

Examining factors influencing the emergence of a knowledge society: an explorative study

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Abstract

This article addresses the contextual ambiguity prevalent in the literature surrounding the conceptualizations of a knowledge society. By identifying and clarifying these conceptual challenges, the research aims to provide a solid foundation for understanding the factors influencing the emergence of a knowledge society. The objectives include presenting a clear and comprehensive representation of the multifaceted elements that contribute to this societal transition. Methodologically, a quantitative approach is employed using a regression analysis.

The originality of this research lies in its endeavor to develop new perspectives and insights into the catalysts behind the emergence of a knowledge society. By addressing the existing gaps in the literature and employing advanced quantitative methods, the study contributes to the ongoing discourse on the transition to knowledge societies. Practical implications of the research are also developed. The findings offer guidance for policymakers, educators, and stakeholders involved in shaping societal structures, emphasizing actionable insights derived from the identified catalysts.

In terms of contribution, this paper provides a nuanced understanding of the factors influencing the knowledge society emergence. By synthesizing empirical evidence with theoretical frameworks, it not only advances academic discourse but also practitioners with valuable insights for informed decision-making in an era characterized by rapid societal transformation.

KEYWORDS: Knowledge Society, Technology Integration, Economic Performance, Knowledge Production, Social Transformations.

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1. Introduction

In the interconnected world of the 21st century, the concept of a knowledge society has gained immense significance as a driving force behind societal progress and development. According to Ranga and Etzkowitz (2015), a knowledge society is characterized by its ability to create, disseminate, and utilize knowledge as a key resource for innovation, economic growth, and social transformation. As scholars and policymakers

endeavor to comprehend the intricate mechanisms driving the evolution of knowledge societies, it becomes imperative to dissect and evaluate the determinants that underlie this profound transition. Understanding the factors that contribute to the emergence of a knowledge society is not only crucial for policymakers and researchers but also holds profound implications for sustainable and inclusive development on a global scale (Simeoni et al., 2024).

While the concept of the knowledge society has attracted considerable attention in academic literature, the existing corpus is marked by a significant growth in theoretical definitions and conceptual models. This ambiguity represents a major challenge, as it prevents a comprehensive understanding of the factors that foster the emergence of a knowledge society. Our study aims to fill this critical gap in the literature by identifying and analyzing the specific factors responsible for the development of a knowledge society.

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To achieve this, we will explore the following research questions:

- what are the key theoretical definitions and conceptual models presented in the existing literature on the knowledge society?
- what factors are identified in the literature as potentially contributing to the emergence of a knowledge society?
- how do these factors interact and influence the emergence of a knowledge society?

By analyzing the complex interconnections among education systems, technological infrastructures, economic frameworks, and cultural dynamics, this study endeavors to unravel the complex web of factors that contribute to the emergence and advancement of knowledge societies. By scrutinizing empirical evidence and employing analytical framework, our research seeks to provide a comprehensive understanding of the key drivers that steer societies towards embracing knowledge as a foundational pillar. The article is structured into three sections. In order to assimilate the concept of the knowledge society from a theoretical point of view, the first section presents the fundamental and founding theories of the concept present in the literature. Then, the second section presents the hypotheses development. The third section represents the methodological framework of the study. Finally, the fourth section presents a discussion of the results of our study.

2. Theoretical foundations

The notion of a knowledge society has an extensive history that spans decades. Beginning in the 1960s, theorists delved into discussions about the trajectory of advanced capitalist nations, positing that the utilization of knowledge and information would shape their future. Consequently, various scholars introduced concepts such as the knowledgeable society (Lane, 1966), post-industrial society (Bell, 1973), information society (Umesao, 1963), network society (Castells, 1996), and learning society (Faure, 1972). Each of these concepts encapsulated distinct paradigms of societal evolution, all of which converged on the pivotal importance of knowledge, which in turn spurred continuous innovation as the foundation of societal development. In the intricate interplay of these concepts, we witness the dynamic synergy between historical insights, technological advances, and evolving societal norms – all converging into the tapestry of a knowledge society. This interconnectedness transcends individual paradigms, leading us to a comprehensive understanding of how knowledge serves as the catalyst for societal progression.

