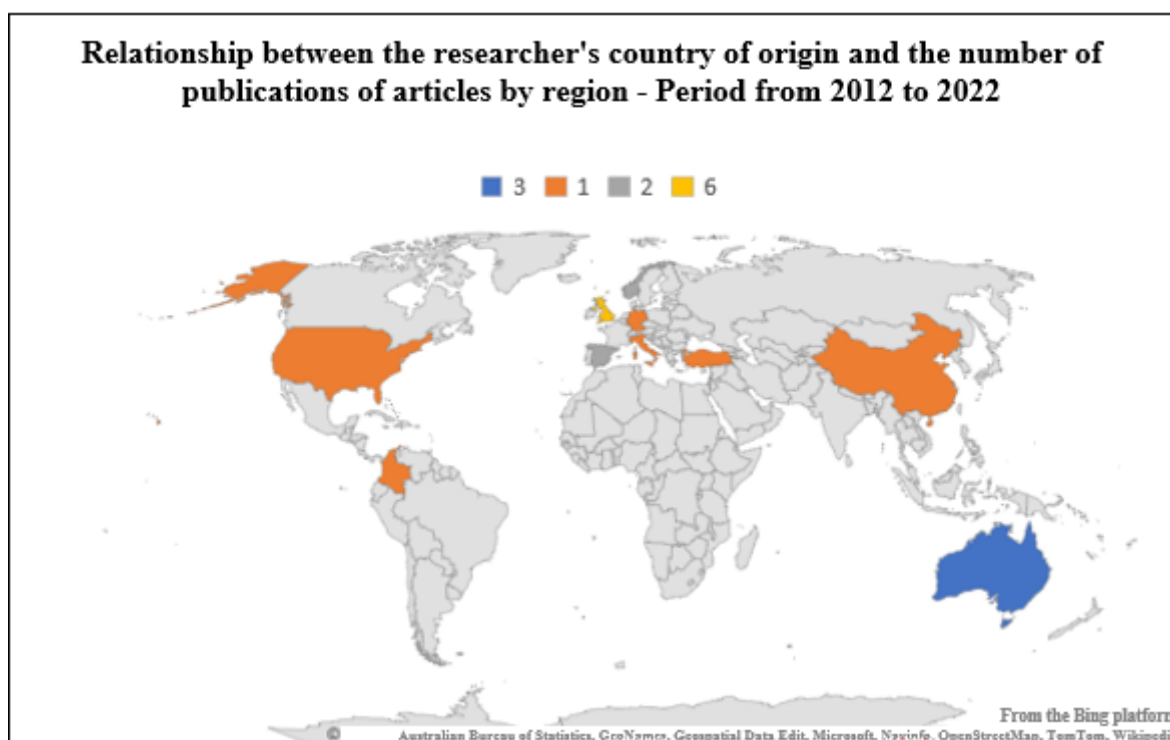


Figure 5. World map of the places of publication of the selected articles in the period 2012-2022.

The results suggest that the European region concentrates more interest in the topics mentioned. In America, only Colombia and the United States of America have conducted studies. There was no result involving Brazil, which shows an opportunity for this research to develop a methodology for implementing an engagement platform for value co-creation in health.

In the evaluation of the content of the selected articles, we sought to answer the first research question: What engagement practices between healthcare professionals with clinical research are presented in the literature for value co-creation? In response to this first question, we observed that only 4 articles reported co-creation practices in the health area aiming to generate value.

5. Discussion

In response to the first question of the study on engagement practices among professionals for value co-creation, the studies emphasize the use of *multistakeholder* interaction environments capable of stimulating and promoting the participation and collaboration of those involved in value generation.

In the article analysis, the theoretical aspects of the literature were reflected in the case studies, where the interactions between people were considered primary factors for the success of co-creation. Thus, engagement was considered an essential pillar for creating value together, enabling different agents in the process to combine their experiences and competencies in building new knowledge.

The application of work environments used to promote and sustain collaborative networks, in the continuous search for service and product improvements, as well as the capacity to provide new ways of offering them was evidenced.

According to Mandal [17], Turkey's COVID-19 Platform was a model of a research ecosystem made possible to accelerate the development of vaccines and drugs during the pandemic, being structured from the engagement of researchers and sharing of resources, contributing to important results for the scientific community. The successful application of the co-creation methodology in this study contributed to mobilizing and strengthening the process of design, development, and production of possible innovative vaccine candidates for COVID-19. The platform, since its conception, has been modeled to co-create and share knowledge. The impact on the innovation and health ecosystem has achieved international visibility, being recognized as a model of co-creation of scientific approaches [17].

