European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

Cultural Landscape of the Digital Divide: A Bibliographic Analysis

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Abstract:
Traditional approaches to understanding the digital divide, a gap that prevents sections of the population from accessing or utilizing digital technologies effectively have often emphasized demographic factors such as age, income. However, more recent research suggests that attitudinal and cultural factors play a significant role in shaping individuals' engagement with technology, influencing both community well-being and social capital. The disparities in access, skills, and usage of digital technologies, frequently linked to socioeconomic status, age, education, and geographical location, raise important questions about the equitable distribution of technological advancements. This study employs bibliometric analysis to investigate the complex relationship between culture, the digital divide, and mobile phone adoption, aiming to identify key trends, research themes, and potential directions for future research. It aims highlight research conducted in this interdisciplinary field leading to more culturally sensitive and effective digital inclusion strategies

Keywords:
Digital Divide, Culture, Mobile phone, Technology Adoption, Bibliometric Analysis

1. Introduction

The proliferation of digital technologies has brought the digital divide into sharp focus, highlighting disparities in access, skills, and usage patterns across different populations. (Goncalves et al., 2018). Digital divide refers to the gap between individuals, households, businesses, and geographic areas at different socioeconomic levels with regard to both their opportunities to access information and communication technologies and their use of the Internet for a wide variety of activities. (Van Dijk & Hacker, 2003).Traditional approaches to understanding the digital divide have primarily focused on demographic factors such as age, income, and education. However, recent research emphasizes the importance of attitudinal and cultural factors in shaping individuals' engagement with technology and its impacts on community well-being and higher levels of social capital, underscoring the intricate relationship between technology adoption and community well-being. (Dutton & Reisdorf, 2019)The disparities in access, skills, and usage of digital technologies, often correlated with socioeconomic status, age, education, and geographical location, raise fundamental questions about the equitable distribution of the benefits and burdens of technological advancement. This study utilizes bibliometric analysis to examine the interplay between culture, the digital divide, and mobile phone adoption. By doing so, it reveals key trends, prominent research themes, and potential avenues for future study. Specifically, the analysis involves scrutinizing frequently used keywords, prominent themes nd cross-country collaboration patterns.

2. Background of Study

Culture plays a significant role in shaping technology adoption and use, further complicating the digital divide. Studies comparing technology use among different cultural groups reveal distinct patterns and preferences (Jackson et al., 2008)For instance, research has shown that cultural factors can significantly influence the adoption of mobile banking, and that effort expectancy has a greater impact in Eastern cultures than in Western cultures (Jadil et al., 2021) . The concept of digital acculturation also explains how individuals manage their identities and practices within the social and cultural boundaries created by the online and offline worlds (Dey et al., 2019), influencing how people adapt to and engage with digital technologies. In rural China, the *shuren* culture, characterized by close relationships among community members, has been found to play a catalytic role in ICT4D implementation (Ye et al., 2021). Understanding the cultural landscape and tailoring interventions to align with local values and practices is essential for bridging the digital divide and promoting equitable access to the benefits of technology(Maier-Rabler, 2017). As areas achieve equal ICT capability and balanced regional development, the digital divide will gradually narrow (D. Wang et al., 2021)

3. Review of Literature

The literature indicates that addressing the digital divide requires culturally sensitive and context-specific strategies. Several studies have highlighted the influence of culture on technology adoption and use. (Jackson et al., 2008) compares technology use between Chinese and U.S. children, suggesting that cultural values and norms can shape how individuals interact with technology. Additionally, Potnis, 2016examines economic barriers to mobile phone ownership experienced by women in India, highlighting how cultural norms and gender roles can create disparities in access and use. Furthermore, comparison between Egypt and the United States reveals how country culture influences consumers' perceptions of mobile banking, indicating that cultural context plays a significant role in shaping attitudes toward digital technologies (Hassan & Wood, 2020).

Research in the cultural context of digital technology use, particularly as it relates to the digital divide, emphasizes that access to technology alone is insufficient for equitable participation in the digital age. The digital divide extends beyond mere physical access, encompassing the skills, knowledge, and social contexts necessary for effective technology utilization. This perspective acknowledges that disparities in digital literacy and the ability to leverage digital information significantly impede individuals' capacity to benefit from technology. The utilization of digital information technology enhances social capital in terms of social networks, social participation, and social trust, subsequently alleviating multidimensional poverty, can help alleviate informal financial constraints rooted in interpersonal relationships, thereby addressing the multidimensional aspects of rural poverty (Djahini-Afawoubo et al., 2023)The foundational concept remains that of exclusion and the underlying narrative is that particular groups or geographies are being prevented from accessing the benefits of digital technologies Furthermore, a significant correlation between social capital and a reduced likelihood of multidimensional poverty among rural households has been demonstrated by previous studies (Ma et al., 2018; J. Wang & Xu, 2023).

Lee et al., 2013 shows how the adoption lifecycle itself differs across cultural types. For instance, individualistic cultures may show faster initial adoption rates, while collectivist cultures might experience a slower start but then a more rapid uptake once the technology gains social acceptance. Similarly, Zhao et al., 2021demonstrates the influence of subjective norms

and self-efficacy on users' behavior intention being more salient in the collectivistic culture, whereas perceived usefulness is more important for online learners in an individualistic culture. The study by Kaba & Osei-Bryson, 2013) confirms that the alignment between the values of national cultures and the characteristics of an ICT influences the adoption or use of the ICT.

