A systematic literature review of intellectual capital and sustainable development of health care

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Abstract.

The healthcare sector is one of the major sectors affected by the novel coronavirus (COVID-19). The pandemic brought enormous pressure on the health care sector thus shifting focus on valuing its intellectual capital (IC) and ensuring sustainable development. IC is critical for not only achieving a competitive advantage but also influencing sustainable development. The existing literature remains fragmented and underexposed with relation to IC and sustainable development in the health care sector. To address this issue, this study undertakes a systematic literature review of the IC and sustainable literature specific to the healthcare sector (n=39). After analysing research articles indexed in Scopus, the findings highlight that publications in this area have been the highest over the last four years and around 50 per cent in the field of business, management, environmental sciences and social science combined. The extant literature has predominantly explored areas falling under three major themes, strategic approach, systems, and performance enhancement. The implications are for the academicians and practitioners to undertake future research agenda emphasizing IC contribution in the sustainable development of the health care sector.

Keywords: Intellectual capital, sustainable development, healthcare, systematic literature review

1 Introduction

Governments globally are committed to the United Nations Sustainable Development Goals (SDGs) and face considerable pressure to transform their policies for guaranteeing the well-being of all. Governments are further challenged to build sustainable health care for addressing the environment and rising health risks. World Health Or-

ganisation (WHO) has emphasized the need for research and academic institutions to address the priority evidence gaps in institutional regulations and optimization of quality and performance of human resources for health [18]. The health care system is heavily dependent on its health workers, enabling it to function to improve social welfare. Countries must have the availability and sufficiency of health workers. Still, it is also crucial that they are equitably distributed, accessible by the population, and motivated and empowered to deliver quality care. It is recognized that depending on countries' socio-economic development; they are challenged with varying degrees of difficulties in education, deployment, retention, and performance of their workforce. For example, an international study on sustainable health care systems across 11 countries reported that though the health care systems are varied, austerity and increasing demand for healthcare services highlighted existing systems were unlikely to remain sustainable[39]. Several factors may affect the quality of the healthcare service in intellectual capital. Intellectual capital leads to sustainable development which such conditions are most desirable to the government.

Intellectual capital (IC) refers to the organisation's intangible resources such as relationships with suppliers, customers and employees, the organisation's processes and routines, and expertise and knowledge of human resources [44]. Healthcare organizations comprise intangible resources, internal capabilities and external relationships that are all critical components of intellectual capital (IC). Studies have suggested that IC plays a role in sustainable development; however, these are mainly focused on the business sector [14]. D Botturi et al. [7] suggested building a sustainable health care system by strengthening the social capital needs, improving its culture, structure, information and communication technology, social web for enhancing efficiency, and developing professional competencies towards innovation. Prior studies have investigated the role of IC in sustainable development through systematic literature reviews in the context of innovation [3] or technology policies [45]. While extant literature has argued that IC as an intangible resource does not appear in the financial statements [11, 12], it is proven to contribute towards value creation for the firms[48] and economy[60], and thus critical for sustainability[22].

There is a lack of understanding of how intellectual capital plays a role in the sustainable development of the health care sector. To the best of our knowledge, there is no systematic literature review on how IC and sustainable development, specifically impact the health care sector. Thus, this research aims to critically review the literature on intellectual capital and sustainable development of the health care sector published in the Scopus database. By combining keyword and content analysis[32], the following research questions (RQs) will be answered:

RQ1: What is the development of studies in IC and sustainable development in the healthcare sector region and country wise?

RQ2: What is the coverage of literature with regards to IC and sustainable development in the healthcare sector?

The rest of the current paper is structured as follows: Section 2 provides a background on IC and sustainability. Section 2 describes the methodology used in this

study. Section 3 discusses the results after applying for a systematic literature review. Lastly, section 4 presents the conclusion, limitations and future recommendations.

2 Methodology

The purpose of this research is to review the current state of research in the field of intellectual capital and sustainability development. This review also supports the identification of knowledge gaps important for future research directions. To support this purpose a systematic literature review (SLR) is undertaken to ensure comprehensiveness, objectivity, openness and replicability [52, 55]. Using the PRISMA model [35], a four-stage approach that includes identification, screening, eligibility and inclusion is adopted for the SLR.

During the identification stage, keywords search in Scopus indexed journals. This is followed by the screening stage in which the titles and abstract are scanned for the identified articles (n=72). This stage examines the relevant articles based on inclusion and exclusion criteria. The next step involves the eligibility step that critically appraises the screened articles (n=57) for verifying the suitability of articles. The last step of inclusion involves 39 articles to be included in the final review.

