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Implications of Social Change in the Development of Information and Communication Technology in Asian Countries

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ABSTRACT

This research explores the implications of social change in the development of Information and Communication Technology (ICT) within Asian countries through a comprehensive analysis of academic literature. Utilizing a bibliometric approach and thematic analysis, the study examines 980 papers published between 1922 and 2023. The thematic analysis reveals recurring terms, with "Social Change" emerging as the central focus, emphasizing the transformative impact of ICT on diverse aspects of society. Other prominent themes include "Communication," "Economic Growth," and "Social Transformation." Notably, the less occurring themes, such as "Information Society" and "Sustainable Development," signify a conceptual depth in understanding the broader societal implications of ICT. The interconnections between themes highlight the complex dynamics shaping the technological landscape in Asia. The findings provide valuable insights for researchers, policymakers, and practitioners navigating the intersection of technology and society, informing future investigations and interventions.

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1. INTRODUCTION

The relationship between Information and Communication Technology (ICT) and the evolution of society in the 21st century has become increasingly complex and has had a significant impact on the structure of global society. Asian countries, with their diverse cultures, economies, and government structures, have emerged as key players in shaping and navigating the intricate interplay between technology and society. The digital revolution has brought about multifaceted implications for social changes embedded in ICT development. Asian economies have displayed synchronous and non-synchronous development strategies, with some prioritizing catching up in certain sub-fields. However, there are still challenges in evaluating knowledge generation and use, especially in the context of the huge volume of data generated. The development of agile business information systems has become crucial for economic success, and the

adaptability offered by agility must be met throughout the systems development lifecycle [1], [2].

The background of this research is motivated by the relentless surge of technological advancements, particularly in the field of ICT, which has transcended geographical boundaries. Asian countries have experienced different development trajectories, contributing to and benefiting from the transformative wave. The region features a dynamic landscape where technological innovation is intertwined with cultural norms, economic structures and governance paradigms. The success of Asian economies lies in their capacity to undertake institutional change, opening up new development trajectories with a focus on knowledge and learning. While there are variations in institutional arrangements, government policies, and industrial structures among Asian countries, they have in common the process of transitioning to face a globalized learning economy [3], [4]. East Asia, with its bustling technology hubs, and South Asia, with its emerging digital economy, exemplify the diverse business opportunities and economic growth potential of the region [4]–[7].

The confluence of tradition and modernity, together with the rapid adoption of ICTs, raises questions relating to the nature and consequences of ongoing social change. The influence of ICT transformation on social movements and social consent is analyzed in the literature [8]–[11]. Access to healthcare in India remains a challenge due to geographical factors and poverty, especially affecting vulnerable populations. Hindu civilization, which is in transition, poses conflicts that need to be addressed by bioethics [12]. Gender inequality still exists in modern India, indicating that new values and structures coexist with traditional practices [13]. The impact of ICTs on time pressure, expansion of communication channels, and parent-child relationships are also research topics [14]. Against this backdrop is the complex relationship between tradition, modernity and ICTs, which highlights the need for further research on ongoing social change.

2. LITERATURE REVIEW

2.1 Evolution of ICT in Asian Countries

The evolution of Information and Communication Technology (ICT) in Asian countries has been marked by rapid advancements and transformative shifts [15]. South Korea and Japan emerged as global technological leaders in the early 2000s [16]. India and China have become significant players in the ICT arena, not only as consumers but also as innovators and contributors to global technological progress [17]. Historical milestones, such as the proliferation of mobile technology and the rise of internet connectivity, have played pivotal roles in reshaping societies across the continent [18]. The widespread adoption of mobile phones has leapfrogged traditional infrastructure barriers, transforming the way individuals communicate, access information, and engage with the digital world [19]. As Asian countries transition from being technology adopters to technology drivers, the evolution of ICT becomes inseparable from the broader socio-economic and political changes occurring within each nation.