The relationship between technology adoption, culture, and the digital divide is influenced by cultural differences that shape attitudes toward technology. Individuals from individualistic cultures engage more with technology independently and proactively, fostering a higher propensity for adopting innovative ICT solutions compared to those from collectivist societies where social contexts play a crucial role in decision-making processes (Lee et al., 2013).This dependence on social context in collectivist cultures can impede technological adoption, suggesting that cultural frameworks like Hofstede's dimensions provide valuable insights into the variances across countries. Moreover, the impact of culture on technology adoption extends beyond individual preferences to organizational and societal levels. (Zhao et al., 2021) conducted a meta-analysis revealing that cultural backgrounds significantly affect user engagement with e-learning platforms, showcasing how these factors can moderate intrinsic self-efficacy and external social influences in technology adoption(Zhao & Bacao, 2020) The findings suggest a pervasive influence of culture on both individual and institutional technology acceptance. Mobile technology is reshaping social interactions and community engagement, while also acknowledging the persistent challenges of the digital divide (Chiumbu & Ligaga, 2013). Cultural attitudes towards specific types of technology, such as digital communication tools, further solidify the notion that culture dictates adoption patterns.
The digital divide, a gap that prevents sections of the population from accessing or utilizing digital technologies effectively, is exacerbated by these cultural factors. Socio-cultural dynamics, including trust and community orientation, impact the readiness and willingness to adopt new technologies, such as cloud-based systems among educational institutions in developing countries (Abachi & Muhammad, 2014)). In essence, successful technology adoption strategies must encompass an understanding of cultural contexts and historical backgrounds that shape technological perceptions and behaviors. In conclusion, it is evident that cultural differences play a crucial role in technology adoption and the emergence of a digital divide. By acknowledging and integrating cultural considerations into technology implementation strategies can help mitigate barriers, foster inclusivity, and enhance the effectiveness of technological advancement across diverse societal landscapes.

These findings emphasize the need for culturally sensitive strategies to bridge the digital divide and promote inclusive access to the benefits of digital technologies. Digital divide is the interconnecting theme, initiatives that bridge this divide will contribute to more balanced regional development and equal ICT capability (D. Wang et al., 2021). By exploring the intersection of cultural attitudes, digital access, and community impacts, this paper aims to provide a more nuanced understanding of the digital divide and inform strategies for promoting digital inclusion.

4. Research Questions:

Given the multifaceted relationship between technology adoption, culture, and the digital divide, this bibliometric analysis seeks to answer the following research questions:
RQ1: What is the current status of studies exploring cultural factors in the digital divide with respect to smartphone use?

RQ2: What are the prominent research themes among studies exploring cultural factors in the digital divide with respect to smartphone use?
RQ3: What are the directions for future research on cultural factors addressing the digital divide with respect to smartphone use?"

5. Research Methodology

The methodology used in this study comprised of finding studies in the aggregator database, Scopus covering peer reviewed, reputed journals from year 2003 to 2024. Studies were screened based on the following boolean search criteria, (“smartphone" OR "mobile phone" OR "cell phone") AND ("technology adoption" OR "digital adoption" OR "ICT adoption" OR "e-inclusion" OR "digital divide") AND ("culture" OR "ethnicity" OR "cultural differences" OR "ethnic groups" OR "cultural values") AND ("determinants" OR "factors" OR "influence" OR "impact"). 153 papers were found falling in the criteria, relevant to the study. This approach was selected to investigate the intersection of culture, the digital divide, and mobile phone adoption.

VOS Viewer software was used for the bibliometric analysis to visualize the relationships and map the intellectual landscape of the field, examining frequently used keywords, prominent themes, and international collaboration patterns at the intersection of culture, the digital divide, and mobile phone adoption. This method facilitated the identification of key trends, prominent research themes, and potential directions for future investigation Specifically, the analysis involved examining frequently used keywords, highly cited journals, prolific authors, and patterns of collaboration across countries. For this purpose, VOSviewer, a software tool was used for visualizing bibliographic data. Further, Biblioshiny tool was utilized to conduct the thematic analysis.

The VOS Viewer outputs consisted of numerous nodes (circles) of varying sizes and colors, connected by lines of varying thicknesses and colors. Each node represents a keyword or concept, and the lines represent the strength of the relationship (co-occurrence) between concepts. The size of each node is proportional to its frequency or importance within the dataset used to create the visualization. The VOSviewer map reveals a rich research landscape exploring the multifaceted relationship between culture, mobile phones, and the digital divide.

Network visualizations are interpreted through the following: Nodes: Each node represents an item (e.g., keyword, author, document); Node size: The size of a node indicates the frequency or importance of the item; Links: Links between nodes represent relationships or connections between items; Link strength: The thickness of a link indicates the strength of the relationship. Further, clusters are nodes of the same color, indicating a group of related items where colors represent different time periods.

6. Findings of Study:

Mostly studies analyze technological aspects, adoption patterns, the influence of socio-demographic factors, healthcare implications, and the role of culture in shaping technology access and use. Larger nodes like "culture," "mobile phone," and "technology" indicate their higher frequency and significance in the underlying data. The thickness of the lines connecting the nodes signifies the strength of association between concepts. interconnectedness and the multifaceted nature of mobile technology's influence across various domains.