2.1 Identification

A systematic search protocol was developed to identify relevant articles for this research. The protocol outlined above ensures robustness and rigour and ensures the scope and boundary in the search of articles. One of the elements of this study is sustainable development, the sustainable development goals (SDGs) were formulated by the United Nations only in 2015. However, sustainability in the healthcare sector has been investigated since the 1990s. For example, KW Vestal et al. [53] suggested that to achieve a patient-focused healthcare system, the organisations would have to undergo rapid sustainable transformation. Similarly, MD Halley ,AW Little [17] concluded that hospital-owner primary care practices benefited from a net income primary tool that supported in achieving competitive advantage and sustainable practice operations. Thus, sustainability in healthcare has been investigated from various angles even before the SDGs.

The quality of the articles to be selected for review was assured as only those were focused upon that were published in the Scopus database. The selection of the Scopus database is coherent with existing studies that have argued in favour of its extensive coverage of more than 20,000 peer-reviewed journals [34], scoring over the Web-of-Science database [50]. L Waltman [56] further argues that about 97% of the papers indexed in Web-of-Science is also included in the Scopus database. The search was limited to articles of empirical, conceptual and literature review articles addressing the research questions. The search string that involves querying relevant keywords was derived from the research objectives and by referring to the equivalent terms used in related topics. The keyword combinations used in the search were (Intellectual capital OR human capital OR structural capital OR relational capital AND healthcare

or hospital AND sustainable development OR sustainability). The search resulted in a total of 72 entries.

2.2 Screening

In the screening stage, the article titles and abstracts were reviewed for relevance to the research objectives. A specific exclusion criterion was developed in the context of IC, sustainability and healthcare. Excluded from the review were studies that (a) only investigated IC in healthcare or sustainability in healthcare, or (b) were editorials, book chapters, conferences or research notes. We included the work of economic and social sustainability that is witnessing an emerging trend [13] and environmental sustainability that has been investigated extensively [27]. The references of selected articles were also scanned to identify additional relevant work. The screening process resulted in 57 articles.

2.3 Eligibility

During the eligibility stage, the 57 articles screened were appraised for suitability for inclusion. An independent review of the full text of all selected articles was independently reviewed to validate its content in the context of the research objectives by three authors. Using a tabular format, the authors extracted key information of the research papers, that included title, abstract, methodology, and key findings. This supported minimizing the reviewer bias and maintaining the level of uniformity towards the article selection process. The reviewing authors then jointly discussed their review findings, thus resolving minor differences and jointly deciding on the final set of articles to be included in the research. The articles with featured IC or sustainability as a secondary concept were excluded from the study. Through the inclusion/exclusion criteria, a further 18 articles were considered non-eligible for inclusion.

2.4 Inclusion

Through the implementation of the stages discussed above, a final set of 39 articles met the screening and eligibility criteria. An inductive and deductive approach was used to identify topics covered in the various articles through analysis and synthesis. Further, an NVIVO analysis was carried out to identify emerging themes from the research articles. These were then matched with the topics covered in the literature for IC and sustainability. This approach allowed the research team to compile three key topics from the 39 articles.

3 Results

3.1 Descriptive Analysis

The analysis of the literature revealed certain trends and patterns which are presented in terms of how the documents were published over the years, the major subject areas in which the publications have taken place and the country-wise distribution of these articles. As can be seen in figure 1, the published studies were published from 2009 to 2022. The majority of the studies were published after 2018. The highest number of research articles were published in 2021.

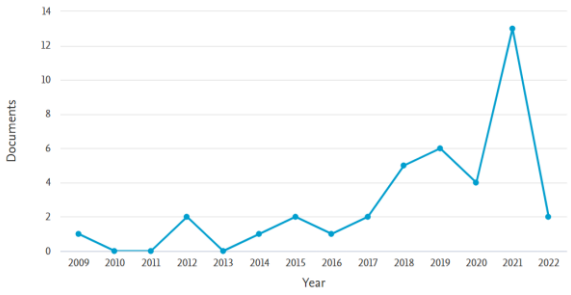

Figure 1: Timeline of published studies (n = 39)

Figure 2 depicts the publications in various subject areas. The maximum number of publications have taken place in the business, management and accounting area (21.3%). The next area in which the publication has been majorly reported is in Environmental Science followed by Social Sciences and Energy. Thus, the shortlisted articles in the field of IC, sustainability and health sector have been spread across subjects.