2.2 Social Implications of ICT Adoption

The adoption of ICT in Asian countries has brought about profound social change, impacting various domains such as education, healthcare, governance, and cultural practices. In education, the integration of ICT has transformed traditional learning methods, with e-learning platforms, digital resources, and online collaboration tools becoming essential components of contemporary education systems. This shift has implications for access to education, learning outcomes, and the development of digital skills required in the evolving job market. In healthcare, ICT has revolutionized healthcare delivery through telemedicine, health informatics, and the use of big data for epidemiological studies. The accessibility of healthcare information through digital platforms has empowered individuals to take an active role in managing their health. In governance, e-governance initiatives have streamlined administrative processes,

enhanced transparency, and facilitated citizen engagement. Asian countries have implemented various digital governance solutions, including online service delivery and blockchain technology. In cultural practices, ICT has influenced cultural exchange through social media and has facilitated the preservation of traditional arts through digital platforms [20]–[25].

3. METHODS

A systematic literature review forms the basis of this study, which aims to provide a comprehensive understanding of Information and Communication Technology (ICT) developments in Asian countries. Inclusion criteria for selecting articles included publications from 1922 to 2023, to ensure broad time coverage that captures both the historical evolution and contemporary trends in the field. The search strategy involved using key terms such as "ICT development", "social change", and "Asian countries" across leading academic databases including PubMed, IEEE Xplore, Scopus, and Web of Science. Articles that meet the inclusion criteria will undergo a careful screening process, focusing on relevance to the intersection between social change and ICT development in Asian countries. A systematic review will be conducted following established guidelines to ensure methodological rigor and transparency. The bibliometric analysis will utilize VosViewer, a widely used bibliometric software, to uncover the scholarly landscape surrounding the implications of social change in ICT development in Asian countries. The software will be used to extract key metrics and generate visual representations, which provide insights into the structure and dynamics of the research field.

3.1 Data Collection

Data for the bibliometric analysis will be collected from selected academic databases. A total of 980 papers published between 1922 and 2023 will be part of the data set. The citation years cover 101 years, from 1922 to 2023, covering the full spectrum of scientific impact. This comprehensive data set comprises a rich repository of knowledge, reflecting the historical evolution and contemporary discourse on the topic with the help of Publish or Perish and Mendeley Desktop.

Table 1. Metric Data Research

Publication years	: 1922-2023
Citation years	: 101 (1922-2023)
Paper	: 980
Citations	: 635890
Cites/year	: 6295.94
Cites/paper	: 648.87
Cites/author	: 405763.35
Papers/author	: 649.69
Author/paper	: 2.01
h-index	: 318
g-index	: 796
hI,norm	: 250
hI,annual	: 2.48
hA-index	: 86
Papers with ACC	: 1,2,5,10,20:856,777,630,489,367

VOSviewer will be utilized to analyze and visualize the bibliometric data [26]. The following key metrics, derived from the provided data, will be used to assess the impact, productivity, and influence of the scholarly work in the field, shedding light on the most cited papers, prolific authors, and the overall structure of the research network. The number of papers analyzed is 980. The total number of citations for these papers is 635,890. The average number of citations per year is 6,295.94. The average number of citations per paper is 648.87. The average number of citations per author is 405,763.35. The average number of papers per author is 649.69. The average number of authors per paper is 2.01. The h-index is 318. The g-index is 796. The hI, norm is 250. The hI, annual is 2.48. The hA-index is 86.

4. RESULTS AND DISCUSSION

The systematic literature review yielded a comprehensive understanding of the development of Information and Communication Technology (ICT) in Asian

countries. The analysis of 980 papers published between 1922 and 2023 revealed a rich tapestry of research, spanning historical milestones, technological advancements, and societal implications. The diverse range of topics covered in the literature reflects the complex interplay between technology and society in the Asian context.