European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

This VOSviewer bibliometric analysis visualizes the relationships between keywords in research on Culture, Mobile Phones, and the Digital Divide. The size of the nodes represents the number of publications mentioning each keyword, and the links indicate co-occurrence, meaning how often keywords appear together in the same research papers. The color-coding likely represents clusters of related concepts (though the legend is missing from the image). The key findings based on the visualization are as follows:

Keywords:
In terms of the keywords, Technology Adoption is the central theme, represented by large, centrally located keywords like "technology adoption," "mobile phone," "smartphones," and "cellular telephones." The numerous connections to other keywords highlight the multi-faceted nature of this research area. Several keywords focus on demographic aspects, including age ("aged", "adult", "adolescent", "middle aged", "young adult"), gender ("male", "female"), and ethnicity ("hispanic", "black person", "caucasian income", "ethnic group"). These are strongly connected to the technology adoption keywords, suggesting research on how technology adoption varies across different demographics. The presence of keywords like "questionnaire," "comparative study," "regression analysis," and "article" indicates that both quantitative and qualitative research methods employed in the studies analyzed. Keywords reflecting the context of technology adoption include "social media," "health education," "digital divide," "cultural influence," and "internet" that suggests an interest in the social, economic, and cultural factors that influence access and usage of technology. The notable inclusion of "coronavirus disease 2019" and "pandemic" suggests a focus on how the pandemic has affected technology adoption patterns or usage.

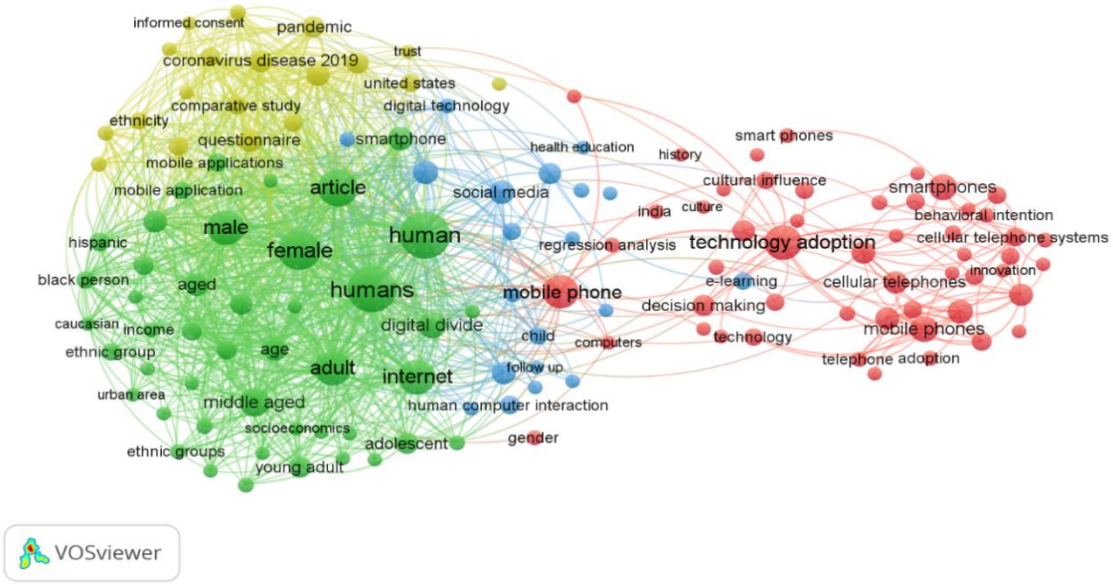

Figure 1. Index Keywords

European Economic Letters
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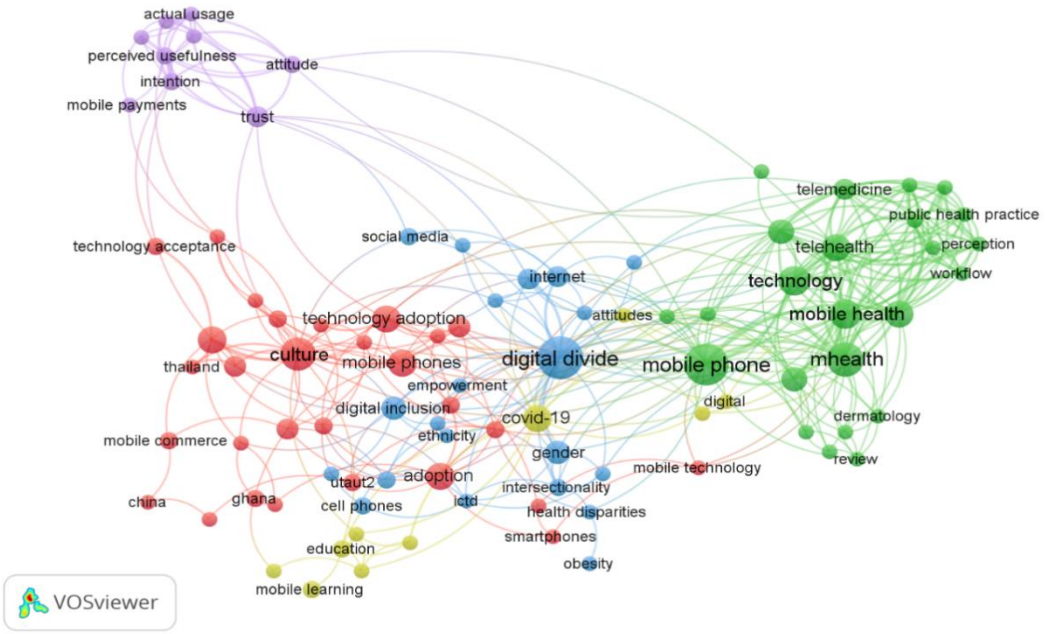