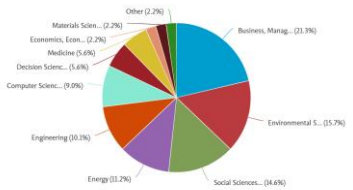

Figure 2: Publications by subject area (n = 39)

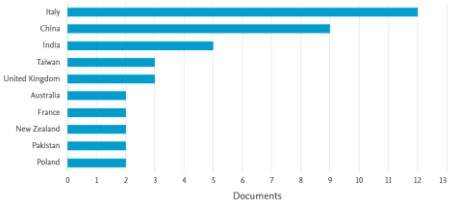

Figure 3: Geographic locations of the selected studies (n = 39)

Figure 3 presents the research articles distribution in terms of country. The highest number of articles in the field of IC, sustainability and healthcare sector are published by Italy followed by China and then by India. Approximately 50 per cent of the stud-

ies have been conducted by authors from Asia and the balance across European and the Asia Pacific countries.

3.2 Thematic analysis

3.2.1 Strategic approach in healthcare

The study by J-W Park et al. [38] emphasizes the digitalization of various healthcare services that enhances the average life of a human being due to continued growth in the economic conditions, increase in the ageing community and utmost care in the nutritious life. The progress of information and communication technology in the healthcare sector results in innovative solutions to mitigate critical issues arising due to social and economic challenges such as the ageing population or chronic illness [16, 46]. D Zhou et al. [62] suggests intellectual elements of the healthcare sector motivate the scientific and social environmental resources that identify and suggest initiatives against infectious diseases and coronavirus concerns. The methodological strategies help to evaluate the effects on the stimulating elements. The study was carried out to find the solutions for the synergic method for blending dynamics. Sustainable progress and improvement in the medical field is pioneering and influences the global financial system. One of the effective strategies to measure sustainability is social orientation [40].

Crucial strategy management in the healthcare sector is a form of knowledge management that supports it to survive changing global environment. Healthcare sectors require various strategies on knowledge management by innovation, detection, procurement, advancement, safeguarding, spreading and usage of various innovations to facilitate solutions for medical challenges [1]. The recent era is known for infectious diseases, chronic ailments and more ageing people and the present living conditions forced and demanded the healthcare professional invent with various experiments [36]. One of the significant strategies of the healthcare sector concentrates on avoiding a large volume of healthcare waste that amounts to two to three per cent of waste generation globally. China is faster in generating wastage in huge volumes and at the same time responsible to save human life and its environment. Sustainable management of wastage relating to healthcare is in big discussion to bring about solutions to safeguard humankind in society. It is the right time to bring innovative strategies to manage healthcare wastage that arises due to dispensing chemists, contagious, biochemical, pathological, cytotoxic, and emitting radiation that saves human as well as environmental wellbeing [19]. Indefensible and inappropriate healthcare waste handling in the healthcare sector results in negative public physical conditions and a biological natural environment [4].

The healthcare sector is one of the prime industries that provide services to humankind and support the gross domestic product that influences the economy. Different strategies of a supply chain in the healthcare sector influence measurement and performance. The healthcare supply chain is an integral part of the service supply chain. The healthcare supply chain is inspired by dedicated services from the service providers to various customers with less cost [24]. The study concluded that intangible asset is very influential for the customers on social health supply chain productivi-

ty, greater importance to the economic environment, social aspects, and environmental elements. The social health supply chain process consists of various factors that influence profit, quality of the service provided by the healthcare sector, income generation, satisfaction of the customers and satisfaction of the stakeholders [25].

3.2.2 Systems in healthcare

Since the introduction and progress of information technology, including big data, the internet of things (IoT), cloud computing, and artificial intelligence, the healthcare system has undergone a significant transformation, becoming more effective and useful, affordable, and customized [51]. Organizing smart healthcare systems from the perspectives of individuals, industries, and governments has thus emerged as a critical challenge to achieve the long-term growth of a sustainable healthcare system.