According to Nicolescu & Nicolescu (2005), the knowledge society is characterized by the conversion of

knowledge into raw material, capital, products, elements of economic production and economic advances in which the generation, sale, purchase, learning, storage, development, sharing and protection of knowledge become predominant and condition the profit and economic sustainability. Moreover, Lytras & Sicilia (2005), argue that the knowledge society is built on the synergies of individuals, teams, organizations, social networks and communities that effectively exploit the flows of knowledge and learning. Furthermore, Fairclough (2012) presents knowledge societies as a qualitative change in economies and societies such that economic and social processes are knowledge-driven and change occurs, at an accelerated pace, through the generation, circulation, and operationalization of knowledge in economic and social domains. As outlined by Afgan and Carvalho (2010), a knowledge society is characterized by its reliance on the imperative of disseminating knowledge, converting information into actionable insights. The dissemination of knowledge is considered crucial for establishing a knowledge society (Znagui, 2021), emphasizing principles of justice, equality, and nondiscrimination.

Conceptually, the United Nations Educational, Scientific and Cultural Organization (UNESCO), contributed to the exploration of models specific to the knowledge society. In its report “Towards Knowledge Societies” published in 2005, UNESCO defines knowledge societies as those leveraging diversity for knowledge-sharing and human development. Embracing a participatory pluralist discourse, the report underscores freedom of expression, universal access to knowledge, and respect for linguistic and cultural diversity. The proposed conceptual framework for the knowledge society is detailed in Figure 1.

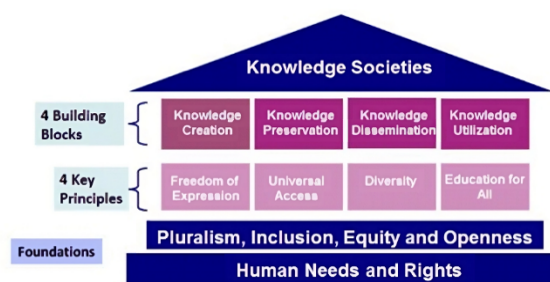


Figure 1 - Conceptual model of the knowledge society, UNESCO (2005).

Through its conceptualization, the vision of UNESCO for knowledge societies, promotes a social framework rooted in human rights principles, urging active participation in addressing societal challenges and promoting peace through fair and inclusive utilization of knowledge (Cummings et al. 2018; Mansell 2015). Building on this foundation, UNESCO has outlined essential foundations, key principles, and building blocks for the establishment of knowledge societies. The concept underscores that universal access to knowledge

is crucial for the emergence and flourishing of knowledge societies, involving the creation of suitable infrastructure alongside legal and economic considerations (Mansell & Tremblay, 2013).

Critical analysis of the model present in the literature focuses on the exploration of its economic aspects, technological stance, and the basic principles of its inclusive framework. This discourse places a strong emphasis on problem-solving by critically questioning the role of knowledge in human development, integrating practical experimentation with theoretical knowledge, and establishing a knowledge hierarchy based on pluralistic principles with a focus on locally sourced endogenous knowledge (Souter, 2014). Furthermore, the economic dimension prioritizes collaborative, communal knowledge sharing over individual ownership, viewing knowledge as a non-rival public good, rejecting exclusive intellectual property claims (Mansell, 2013). The approach to technology emphasizes digital solidarity, fostering innovative partnerships across various entities, with the internet as a primary medium and recognition of the complementary nature of both old and new information and communication technologies (ibid).

Transitioning to the model of Sharma et al. (2008), a distinct perspective on knowledge societies emerges, offering additional insights into the intricate dynamics of this conceptual framework. According to Sharma et al. (2008), knowledge societies exhibit distinctive characteristics, including high knowledge and information absorption capacities, established governance structures, and a cultural ethos that prioritizes easy dissemination and sharing of knowledge. These qualities form the basis for active participation in intricate processes of knowledge collection, transformation, dissemination, and utilization. Moreover, the authors argue that knowledge societies emphasize sustainability, innovation promotion, and community learning. Consequently, these attributes foster an economic landscape where knowledge-based activities become pivotal drivers of growth, according to the authors. Figure 2 illustrates the model presented by Sharma et al. (2008).