Figure 2. Author Keywords

Analysis of the existing literature reveals several interconnected areas of focus. A significant portion of research centers on the technology itself, specifically mobile phones and smartphones, and their diverse applications. This suggests a foundational interest in understanding the capabilities and potential of these devices. However, research goes beyond the technology to explore *Technology Adoption*, probing the factors that influence whether individuals embrace and utilize mobile phone technology. This includes examining decision-making processes, motivations, and overall acceptance of these devices. A critical area of investigation lies in the *Digital Divide*, where researchers are actively exploring the inequalities in access to and use of mobile technology . Studies in this area often consider how societal factors, such as ethnicity, social status, educational attainment, and age, affect access and usage. The "Culture" node is significantly connected to both technology adoption and the digital divide, highlighting research that analyzes how cultural factors shape both technology use and the emergence of the digital divide. Furthermore, the strong presence of demographic terms (male, female, age, ethnic groups) underscores the considerable attention given to how various demographic groups experience the use and impact of mobile technology. The presence of quantitative methods, indicated by terms like "least squares approximations," suggests that some studies employ statistical techniques in their analysis. Furthermore, the connection between mobile technology and health has garnered considerable attention, encompassing areas like e-health, mobile health, telehealth, and even the impact of mobile technology during pandemics like COVID-19 This reflects a growing interest in the role of mobile technology in healthcare delivery and public health initiatives. It emphasises that digital divide is the interconnecting theme, initiatives that bridge this divide will contribute to more balanced regional development and equal ICT capability. The visualization highlights two dominant perspectives in researching "Culture, Mobile Phones, and the Digital Divide": one focused on the cultural influences on technology adoption, and the other on the processes of technological diffusion. The relatively weak connection between the two suggests a need for more integrated research approaches. The lack of strong central nodes within each cluster also indicates a diverse range of contributing studies within each of these perspectives.

European Economic Letters
ISSN 2323-5233
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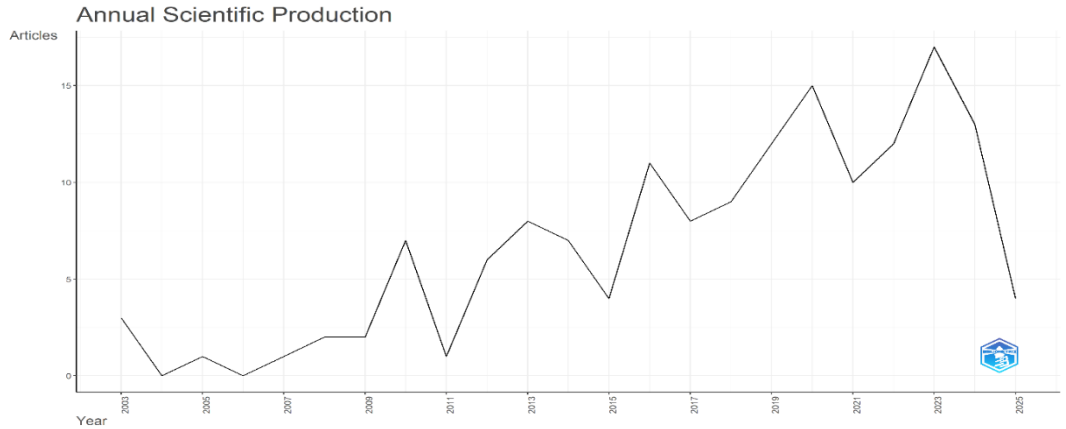

Figure 3. Annual Scientific Production over years

The annual scientific production graph Figure 3. Annual Scientific Production over years reveals a dynamic publication landscape, with the number of articles published each year experiencing periods of both growth and decline. This fluctuation suggests that research productivity is not consistently increasing, but could possibly be influenced by a variety of factors.

Geographies Covered

A bibliometric analysis of scholarly output from 2003 to 2021 reveals shifting global dynamics in academic publishing. USA consistently demonstrates the highest level of article production, indicative of its leading role in this field However, China exhibits substantial growth, particularly after 2016, signalling a rapid expansion of its scholarly contributions. This could reflect a growing interest in and research focus on these topics. While the UK shows a consistent, albeit slower, increase, Italy and Malaysia display more modest growth in comparison. The slower growth in other countries underscores the need to address factors that could enhance research capabilities and output, promoting greater global participation and improving the overall quality of global research. Moreover, focusing solely on the quantity of articles overlooks the quality and impact of these publications.