Similarly, the implementation of online health communities, formed by groups of people who interact with each other to discuss problems in common, has shown benefits where the value of the results generated are consequences of the interaction between people [18]. It is noted that the new knowledge acquired is the result of the process of interaction,

engagement, and collaboration of the parties involved in the community.

These findings confirm the literature regarding virtual interaction models, which supported by technological development, contribute to integrating health professionals and patients in the co-creation of services that better meet the health needs of the community [19].

Thus, the models presented can serve as sources of inspiration for the adoption of co-creation practices among professionals to generate value in the SUS, in view of the results described in the literature, such as: training of health professionals, empowerment and management of patient care, multi-agent participatory processes focused on problem-solving, processes for disease prevention and health promotion, and the application of technological resources to facilitate and expand the connection and communication between those involved.

The concept of co-creation was explored as an approach to mobilize knowledge on health condition management. Knowledge mobilization is a term used in health research to describe the process of generating, sharing, and using evidence [20]. The same authors approach research and care practice with different purposes and languages. However, in the knowledge mobilization process, not only scientific traditional knowledge was considered but also included other sources of knowledge such as beliefs, values, and experiences. The traditional model of scientific evidence starts to consider an important agent, patients, and/or their support network, bringing their perceptions, understandings, and experiences about health and disease. Involving patients and physicians in generating new knowledge is important to ensure that research results are impactful and efficient [20].

In the studies, the concern of the VUCA scenario (volatility, uncertainty, complexity, and ambiguity) in the health area was noticed, as experienced in the COVID-19 pandemic. The capacity of the public sector to co-create with other stakeholders has been strengthened, due to the increasing presence of turbulent and disruptive events [21]. The adoption of multi-agent co-creation processes was emphasized as a powerful governance methodology aimed at managing problems and prospecting solutions. Co-creation aimed at solving complex problems, which are difficult to be solved exclusively by a single agent was highlighted, and resources and other stakeholders must be brought together to co-create public value [21]. For the authors, co-creation can be implemented through six robust governance strategies for public administration and leadership: Scalability, Capacity to prototype, Modularization, Limited autonomy, DIY strategies and Strategic Versatility.

The strategies addressed reinforce the value of the co-creation methodology in the contemporary scenario, by prioritizing agile, adaptive, and potentially innovative responses, coming from joint actions of the public health sectors.

Regarding the models and requirements essential to an Engagement Platform for Value Co-creation, the articles did not present specific technical functionalities for modeling the tool but contributed to expanding knowledge about the models used and requirements identified as essential to it.

Thus, when considering the models found in the literature, we highlight essential requirements of these environments characterized as engagement platforms for co-creation: allowing the connection and interaction between users in a formalized space for exchange, the sharing of information and (material, human, processes and artifacts) resources between users, structured collection, secure storage, processing and integrity of shared data, protection and confidentiality of the information generated, accessibility to users, scalability of information and effectiveness of user engagement.

The research made it possible to recognize models implemented in the health area with proven success in translating benefits to society. The importance of recognizing these co-creation practices lies in the fact that they serve as a basis for experimenting with models in SUS public health services.

Co-creation has also gained prominence in the citizen science literature, as a collaborative method of working with society and generating new knowledge [8]. The authors point out close links between co-creation and social innovation, understood as a new setting of practices aimed at addressing social problems. In this sense, co-creation involves new social practices and new modes of interaction and can be applied as a contemporary model of social innovation. It is emphasized that social innovation processes are often determined by co-creation, as they address cross-sectoral cooperation and the participation of all agents [8].

The literature discusses value co-creation in health care (VCCH). According to Peng et al. [22], VCCH addresses the integration of resources through activities and interactions with collaborators in order to generate benefits for patients in the healthcare service system. Patients and healthcare providers integrate knowledge, skills, equipment, medicines, facilities, and financial resources to achieve their mutual benefits. In this concept, patients actively participate in the healthcare system, creating value for themselves, and moving from being passive beneficiaries to active co-creators of the system. The benefits that can be presented by co-creation between patients and service providers are: improved use of medical resources, reduced healthcare costs, improved physician-patient relationship, and patient empowerment.

For the authors Rubio et al. [23], co-innovation is a co-creation behavior emphasized by studies of value co-creation in digital environments [24, 25, 26]. Co-innovation is related to users' participation in contributing ideas for new product/service modalities and ways to improve them, identification of new users, and new consumption moments and trends [23].

In the articles on Engagement Platform, the conceptual analysis of employee engagement, consumer engagement, and patient engagement was verified.

The concept of engaging individuals in organized settings (either as service providers or as final receivers) has been emphasized as a promising lever for innovation [27]. For the author, the similarity between individual engagement *versus* innovation is correlated to meet the rapid and continuous changes in the economic-social scenario, where organizations need to seek new strategies to remain competitive and sustainable.