The conceptual framework outlines four fundamental components integral to understanding and fostering a knowledge society: infrastructure and governance dimensions, collectively forming the structural capital of society; human capital, representing the cognitive capacities of citizens; and the culture of society, encapsulating relational capital. These components are systematically explained by the delineation of thirteen indicators, as visually depicted in Figure 2. As per the model, establishing a robust knowledge society necessitates a comprehensive examination of the interconnectedness of structures, individuals, and relationships, encompassing the multifaceted aspects contributing to knowledge creation. Evidently, the enduring sustainability of a knowledge society is contingent upon the cultivation of a culture that fosters

learning, innovation, knowledge sharing, diverse perspectives, and leadership across various domains.

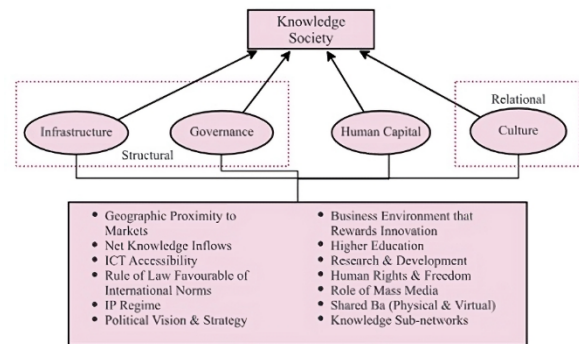


Figure 2 - Conceptual model of the knowledge society (Sharma et al., 2008).

Examining potential gaps between both models of UNESCO (2005) and Sharma et al. (2008) reveals distinctions that could guide the development of a more comprehensive framework. The model presented by UNESCO (2005) with its global focus and emphasis on pluralism and participation, contrasts with the one illustrated by Sharma et al. (2008) in a more specific approach, highlighting dimensions like infrastructure, human capital, and societal culture. While UNESCO (2005) underscores cultural diversity, Sharma et al. (2008) leans towards a potentially universal perspective. The differences in operationalization, temporal relevance, and stakeholder engagement also contribute to the identified gaps. In this context, the primary objective of our new model is to bridge these gaps by presenting a framework that integrates global principles with specific, practical indicators for the emergence of a knowledge society. Emphasizing both cultural inclusivity and universal applicability, the new model will incorporate dynamic variables responsive to contemporary socio-economic and technological dynamics, offering a comprehensive guide for understanding and fostering knowledge societies.

3. Hypotheses formulation

3.1 Information Technology Infrastructure in a society

The notion of Information Technology Infrastructure (ITI) encompasses an assemblage of technologies, tools, and assets employed for the acquisition, processing, storage, distribution, and utilization of information (Cassia et al., 2020). The robust foundation of ITI is intricately linked by the integration of various components, where technology integration, Information Technology (IT) planning, IT security, and technology management converge to create a comprehensive framework.

A number of studies suggest a reciprocal interaction between ITI and the emergence of a knowledge society determined by a selection of key variables (Bechmann, 2009; Balloni et al., 2012). At the core, technology integration emerges as a transformative force, seamlessly weaving technological advancements into the societal fabric (Sony & Naik, 2020). This integration extends beyond mere connectivity, fostering an environment where information flows effortlessly, enhancing efficiency, and enabling widespread access to knowledge (Fukuda, 2020). The interconnectedness of devices, networks, and systems becomes the conduit through which the knowledge society emerges (Anvarova, 2023).

Strategic IT planning acts as the architect of this transformation, orchestrating the alignment of technological resources with the overarching goals of the society. Through meticulous planning and foresight, IT infrastructure becomes a dynamic entity, capable of adapting to the evolving needs of the community (Borges et al., 2021). It anticipates technological shifts, ensuring that the society remains agile and responsive to harness the potential of emerging innovations. Amidst this transformative landscape, IT security assumes a critical role in safeguarding the integrity and confidentiality of information (Soomro et al., 2016). With the omnipresence of technology, ensuring robust security measures becomes imperative. The establishment of secure frameworks not only protects sensitive data but also nurtures a sense of trust within the society (Sanakulov, 2019). This trust forms the foundation for the unrestricted exchange of information, fostering a collaborative environment conducive to knowledge-sharing and innovation. Reinforcing these pillars is the strategic guidance of technology management, influencing the nuanced aspects of IT infrastructure. From the selection of technologies to the implementation and ongoing maintenance, technology management becomes the steward of a resilient and future-ready IT foundation (Siddiqui et al., 2020). This involves meticulous evaluations of technological options, prudent investments, and resource optimization, ensuring that the IT infrastructure evolves in tandem with the society's goals and aspirations (Yaras & Öztürk, 2022).