M Mahoney ,J-L Potter [29] suggests a sustainable development system of smart healthcare is proposed incorporates considerations of social, environmental, and economic factors. It is anticipated that combining artificial intelligence with the three factors will result in the improved sustainable growth of the smart hospital. The notion of ecological efficiency is used in collaboration with a systematic integration framework to provide support and guidance for the sustainable development of intelligent healthcare. The Health Hospital Initiative provides tools and resources to help organizations foster sustainable growth. In order to assist enterprises in measuring, understanding, and communicating the effect on important sustainability challenges, the Global Reporting Initiative provides sustainability reporting. Data integration and information sharing can be encouraged through the use of a healthcare information system, which can foster the development of a smart medical system. It has become more common for researchers to compare the effects of reusable medical devices [9, 15], energy efficiency [49], water-saving and water-waste treatment [15], and food selection and waste [54].

Sustainability in health research has steadily become a component of medical waste management [58]. Hospitals are, in a sense, public spaces. It is imperative that their abilities are increased so that they can respond to a variety of situations. The implementation of a hospital emergency management system is therefore critical to their long-term sustainability and development [59]. To deliver accurate and efficient customized solutions for the community healthcare centre and improve job productivity, the system employs intelligent terminal technology and customized professional medical software. Healthcare enterprises began to understand approaches to include information technology (IT) in the health care system to enhance automation and cost-effectiveness [10]. The proper use of information technology in the health care system will increase our efficiency to gather, organize, manage, analyze data, and transmit medical data securely and effective manner, as well as alleviate challenges at present [61]. Numerous countries have introduced their new healthcare systems with this in mind. In the United Kingdom, for example, the Department of Health established "telemedicine," a national service framework for the aged. Patients, medical organizations, and society may all benefit from connected health. It enables patients to remotely access medical organizations, providing them with convenience and flex-

ibility. Furthermore, it improves the quality of care with timely health conditions to the patients and stimulates the prevention of disease.

Additionally, individuals can legally allow medical institutions to exchange their information with other organizations to tailor the treatments they require. Through pervasive computer technology, connected health revolutionizes the approach to patient care and disease prevention in medical organizations, assisting in the development of a more effective and efficient medical system [2]. Connected health benefits society by facilitating and promoting coordination among many stakeholders in medical systems and fostering the attainment of sustainability [10]. This research project identifies connected health as a patient-centred medical care system that uses modern technologies (such as software, hardware, and wearable devices) to collect all types of data relevant to patients, incorporates stakeholders in the healthcare care industry through prompt and effective information sharing, and evaluates integrated data that can provide preventative measures and long-term monitoring medical services and give patients a complete picture of their health status. Connected health contributes to the realization of a paradigm change in health care, which is defined by developing preventative, proactive, and quantifiable healthcare choices in a comprehensive, participative, and customized method [20]. Whereas the health care system is seeking to strike a balance between quality and cost. In order to ensure the long-term viability of a medical care system that meets the three-bottom line, or economic, environmental, and social factors, it is necessary to encourage the cooperation of stakeholders in the medical care business [21]. These findings will aid in the development of a sustainable medical care system and sustainable society by identifying significant aspects that influence connected health acceptance levels.

3.2.3 Performance enhancement in healthcare

Performance management helps the Health Care Institutions (HCIs) to provide state-of-the-art healthcare with maximum efficiency, effectiveness, patient satisfaction, and safety leading to achieving the vision and strategic goals of the institutions. Effective performance and sustainability of HCIs are highly correlated with the management of Intellectual Capital (IC) within the institution. IC being the collective knowledge assets of a healthcare institution, can create a link between expertise, experience, and competencies inside and outside the institution [8]. As the main aim of the healthcare sector is to provide high-quality patient care and services, effective management of intellectual capital is critical in ensuring better performance.

Performance measures of HCIs are mainly classified as financial performance and patient performance. A strategic map of Balanced Score Card (BSC) specifies asset utilization, new revenue opportunities and profitability as indicators for financial performance. BSC also defines service attributes, patient relationships and hospital image as main indicators of patient performance [28]. Knowledge assets and capabilities are the basic elements of financial and patient performance required to be cautiously nurtured and developed to positively affect the performance of the HCI [23]. Research studies also proved that principal process capabilities, such as flexible management, innovation management and customer relationship management have a direct impact on organizational performance [30]. For an HCI, this implies that central process

capabilities such as patient relationships, inter-and-intra-hospital collaborations and medical innovations, are the main factors of patient and financial performance [42].

The research work done on knowledge management enabled performance ascertained that the financial and patient performance is considerably improved through knowledge management supported value creation processes in the healthcare institutions. This gives the insight to develop and implement an effective performance management system focussing on strengths and achievements of hospital personnel for promoting work excellence thereby achieving better performance and sustainability goals of the institution [57].