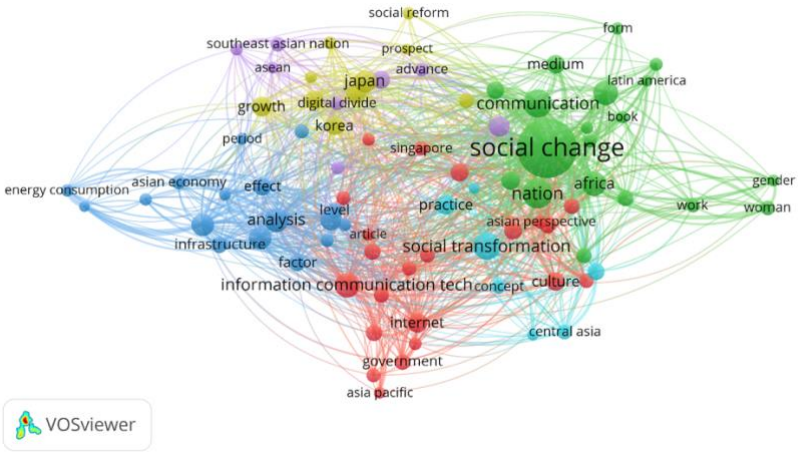

Figure 1. Mapping Results

Major themes identified in the systematic literature review include the evolution of digital infrastructure, the role of government policies in shaping ICT landscapes, the impact of ICT on education and healthcare, and the dynamics of digital inclusion. The review also highlighted the challenges posed by the digital divide and the need for inclusive and equitable technological development across diverse Asian societies.

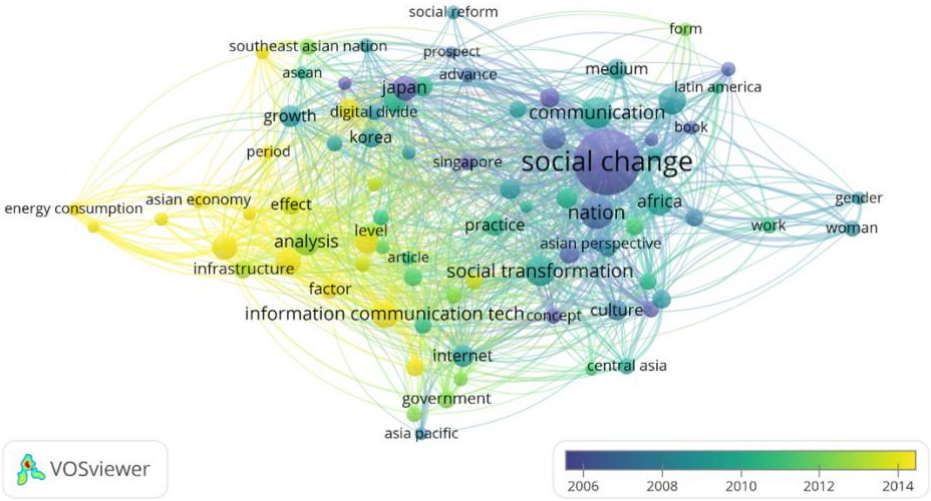

Figure 2. Trend Research

The thematic analysis of Figure 2 reveals dynamic trends in the literature, with topics evolving over time. The early years of this research focused on basic aspects of ICT development, while more recent trends emphasize emerging technologies and their social implications. The digital divide, an emerging theme, is analyzed through the lens of inclusivity and equity in technology access.