This leads us to formulate the following hypothesis:

Hypothesis 1: Information technology infrastructure influences the emergence of a knowledge society.

3.2 Knowledge production and dissemination within society

The impact of knowledge production dynamic within a society and its modernization has been the subject of a number of studies (Välilmaa & Hoffman, 2008; Malik, 2018; Hopkins, 2011) and lead to present various variables that may potentially influence the emergence of a knowledge society. According to Jehanzeb & Bashir (2013), training represents the pivotal factor that enables individuals to acquire the skills and expertise they need

to contribute to a knowledge-based community. Through targeted training initiatives, societies may cultivate a workforce adept at navigating the complexities of contemporary challenges and advancements.

Lifelong education stands as another pillar in the foundation of a knowledge society, emphasizing the continuous pursuit of knowledge throughout one's life (Ashour, 2024). This commitment to ongoing learning ensures that individuals remain adaptable and resilient in the face of evolving information landscapes, technological innovations, and societal shifts. Moreover, practical learning experiences bridge the gap between theoretical knowledge and real-world application, fostering a holistic understanding and mastery of skills that are directly applicable to the challenges and opportunities of the knowledge era (Eynon & Young, 2021).

Furthermore, Research and development (R&D) activities constitute a dynamic force propelling the knowledge society forward. By engaging in R&D endeavors, societies not only expand their collective knowledge base but also foster a culture of innovation. This culture is a catalyst for technological advancements, scientific breakthroughs, and the creation of novel solutions to complex problems (Aliu Mulaj & Dedaj, 2022). The ripple effects of R&D extend beyond intellectual enrichment, influencing economic growth through the development of new industries, products, and services.

In the collaborative form of a knowledge society, information-sharing and coordination serve as connective threads, weaving together insights, experiences, and expertise across individuals and organizations. A culture of open communication facilitates the free exchange of knowledge, accelerating the pace of discovery and innovation (Sayogo & Gil-Garcia, 2016). Coordinated efforts ensure that knowledge is strategically applied across various sectors, leading to synergies that contribute to comprehensive societal development.

This leads us to formulate the following hypothesis:

Hypothesis 2: Production and dissemination of knowledge within society influences the emergence of a knowledge society.

3.3 Economic performance within a society

Economic performance in a society represents an essential key measure of the vitality of its economic activities. Previous studies suppose that an economic growth in a modern society lead to transform it into a knowledge society (Baporikar, 2016; Stehr, 2012; Fukuda, 2020).

As a multifaceted concept, economic performance encompasses a wide array of indicators. Direct economic performance serves as a foundational pillar, offering a comprehensive overview of the financial vitality. Indicators such as GDP growth, employment

rates, and overall economic output not only gauge the economic health of the society but also reveal its capacity to invest in knowledge-centric initiatives (Wang & Tan, 2021). Furthermore, market presence emerges as a dynamic force, influencing the societal narrative on the global stage (Enke, 2023). The competitiveness and visibility of a society in the international marketplace play a pivotal role in establishing its identity as a knowledge-driven entity. A strong market presence not only attracts foreign investment but also signals the society's prowess in generating innovative, knowledge-based products and services that contribute to the global intellectual landscape (Shorette, 2022).

Beyond the tangible metrics of direct economic performance and market presence lies the nuanced realm of indirect economic impact on society. This encompasses the profound ripple effects of economic activities, such as the creation of jobs, the invigoration of local economies, and the elevation of overall living standards (Fernández-Portillo et al., 2020). In the context of a knowledge society, these impacts extend beyond conventional economic indicators, influencing social mobility, inclusivity, and the overall quality of life (Botzen et al., 2019). The societal benefits derived from knowledge-driven economic activities transcend financial gains, permeating the very fabric of communal well-being.