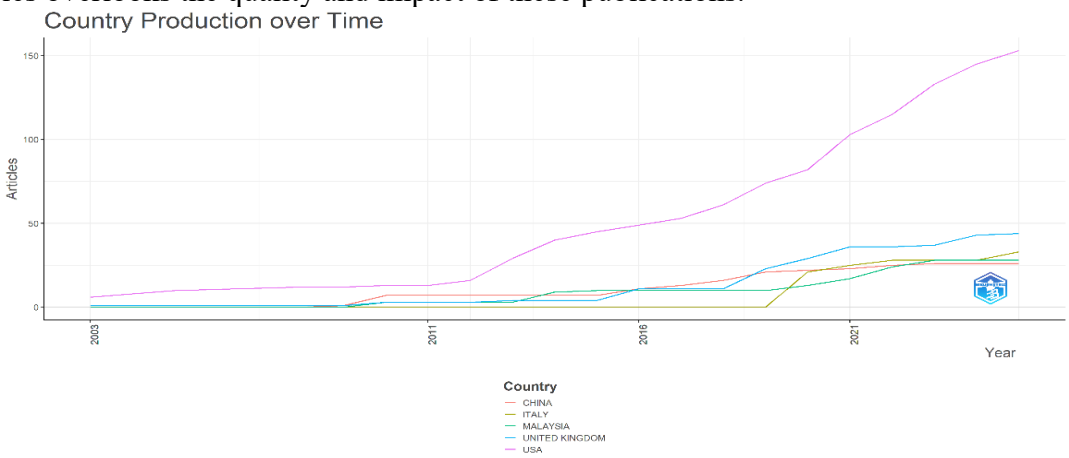

Figure 4. Country Production Yearwise

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ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