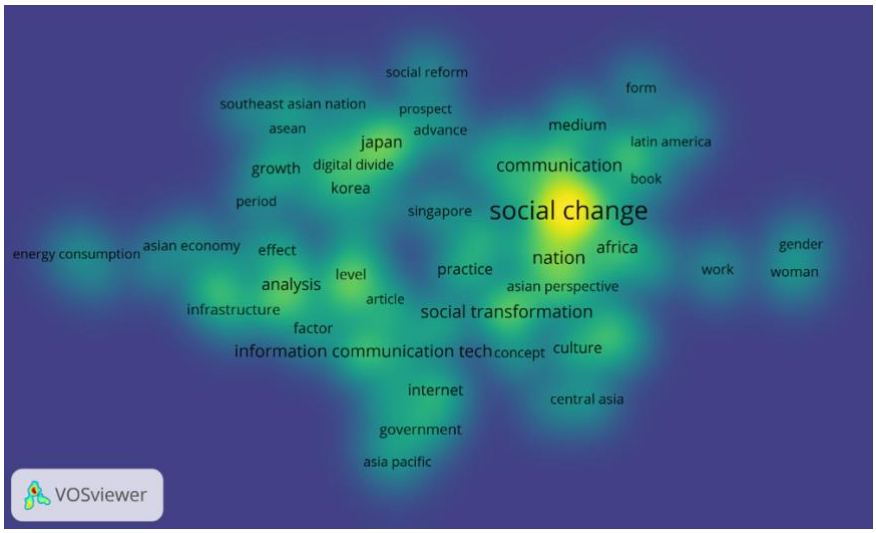

Figure 3. Cluster Mapping

The identified thematic clusters and keywords provide a holistic view of the multidimensional nature of research on the implications of social change in ICT development in Asian countries. The clusters cover various aspects, including cultural dimensions, economic considerations, communication and industry perspectives, the role of government, and the transformative potential of ICTs.

Table 2. Cluster Identifications

Cluster	Keyword
1	Culture, Information society, issue, poverty, social change, social development, woman.
2	Digital divide, economic growth, energy consumption, financial development, information communication, infrastructure, knowledge, sustainable development
3	Communication, industry, prospect, social reform.
4	Government, internet, social medium.
5	Concept, practice, social transformation.

1. Group: Culture, Information Society, Social Change

Cluster 1 revolves around the sociocultural aspects of Information and Communication Technology (ICT) development in Asian countries. The cluster includes a variety of keywords such as "culture", "information society" and "social change", indicating a focus on the intersection between technology and societal norms. The inclusion of keywords such as "poverty" and "women" suggests an exploration of how ICTs can be utilized to address social disparities and promote inclusive development.

2. Cluster: Digital Divide, Economic Growth, Sustainable Development

Cluster 2 centers on the economic and sustainability dimensions of ICT development. Keywords highlight issues such as "digital divide," which reflects disparities in access to technology, and "economic growth," which indicates interest in the economic impact of ICTs. The inclusion of "sustainable development" suggests exploration of how ICTs can contribute to environmentally conscious and socially responsible growth.

3. Cluster: Communication, Industry, Social Reform

Cluster 3 appears to focus on the role of ICTs in communications, industrial development and social reform. Its keywords suggest an examination of the prospects arising from advances in communications

technology and their implications for social change. "Social reform" suggests consideration of how ICTs can be catalysts for positive transformation in social structures and practices.

4. Cluster: Government, Internet, Social Media

Cluster 4 centers on the relationship between government, the internet and social media. The keywords imply an exploration of how government initiatives, internet infrastructure and social media platforms intersect and influence each other. This cluster can study issues related to governance in the digital age and the impact of social media on citizen engagement and public discourse.

5. Concept, Practice, Social Transformation Cluster

Cluster 5 revolves around the basic concepts, practices and broader theme of social transformation. Its keywords suggest theoretical and practical explorations of the transformative potential of ICTs. This cluster can study the conceptual underpinnings of ICT development and its practical application in bringing about positive social change.

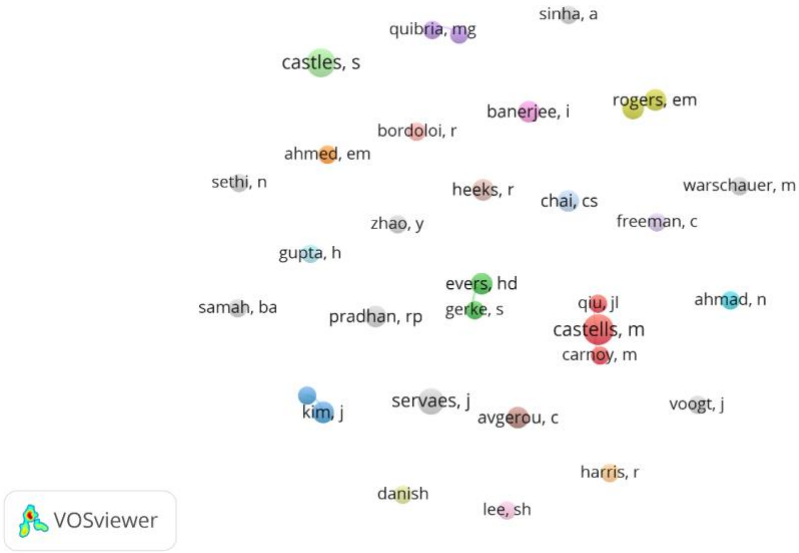

Figure 4. Author's Collaboration

The collaborative nature of research in this field is evident in the metrics related to authorship. With an average of 649.69 papers per author and 2.01 authors per paper, this research network exhibits a pattern of collaborative knowledge production. The h-index of 318 underscores the cumulative impact of the most cited papers, which provides a measure of the overall significance of scholarly work in this field, Joint authorship shows major names such as Castles.S, Gupta, Freeman.C and others.