Moreover, interdependent partnership between economic performance and a knowledge society represents a reciprocal relationship. The characteristics of a knowledge society, marked by a commitment to continuous learning and innovation, reciprocally enhance economic performance. A workforce steeped in knowledge becomes a catalyst for increased productivity, fostering economic diversification and sustainable growth. The generation of innovative solutions within a knowledge society further positions it as a hub for economic dynamism.

From the above approaches, we can pose the following hypothesis:

Hypothesis 3: Economic performance in a society influences the emergence of a knowledge society.

3.4 Social transformations

According to Stehr (2007), social transformations represent dynamic and complex processes through which societies undergo fundamental changes in their structures, institutions, values, and norms. At its core, the response to social challenges stands as a defining factor (Feola, 2015). Societal issues such as inequality, diversity, and social justice serve as crucibles, demanding innovative and knowledge-driven solutions. The ability of a society to meet these challenges not only shapes its character but also paves the way for a culture of continuous learning, adaptation, and the cultivation of intellectual resilience (Manda & Ben Dhaou, 2019).

Furthermore, social transformations are aimed to respond to the environmental challenges. As the global community confronts the profound impacts of climate change, resource scarcity, and ecological degradation, the imperative for knowledge-driven solutions becomes increasingly apparent (Oláh et al., 2020). In this context, a knowledge society becomes not just a repository of information but a proactive force in developing sustainable practices, leveraging scientific advancements and technological innovations to address pressing environmental concerns (Kraft, 2021).

Moreover, the transformative role of mass media in shaping cultural attitudes cannot be overstated. In the landscape of a knowledge society, the media serves as a powerful vehicle for information dissemination and the shaping of public opinion (Luttrell & Wallace, 2021). The democratization of information through various media channels fosters an environment where knowledge is not confined to academic institutions but is accessible to the broader population. This accessibility not only promotes informed decision-making but also cultivates a society where critical thinking and intellectual discourse thrive (Meier & Meier, 2012; Snellman, 2015). Cultural attitudes, deeply ingrained in societal norms and values, form the bedrock of a knowledge society. A culture that values education, embraces intellectual curiosity, and encourages continuous learning becomes a catalyst for progress (Lifintsev et al., 2019; Chwialkowska et al., 2020).

In light of the above, we can pose the following hypothesis:

Hypothesis 4: Social transformations influences the emergence of a knowledge society.

4. Methodology

4.1 Research design and variable measurement

Based on the above review of literature, the resulting model of hypothetical relationships explaining the influence on the emergence of a knowledge society is presented in Figure 3. Moreover, Table 1 presents the instruments for measuring the total five constructs.

In this study, we delineate the structure and dimensions of each construct as follows. The initial construct, ITI, is evaluated through the lens of four dimensions. These specific metrics have been previously employed in scholarly works, notably in the studies conducted by Lewis & Byrd (2003). The second construct encapsulates the production and dissemination of knowledge in society, assessed across four dimensions. This framework aligns with the established guidelines set forth by UNESCO (2005). The third construct pertains to the economic performance in society, gauged through three dimensions. Similar measurement criteria have been applied in prior research, as exemplified by Hussein et al. (2018).