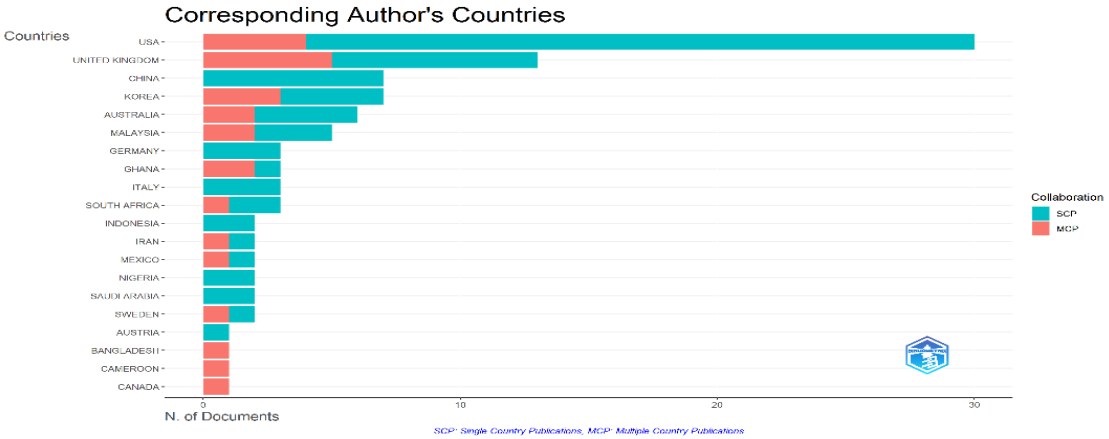

Figure 5. Corresponding Author Countries

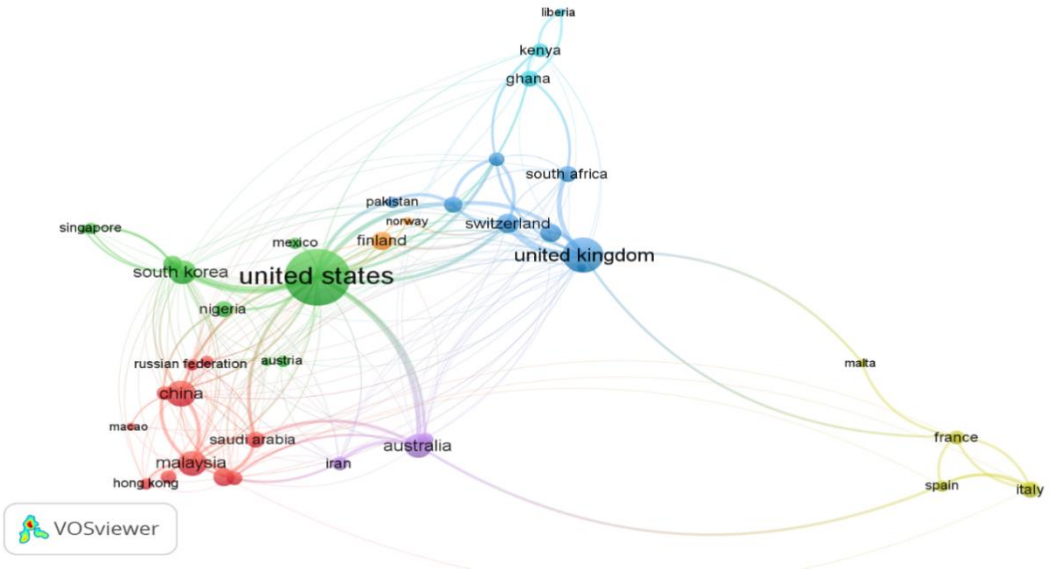

Figure 6. Coupling Countries

The VOSviewer output in Figure 6. Coupling Countries visualizes the collaborative relationships between countries in research on Culture, Mobile Phones, and the Digital Divide. The size of the circles represents the number of publications a country is involved in, and the thickness of the lines connecting the circles represents the strength of the collaborative ties. The color coding likely represents clustering algorithms within the data, grouping countries with similar research focuses. In terms of geography, there appear to be at least three distinct clusters: North America/Western Europe suggesting a high level of collaboration within this region on the topic. The lighter color scheme might indicate this cluster is more focused on the "Culture" or "Digital Divide" aspects than the others. East Asia/South Asia: A smaller, but significant cluster including South Korea, China, and several South Asian countries. This cluster might emphasize mobile phone technology and its impact on culture within Asia. The darker greens and reds potentially indicate a focus on the "Mobile Phones" aspect. Africa/Middle East: A smaller cluster encompassing several African (Kenya, Ghana, Liberia, South Africa) and Middle Eastern (Saudi Arabia, Iran) countries. This cluster's research likely emphasizes the

European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

"Digital Divide" aspect, given the region's existing disparities. The blue tones might represent data focusing on the unique challenges and opportunities within these regions.

The United States stands out as a major hub, indicating its central role in research collaborations. The United Kingdom also plays a significant role in the Western cluster. In terms of the collaboration patterns, the lines show research collaborations and strong links between countries within each cluster and some weaker connections between clusters. The lack of strong connections between some clusters suggests potential for future research bridging these geographically and thematically disparate areas. The study also identifies the theoretical underpinnings of the research, revealing a reliance on models of technology acceptance, diffusion of innovation theory, and social capital theory. Analysing local citations, among the theories cluster, one of the clusters centers around the works of Hofstede (particularly "Culture's Consequences") and Venkatesh, Morris and Davis. This strongly suggests a primary focus on cultural aspects and their influence on technology adoption. Hofstede's work is foundational in cross-cultural research, and Venkatesh et al.'s work likely contributes to the understanding of technology acceptance and usage within diverse cultural contexts concerning mobile phones and the digital divide. Another realm revolves around Rogers' "Diffusion of Innovation" and Hensher's work on "Future Bus Transportation". This points to a research stream emphasizing the diffusion and adoption processes of technology, with a potentially different focus—infrastructure and transportation implications of mobile technology and potentially broader technological adoption. While the connection to the digital divide might be indirect, it relates to how successfully new technologies spread across populations with varying access.