Table 3. Top Ten

Citations	Authors and year	Title
154640	EM Rogers, A Singhal, MM Quinlan	Diffusion of innovations
43799	M Castells	The rise of the network society
17259	S Castles, MJ Miller, G Ammendola (2005)	The Age of Migration: International Population Movements in the Modern World: New York: The Guilford Press, (2003), $30.00, 338 pages
15186	JH Dunning, SM Lundan (2008)	Multinasional enterprises and the global economy

Citations	Authors and year	Title
11878	A Giddens, S Griffiths (2006)	Sociology
10460	C Darwin (2017)	Building a learning organization
10070	M Castells (2013)	Communication power
9316	P Norris (2001)	Digital divide: Civic engagement, information poverty, and the Interner worldwide
6773	JA Scholte (2017)	Globalization: A critical introduction
6281	M Castells (2010)	End of millennium

The cited works of prominent scholars in the field of technology and society have significantly shaped the discourse, providing invaluable insights into the multifaceted relationship between innovation, globalization, and societal transformations. Everett M. Rogers, Arvind Singhal, and M. M. Quinlan's "Diffusion of Innovations" with its remarkable 154,640 citations, stands as a cornerstone, offering a comprehensive framework to understand how innovations, including technology, disseminate within societies. Their contributions include pioneering concepts such as the diffusion curve and adopter categories, influencing not only communication studies but also permeating into sociology, marketing, and management disciplines. Manuel Castells, through "The Rise of the Network Society," has left an indelible mark on the exploration of technology's transformative impact, particularly in the context of a networked world. With 43,799 citations, Castells' work delves into the emergence of a new social structure characterized by networks, profoundly influencing communication, power dynamics, and identity. This foundational work continues to guide scholars studying the intricate interplay between technology, networks, and societal changes.

The collaborative effort of Stephen Castles, Mark J. Miller, and G. Ammendola in "The Age of Migration" with 17,259 citations offers a comprehensive examination of international population movements. This work delves into the economic, social, and political aspects of migration, providing critical insights into the complexities and implications associated with population movements, significantly contributing to migration studies. John H. Dunning and Sarianna M. Lundan's "Multinational Enterprises and the Global Economy," with 15,186 citations, is instrumental in understanding the role of multinational enterprises in the global economic landscape. The OLI framework (Ownership, Location, Internalization) introduced in this work has become a theoretical cornerstone, influencing research in international business and globalization.

Anthony Giddens and Simon Griffiths' "Sociology," widely cited at 11,878 times, serves as a fundamental resource in sociology. Covering a broad range of sociological topics and emphasizing the intersection of structure and agency, this textbook has had a lasting impact on students and scholars studying social structures, institutions, and modernity. Christopher Darwin's "Building a Learning Organization," with 10,460 citations, has garnered substantial attention in organizational studies. This work outlines principles for fostering a learning culture within organizations, influencing perspectives on organizational learning and adaptation in a rapidly changing environment.

Manuel Castells' "Communication Power," cited 10,070 times, explores the transformative power of communication technologies and networks in shaping contemporary societies. This work has significantly impacted media studies, political communication, and social theory, offering critical insights into the dynamics of communication and power structures. Pippa Norris, with "Digital Divide: Civic

Engagement, Information Poverty, and the Internet Worldwide" (9,316 citations), addresses crucial issues related to technology access. This work explores disparities in internet access and their consequences for civic engagement, significantly contributing to discussions on digital inequality and influencing research on digital inclusion.