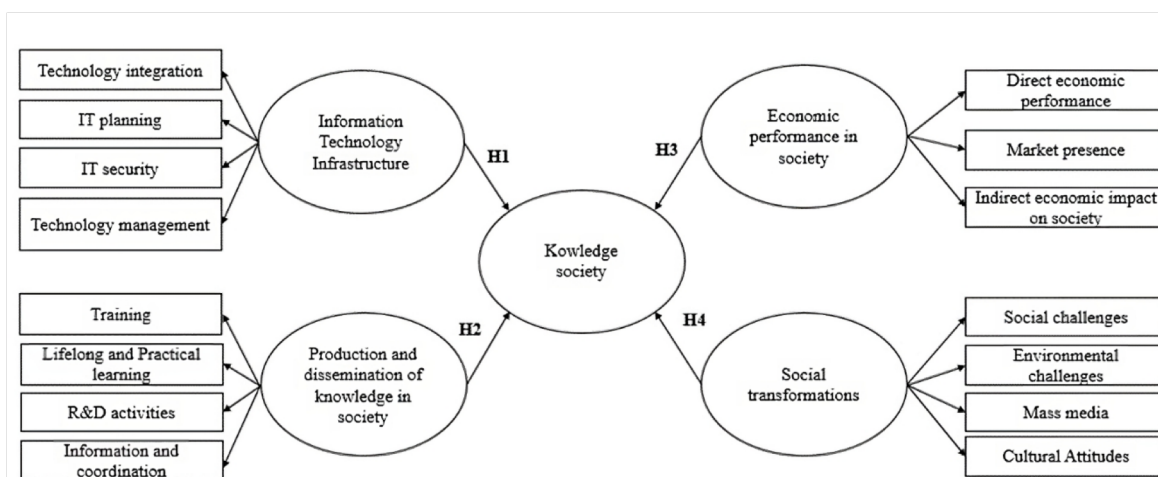


Figure 3 - Research model, Author.

Table 1 - Constructs measurement.

Variables	Items	Number of items	Authors
Information technology infrastructure	ITI1: Technology integration	4	Lewis & Byrd (2003)
	ITI2: IT planning		
	ITI3: IT security		
	ITI4: Technology management		
Production and dissemination of knowledge in society	PROD1: Training	4	David & Foray (2003), Darroch (2003), Loon Hoe & McShane (2010)
	PROD2: Lifelong and Practical learning		
	PROD3: R&D activities		
	PROD4: Information and coordination		
Economic performance in society	EP1: Direct economic performance	3	Hussein et al. (2018)
	EP2: Market presence		
	EP3: Indirect economic impact on society		
Social transformations	TRAN1: Social challenges	4	Sharma et al. (2008)
	TRAN2: Environmental challenges		
	TRAN3: Mass media		
	TRAN4: Cultural attitudes		
Knowledge society emergence	KS1: Net knowledge inflows	4	Sharma et al. (2008)
	KS2: Political strategy		
	KS3: Human rights and freedom		
	KS4: knowledge sub-networks		

The fourth construct encompasses social transformations, evaluated across four dimensions in accordance with the approach taken by Sharma et al. (2008). Finally, the last construct, the emergence of a knowledge society, is appraised through four dimensions, mirroring the methodology employed by Sharma et al. (2008).

4.2 Sample and data collection

The sampling frame represents actors of the regional innovation ecosystem in the Casablanca-Settat region in

Morocco. This ecosystem, which consists of public and private organizations, professional associations, chambers of commerce and co-working spaces, aims to cover the entire innovation process, from ideation to development, validation and production.

In this study, the constitution of our sample is delimited using the stratified sampling technique. Given the heterogeneous composition of stakeholders within our chosen field of study, we assert that the implementation of the stratified sampling methodology is paramount. This approach is considered optimal as it guarantees the inclusion of all pertinent heterogeneous stakeholders,

ensuring a comprehensive representation of the diverse elements within the field (Berndt, 2020). The variables used for stratification describe a set of heterogeneous entities, including Public-sector organizations, Private-sector organizations, Professional associations, Chambers of Commerce and Industry, and Co-working spaces. Total sample size is up to 331.

Data were collected using a questionnaire. Guided by the conceptual framework of our research, we structured the questionnaire into five distinct sections, aligning with the specific data requirements crucial for testing the hypotheses posited in our study:

In the first section participants were asked about the availability, integration, and utilization of digital technologies, as well as the institution's capability to support and enhance knowledge-based activities through its IT infrastructure. Moreover, questions in the second section explored the frequency and scope of research activities, the effectiveness of knowledge transfer strategies, and the extent of collaboration with other entities to ensure the widespread dissemination of knowledge. Furthermore, questions within the third section were designed to evaluate how knowledge production and dissemination contribute to economic outcomes. Respondents provided information on the economic benefits generated by their institution's activities, such as innovation-driven growth, job creation, and contributions to the regional or national economy. The fourth section included questions that explored the societal impacts of knowledge and technology generated by the institution. Participants were asked about the role their institution plays in driving social change, addressing societal challenges, and promoting inclusive development through

knowledge-driven initiatives. The final section aimed to directly assess the indicators and manifestations of a knowledge society within the context of the study. Respondents were asked about the presence of knowledge-intensive activities, the level of societal reliance on knowledge, and the institutional and societal readiness for a knowledge-based economy.