Studies conducted to investigate the role of intellectual capital in the sustainable projects in HCIs showed that among the IC assets, "competence and training" were perceived by healthcare management professionals to make the least contribution to sustainability and "research of efficiency" was perceived to make the most contribution to sustainability [10]. Also, lean management approaches can assist health care providers to maintain sustainability in the provision of quality care services [43]. Moreover, a research work using a stochastic ordering test proved that HCIs management who have endorsed high relevance to Information and Communications Technology (ICT) in the implementation of projects were successful in achieving the sustainability goals of the institution. Technologies, in particular, informatics, have been proved to facilitate a shift towards sustainability to improve healthcare services. Additionally, technologies and ICT applications are considered as the enablers of sustainability in HCIs, which can be used in many ways. For example, to assess the appropriateness of services and treatments; to improve the decision making of medical expertise and to facilitate patients' ability to manage their diseases under the supervision of medical professionals [6]. Effective utilization of data resources can be a driving factor towards improving the healthcare institution's performance and innovations [41].

Research on the knowledge-based perspective of innovation and performance improvement in the healthcare sector proved that the significance of managing knowledge is related to its impact on innovation and institutional performance improvement. In this aspect, HCIs should be able to transform their knowledge domains into efficient services and products, thus renewing the capabilities of the institution. Hence, the HCIs are required to identify, acquire, organise, share and apply their knowledge resources continuously and efficiently [26].

HCIs should maintain and manage their resources and data effectively for sustainable competitive advantage. Nowadays, Big Data Analytics has a very critical role in healthcare practices as its application include adequate resource utilization, prediction of disease outbreaks and prevention and monitoring of diseases thereby supporting the HCIs to ensure the provision of high-quality services and patient care [47]. Furthermore, Bigdata tools and analytics facilitate additional value to HCIs as they facilitate opening new business opportunities. Medical professionals being the major intellectual capital component are required to be given continued education through advanced training to meet the Big Data needs and requirements of HCIs, contributing to better performance and staying ahead of emerging competitors [5].

Recent research studies have proved that HCIs can also positively impact their performance and sustainability through implementing green hiring and Green Human Resource Management Systems [37]. Green hiring is an evolving concept in HCIs whereby medical professionals with the necessary knowledge, skills, approach, and behaviours, are recruited to identify environmental management systems for HCIs. Research studies also revealed that green recruitment has a substantial impact on HCI's environmental, economic and social performance. The implementation of green training programmes for the professionals will facilitate awareness of environmental issues and activities, thus enabling them to contribute towards achieving the sustainability goals of the HCI. Moreover, investing in green training programmes will promote a culture within the HCI that positively develop sustainable initiatives and projects to move to a sustainable healthcare system [31].

4 Conclusion

Improved efficiency of healthcare infrastructure, reasonable resource allocation, and the integrated and orderly expansion of medical ecology are all important components of ensuring the continued development of the overall healthcare sector. Additionally, the topic of sustainable development in healthcare has become increasingly important, at both the civil and national levels of government. Thus, this study has explored the trends in the extant literature related to IC, sustainable development and healthcare. The findings suggest there is still paucity in research as only 39 relevant articles could be shortlisted. From a worldwide perspective, the researchers were from Asia, Asia Pacific and European countries.

Content analysis of the articles using NVIVO software has resulted in the identification of three thematic clusters. Though the specialisations are not explicit on the topic, three main areas arise through the review: a strategic approach, systems and performance enhancement. All three are critical IC elements that are investigated for the healthcare sector. The strategic approach, an important element of structural capital remains critical for the healthcare sector to deal with the pandemic and any future challenges that this sector might witness. The systems theme gave an overview of various technologies put in place for enhancing the health care sector. The findings of the performance enhancement theme predominantly suggest the development of human capital of the health care sector that involves training, recruitment and professional development.

Though this research is an overview of extant literature the findings do offer some implications to academicians and researchers. An important element of IC and critical factor for sustainability is capital employed that still seems to be an underexplored area for the healthcare sector.

The study suffers from certain limitations. The SLR was undertaken for journal articles and excluded conferences proceedings, and book chapters. Due to the novelty of the topic, there is a likelihood that conference proceedings and book chapters could have some valuable contributions in this area. The analysis method itself is subject to certain criticism as a certain level of subjectivity is applied to shortlist the research

articles relevant to this study. However, this subjectivity is mitigated to a certain extent as outlined in the methodology section. Thus, future research can ensure the inclusion of more forms of articles to provide a more comprehensive overview of the topic.

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