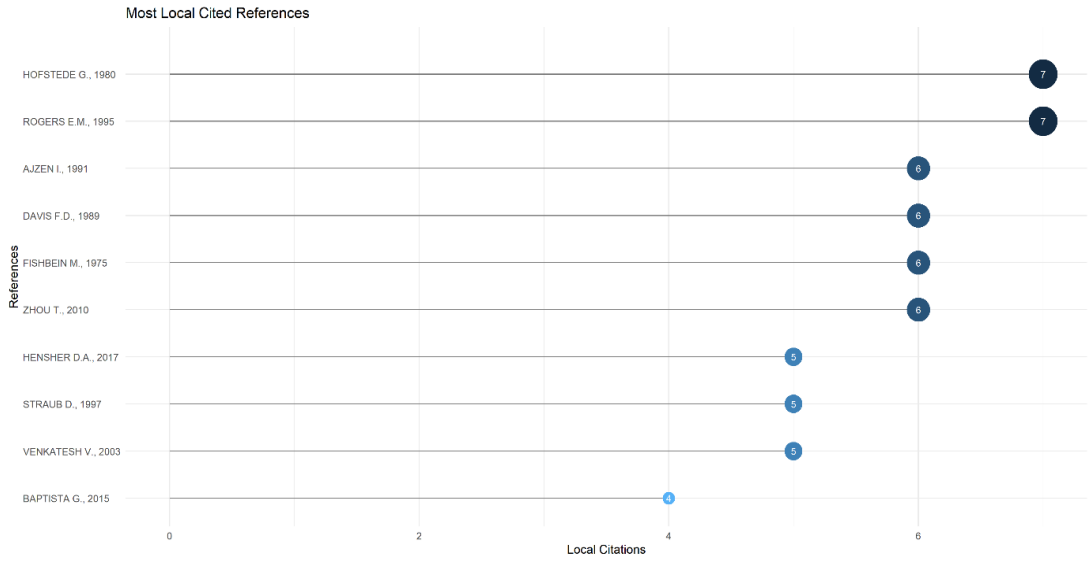

Figure 7. Local Citations

European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

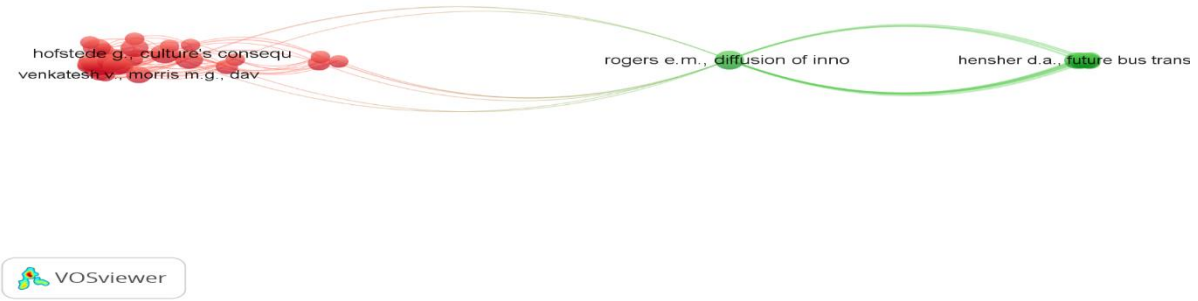

Figure 8.Co citation cited references

- **Thematic Analysis over time**

The thematic evolution map generated by Biblioshiny, representing the progression and development of topics or themes. It visualizes how specific terms, clusters, or topics evolve across different time periods, highlighting emerging trends, dominant themes, and shifts in focus within the field. The evolution of themes over different time periods, provides a dynamic perspective on the data. For the literature searched, the initial years presented more technology related themes, moving to human and technology interaction and further ahead various aspects covering cultural and health domains. The thematic maps shows the technological evolution and its increasing impact on human life. It starts with the adoption of early digital technologies, transitions towards the smartphone era, and then progresses towards considerations of the social and human implications of technology, including its influence on health, demographics, and mental well-being. Initially geographic, the focus evolves into a more universal human story. The growing importance of "human" across various time periods underlines this shift in focus.

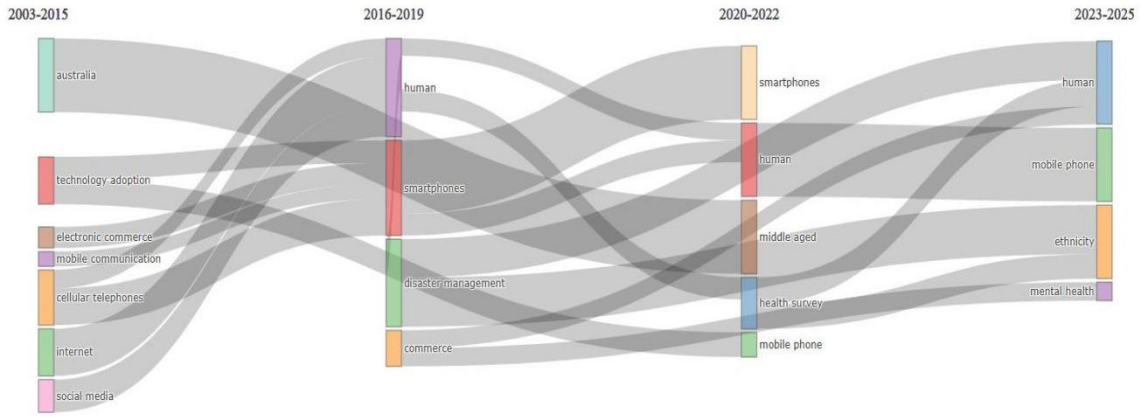

Figure 9. Evolution of Themes

This Sankey diagram illustrates the thematic evolution of research or discussion topics over time, broken down into five-year periods from 2003 to 2025. The thickness of the gray connecting lines represents the strength of the relationship or transition between themes across time periods. Let's analyze the evolution:

2003-2015 (Early Stage): This period is characterized by a geographic focus and the initial adoption of technologies. Themes include technology adoption, electronic commerce (early stages), mobile communication (emerging), cellular telephones (pre-smartphone era), internet use, and social media (nascent). This suggests a focus on the technological landscape and its early impact.

2016-2019 (Smartphone Era): A significant shift occurs. The "human" theme emerges prominently, indicating a growing interest in human factors related to technology. Smartphones become a central focus, along with related themes like disaster management and commerce (likely reflecting e-commerce growth via smartphones). The connections show a strong link between earlier technology adoption and the rise of smartphones. It suggests the impact of smartphones on human lives and related societal changes became a key research interest.

2020-2022 (Pandemic Influence): The "human" theme remains significant, likely intensified by the COVID-19 pandemic. Smartphones are still prominent, but now "middle-aged" individuals are highlighted, potentially showcasing the effect on a specific demographic and implying research on their digital experiences and health. The inclusion of a "health survey" theme suggests increased focus on health data and tracking technologies.

2023-2025 (Current Trends): "Human" remains central, but alongside "mobile phone" (reflecting the continued importance of mobile technology), "ethnicity," and "mental health." This signals a shift towards examining the social impact of technology, including issues of equity, access, and well-being. The connections suggest a continued evolution from previous themes but with a stronger emphasis on social and health implications.

It indicates a significant shift in the discourse surrounding digital technologies. Initially, the focus was on the adoption of technology itself, particularly aspects like e-commerce and internet access. Over time, the narrative has evolved to encompass a more profound understanding of the human and societal implications of technology, particularly concerning how factors like ethnicity and mental health intersect with digital engagement. This transition highlights a growing recognition that technology's impact extends far beyond mere access and necessitates a deeper examination of its effects on diverse populations.

This evolution further emphasizes that the digital divide is not simply a matter of access to technology but rather a complex web of interconnected socioeconomic factors. The increasing prominence of themes like "ethnicity" and "mental health" in the Sankey diagram reflects the growing awareness of how technology can potentially exacerbate existing inequalities and create new forms of social stratification. As such, the diagram underscores the need for proactive strategies that ensure digital inclusion and address the potential negative consequences of technology on vulnerable communities. The document also highlights the importance of digital inclusion and ensuring equitable access to the digital society.