Employing a five-point Likert scale as the primary question format, we complemented this with open-ended questions to ensure a comprehensive data collection approach.

To facilitate the administration of the questionnaire, we utilized Google Forms, leveraging the efficiency of electronic communication by distributing it via email to our selected sample. The data collection phase lasted 5 months. The ensuing response rate amounted to 70%, indicating a substantial and representative engagement from the participants.

Subsequently, the collected data was the subject of an in-depth analysis using SmartPLS V4 software, allowing for robust statistical examination and interpretation in accordance with the research objectives. This meticulous process ensures the reliability and validity of our findings, contributing to the overall rigor of our study.

4.3 Techniques and methods

In pursuit of the objective of our study, we used the partial least squares (PLS) technique, a variance-based method. PLS, recognized as a second-generation tool for multivariate analysis, proves particularly adept at estimating parameters in complex models. The rationale for opting for PLS stems from the exploratory nature of

Table 2 - Results of the Measurement Model, SmartPLS software.

Variables	Items	Loadings	Cronbach's alpha	Composite Reliability (CR)	Average variance extracted (AVE)
Information technology infrastructure	ITI1	0.873	0.948	0.900	0.751
	ITI2	0.803			
	ITI3	0.802			
	ITI4	0.873			
Production and dissemination of knowledge in society	PROD1	0.968	0.858	0.904	0.703
	PROD2	0.680			
	PROD3	0.957			
	PROD4	0.810			
Economic performance in society	EP1	0.792	0.884	0.919	0.743
	EP2	1.000			
	EP3	0.792			
Social transformations	TRAN1	0.877	0.893	0.920	0.744
	TRAN2	0.846			
	TRAN3	0.935			
	TRAN4	0.784			
Knowledge society emergence	KS1	0.873	0.858	0.904	0.703
	KS2	0.803			
	KS3	0.802			
	KS4	0.873			

the study. This approach demonstrates greater flexibility concerning minimum sample size prerequisites, the measurement scale's nature, and the distribution of observed variable indicators when compared to alternative covariance-based methods, as highlighted by Purwanto (2021). The calculation of the proposed research model was executed using SmartPLS version 4 software.

4.4 Assessment of the measurement model

When evaluating the measurement model, a critical step in empirical research, the accuracy and reliability of the selected measurements are closely examined. This process involves assessing the constructs and their respective indicators to ensure they effectively capture the intended concepts. Rigorous examination and validation of the measurement model are imperative for deriving meaningful and valid conclusions. Table 2 and Figure 4 present results of items loadings, Cronbach's alpha values, Composite Reliability (CR) and Average Variance Extracted (AVE).

Regarding the results, the factor loadings are above 0.5, which means that the convergent validity is reached. Moreover, Cronbach's alpha indicates values exceeding 0.7, all AVE values exceeded 0.5, and CR surpassed 0.7. These given results are showing that there is high reliability in the measurement model, and good consistency among all of the variables of the study.

We also examined the discriminatory validity of the constructs using the Heterotrait-Monotrait Ratio (HTMT) (Table 3). The values were below 0.9, which shows adequate discriminatory validity (Henseler et al., 2015).

4.5 Assessment of the structural model

The assessment of the structural model is a pivotal phase in research, where the relationships and interactions

among constructs are examined for their significance and validity. This evaluation delves into the underlying mechanisms that link variables, offering insights into the theoretical framework's coherence. A thorough examination of the structural model ensures the reliability and generalizability of the study's findings. This critical analysis contributes to a comprehensive understanding of the dynamics and impact of the proposed relationships within the research framework.

The outcomes of the structural model evaluation are presented in Table 4. Moreover, the R² value is presented in Table 5. The result shows that all of the independent variables are expected to explain 85.2% of the variance in the knowledge society emergence.