In healthcare, employee engagement is a topic that is often addressed because it is related to workers' well-being and satisfaction. In medical-hospital services, there is a common sense that an engaged worker is more productive and proactive, important characteristics that enable the safe and effective performance of care activities. We can say that the characteristics identified in engaged workers are essential for value co-creation processes in healthcare units, creating opportunities for the joint construction of solutions to the pains identified during patient care.

It can be understood from the studies presented in this literature review that *stakeholder* engagement is considered a promising behavioral requirement to sustain organizations' transformation and survival processes, especially in the current scenario of uncertainty, complexity, and volatility. Promoting a more participatory and co-authorial involvement of human resources and end users seems to be one of the promising paths capable of leading to innovation [27].

6. Conclusions

In line with the recent pandemic scenario and the reinforcement of meeting new health needs, studies on the subject are in line with the understanding that it is crucial to strengthen the innovation ecosystem through practices that engage the different agents of health services in translating needs into new products, services, and processes.

Despite the growing interest of researchers in recent years on the methodology of co-creation in health services, there are still spaces for discussion on how to promote and adopt real practices for value co-creation among professionals with the intention of fostering the innovation ecosystem.

Regarding engagement platforms as support environments for value co-creation, studies are superficial with regard to the systematization of the fundamental functional requirements for the formalization of these environments as spaces for promotion, connection, interaction, and integration between multiple agents.

Although the discussions on how interactions and engagement between the parties involved can contribute to the generation of value for the user, aimed at in this study, have been evidenced throughout this research, it was possible to detect gaps in the literature that address the prototyping and design of these platforms with multi-user spaces, of a democratic and interactive character, with a focus on analyzing problems and proposing solutions.

In summary, the examples cited in the literature on en-

agement platforms included physical and virtual environments, presented through thematic workshops, regular meetings and workgroups, forums, websites, and online health communities. In both models, the key feature is the formalization of space as the link between people involved in the process of creating or improving products or services, allowing the flow of information and sharing of resources.

The following can also be assigned as success factors to an engagement platform for value co-creation in health: the shared vision of information, the inclusive, collaborative, and multidisciplinary approach of the participants, the identification and translation of the demands of the services for the consequent prioritization of the proposed solutions.

We conclude that the findings of this study were important to expand the domain of the topics addressed, answer the research questions and support the identification of essential requirements for the design of the engagement platform for value co-creation.

The expectation is that studies will be carried out to expand and democratize health innovation processes, through value co-creation, and that the knowledge generated in this work can stimulate and guide managers, researchers, students, health professionals, governments, and society in the search for strategies that positively impact the SUS.

The application of engagement platforms was perceived as a relevant systemic structural support instrument to support institutional processes of value co-creation and innovation. The expected benefits for the health area are: alignment of professional practices with the organization's strategic guidelines, ability to connect and qualify the professionals involved, empowerment of end users, the definition of needs and emergencies, and the proposal of efficient and sustainable solutions.

7. Implications

This study allows us to present possible paths for innovation in health, using the engagement platform as a tool to support co-creation actions and practices.

Considering the health challenges of the SUS, both for its complexity and for the speed in scenario changes, prospecting shared working models between professionals, governments, and society to articulate efficient solutions must be an effort to be applied by all parties in order to mitigate the current barriers to innovation.

The contemporary approach to value co-creation provides the empowerment of people, the active listening of users to the pains of the health system, and managerial decision-making based on prioritizing solutions with the greatest impact on society.

This new management model can foster actions that involve the engagement of workers in the construction of new knowledge, with practical implications in the field of care, promoting access to new technologies capable of promoting improvements in the health and well-being of the population.

8. Limitations and Future Research

Due to the opportunities observed in the scientific literature in the translation of theoretical models of co-creation and intersectoral and interdisciplinary engagement practices for value generation in health, as well as the systematization of essential requirements that characterize an engagement platform as a foundation for innovation, it is suggested that further studies be carried out in order to explore and deepen models and practices that can be immediately applicable in the daily life of health services and ST&I institutions.

Abbreviations

ATIT - NIT INI – Technological Innovation Consultancy - Technological Innovation Center - Evandro Chagas National Institute of Infectious Diseases.

COVID: Corona Virus Disease.

INI-FIOCRUZ: Evandro Chagas National Institute of Infectious Diseases - Oswaldo Cruz Foundation.

ST&I Institutes: Science, Technology and Innovation Institutes.

ST&I System: Science, Technology and Innovation System.

SUS: Single Health System.

VCCH: Value Co-Creation in Health Care.

VUCA: Volatility, Uncertainty, Complexity, and Ambiguity.

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Conflicts of Interest

The authors declare no conflicts of interest.

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