The Sankey diagram provides narrative of technological advancement and its evolving impact on human lives. Early interest in technology adoption transitions into a focus on smartphones and their influence on human interaction and behavior. The COVID-19 pandemic appears to have accelerated the focus on human well-being alongside technology, culminating in a current focus on the social and health consequences of our increasingly digital world, particularly the

impact on specific demographics and aspects of well-being. The analysis moves from a largely technological perspective to a more socially conscious one.

Further exploring was conducted using time slices, the map uses a two-dimensional scatter plot. The x-axis represents the relevance degree (centrality) of a theme, indicating how central or important it is within the data set. The y-axis represents the development degree (density) of the theme, showing its emergence, growth, or decline. Further, themes are clustered into following categories:

Central Themes: Occupying the middle ground, these themes show moderate relevance and development. Examples include: mobile communication, cultural identity, cultural influence, cellular telephones, digital divide, and mobile devices.

Motor Themes: These themes exhibit high relevance and are fundamental to the data set. Examples include: internet, human, humans, Australia, commerce, cross-cultural comparison, technology adoption, mobile phones and cultural dimensions; social media, smartphone, and child.

Niche Themes: These are themes with lower relevance and are either emerging or declining. Examples include: electronic commerce, innovation, mobile technology, information systems, and aspects of information technology and reasoned action.

The current status of studies exploring cultural factors in the digital divide regarding smartphone use recognizes that the digital divide goes beyond mere access to smartphones, encompassing a complex web of cultural attitudes, skills, socioeconomic factors, and policies. It's increasingly understood that different "cultures of the Internet" influence how individuals engage with technology, and these cultural nuances can be more influential than demographics alone. Smartphones have become crucial in bridging this divide, offering access to information, communication, and economic opportunities, particularly for marginalized groups.

Studies are focusing on identifying specific cultural dimensions (e.g., collectivism vs. individualism) that impact smartphone adoption and online behavior. They are also investigating the role of digital literacy in enabling meaningful smartphone use and addressing disparities in technology acceptance. Furthermore, research explores how policies and regulations can promote digital inclusion, considering cultural contexts and socioeconomic factors. This includes examining how income inequality and factors influencing mobile internet and smartphone use affect digital equity. Culture also plays a role in creating economic barriers to owning mobile phones

7. Conclusion & Directions for Future Research

Bibliometric analysis tells a story of the complex interplay between technology adoption, demographics, and societal factors suggesting that technology adoption is not a simple, uniform phenomenon. This bibliometric analysis underscores the changing landscape of scholarly publication, highlighting the continuing strength of the USA and the rapid emergence of China as a major contributor. This shift has implications for how research is conducted, disseminated, and utilized globally, potentially influencing the direction of future research and innovation. Factors influencing research productivity could include changes in research funding, shifts in research focus, or even external events. While technology progresses rapidly, the analysis

emphasizes the need to address ethical considerations related to diverse user populations and their well-being. The increasing prominence of "mental health" and "ethnicity" in later time periods highlights this concern. It implies a responsibility to develop and use technology in ways that benefit society as a whole, rather than exacerbating existing inequalities or harming individual well-being. Research in this area needs to consider a wide range of demographic variables and external influences to gain a clear understanding of how technology is integrated into daily lives. The pandemic's inclusion emphasizes the dynamic nature of technology adoption and underscores the importance of considering unexpected disruptions and their impact.

Also, literature suggests for more integration of studying the impact of cultural factors on technology adoption with the process of technological adoption/diffusion. There is a need for more approaches that consider both cultural influences and diffusion processes simultaneously to provide a more holistic understanding of mobile phone adoption and its implications. The connection between the two clusters is relatively weak, indicating that the cultural aspects and the diffusion perspectives, while both relevant to the topic, are often treated as distinct research areas within this particular literature. Research bridging both areas could be a promising direction for future studies.

Future research should prioritize context-specific studies that delve into how cultural factors uniquely shape smartphone use within different communities and regions. Longitudinal studies are needed to track the evolution of cultural attitudes and behaviors over time and their subsequent impact on long-term smartphone adoption and usage. Furthermore, research should adopt an intersectional approach, investigating how culture interacts with other social categories like gender, age, and socioeconomic status to influence the digital divide in smartphone use. Qualitative research methods such as ethnography and interviews can provide deeper insights into the lived experiences of individuals and communities affected by these disparities.

In addition to these approaches, policy evaluations are crucial to assess the effectiveness of interventions aimed at bridging the digital divide in smartphone use, with careful consideration of cultural contexts and potential unintended consequences. Given that smartphones are being adopted by youth at ever-younger ages, studies should also focus on how this affects youth culture, and well-being Special attention should be paid to developing regions, further exploring the factors that affect digitalization to promote equality. Such investigations should focus on users' attitudes and beliefs, as they can shape users' online behavior. These future research directions can contribute to a more holistic, culturally sensitive approach to understanding and addressing the complex challenges of the digital divide in smartphone use. Also, understanding digital inequalities would benefit from incorporating explanations based on context and social group processes. To gain a comprehensive understanding, it's crucial to consider the subject area, data source, and article qual. The observed trends may vary significantly across disciplines, and knowing the specific databases and journals used in the analysis helps assess its comprehensiveness and potential biases.

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