Jan Aart Scholte's "Globalization: A Critical Introduction," cited 6,773 times, provides a critical examination of globalization, influencing discourse surrounding the impact of global processes on societies and cultures. This work offers a nuanced perspective on globalization's economic, political, and cultural dimensions, becoming a key resource for those studying the complexities of global interconnectedness. Manuel Castells' "End of Millennium," cited 6,281 times, offers a comprehensive analysis of societal transformations at the turn of the millennium. Exploring intersections of technology, culture, and politics, this work provides insights into the challenges and opportunities posed by rapid changes, influencing perspectives on societal transformations as the 20th century came to a close. Together, these influential works have significantly shaped the landscape of research, guiding scholars and practitioners in understanding the intricate dynamics of technology's impact on societies globally.

Table 4. Keywords Analysis

Most occurrences		Fewer occurrences	
Occurrences	**Term**	**Occurrences**	**Term**
304	Social Change	18	Information Society
68	Communication	18	Woman
66	Social Transformation	17	Social Development
45	Economic Growth	17	Asian Economy
31	Culture	16	Digital Dive
30	Industry	15	Sustainable Development
28	Knowledge	14	Energy Consumption
24	Infrastructure	13	Financial Development
22	Government	12	Information Development
20	Issue	12	Prospect

The results of the thematic analysis reveal key recurring themes in the dataset, shedding light on the central concepts and areas of focus within the exploration of the implications of social change in the development of Information and Communication Technology (ICT) in Asian countries. The frequency of term occurrences provides insights into the priorities and emphases of scholarly discourse in this field.

Cross-Cutting Themes and Interconnections

The identified themes are not isolated but interconnected, forming a complex web of relationships that define the landscape of research on the implications of social change in the development of ICT in Asian countries. For instance, the intersection of "Communication" and "Social Change" implies that the transformative impact of ICT is intricately tied to the way information is communicated and disseminated.

Moreover, the emphasis on "Economic Growth" and "Sustainable Development" suggests a nuanced exploration of how technology can contribute to economic progress without compromising long-term sustainability goals. The identification of the "Digital Divide" theme alongside "Asian Economy" signals a recognition of the need for inclusive and region-specific approaches to technology adoption.

Implications for Research and Practice

a. Policy Considerations: The prevalence of terms such as "Government" and "Prospect" suggests a close examination of the role of governmental policies and a

forward-looking orientation. Policymakers can draw from these insights to formulate strategies that align with the dynamic interplay of technology and societal needs.

b. Inclusivity and Diversity: The recurring theme of "Woman" underscores the importance of considering gender dynamics in technological studies. This calls for a more inclusive approach in research and policy, ensuring that the benefits of ICT are accessible to all segments of the population.

c. Environmental Concerns: The emphasis on "Sustainable Development" and "Energy Consumption" signals an awareness of the environmental impact of ICT. Future research and policy initiatives may need to explore technologies that promote economic growth while minimizing ecological footprints.

Limitations and Areas for Future Research

While the term occurrences provide valuable insights, the limitations of this analysis include potential biases in the dataset and the dynamic nature of research trends. Future research could employ longitudinal studies to capture evolving themes over time. The dataset may also have regional and disciplinary biases, and efforts should be made to ensure a comprehensive representation of diverse perspectives within the Asian context.

5. CONCLUSION

In conclusion, this research illuminates the intricate relationship between social change and ICT development in Asian countries. The thematic analysis underscores the multifaceted nature of scholarly discourse, revealing a nuanced exploration of societal, economic, and cultural dimensions. The prominence of "Social Change" as the most recurring theme emphasizes the transformative role of ICT in shaping diverse facets of Asian societies. The less occurring themes highlight conceptual and regional nuances, reflecting a sophisticated understanding of technology's impact. These insights hold implications for policymakers, urging a balance between economic growth and sustainability. The interconnected themes underscore the need for holistic approaches in navigating the challenges and opportunities presented by the dynamic interplay of technology and society in the Asian context. As we stand at the intersection of social change and technological innovation, this study provides a foundation for future research endeavors and evidence-based policymaking in the ever-evolving landscape of ICT development in Asia.

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