Furthermore, effect sizes are calculated to assess the extent independent variable contributes to the R² value of a dependent variable. In this study, results of relative effect sizes (f²) show that independent variables have a strong effect on the dependent variable (>.35) (Cohen 1988). Finally, we examine the quality of the model using predictive relevance (Q²) (Chin, 1998). Results in table show that Q² > 0.

5. Research findings and discussion

The main objective of our study is to explore the possible factors influencing the emergence of knowledge society. The quantitative analysis has relied on t-values and a significance level for the acceptance or rejection of hypotheses. All hypotheses with t-values exceeding 1.64 and p-values below 0.05 have been deemed acceptable.

According to the results, there is a significant effect of information technology integration on knowledge society emergence ($\beta = .213, t = 3.620, p < .005$). Therefore, these results support that the interplay of technology integration, IT planning, IT security, and

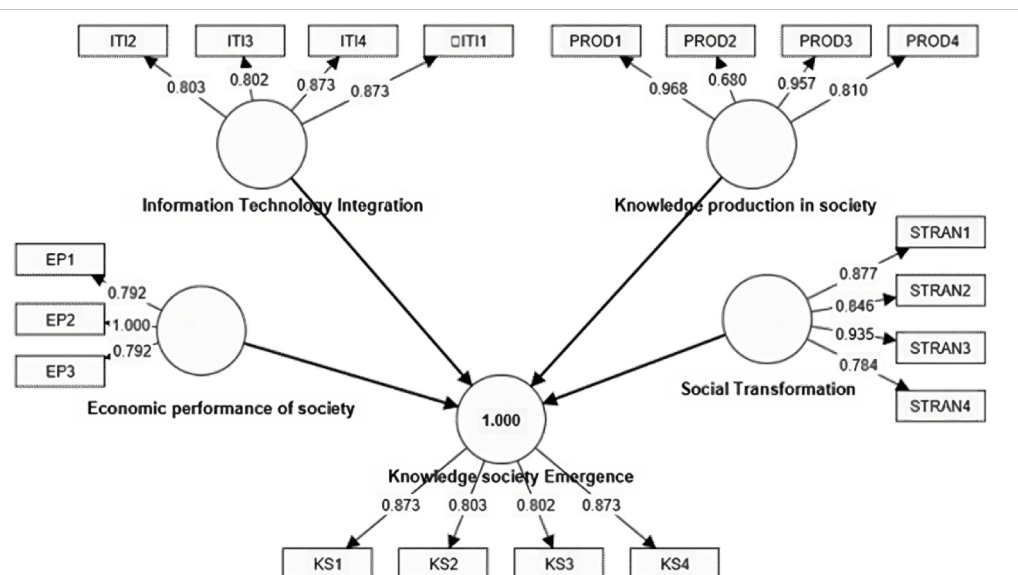


Figure 4 - Measurement Model Assessment, SmartPLS 4.

technology management forms the core of information technology infrastructure, acting as a key driver to the emergence of a knowledge society. Merging these essential elements not only establishes a solid technological framework, but also creates an environment conducive to the exchange and dissemination of knowledge. In addition to effective IT planning, societies can take strategic advantage of technological advances, while robust security measures guarantee the integrity and confidentiality of information, thus preserving the foundations of a knowledge-based society. Simultaneously, effective technology management ensures the optimal functioning and evolution of IT systems, enabling societies to navigate the complexities of the digital age. In this holistic integration, information technology becomes an indispensable catalyst, promoting the continual growth and transformation of societies into dynamic knowledge-based entities. Our findings are in line with the evidence from the literature that argues that the information technology, impact knowledge societies, and that even the society of knowledge depend on technology integration (Bechmann, 2009; Balloni et

al., 2012). Moreover, some other studies have confirmed the current findings as Siddiqui et al. (2020) and Yaras & Öztürk, (2022) where authors affirm that technology integration has an impact on technologically progressive society and society 5.0.

Similarly, results show that there is significant positive and direct effect of knowledge production and dissemination in society on knowledge society emergence ($\beta = .361, t = 3.570, p < .005$). Indeed, the complex interplay between various dimensions of knowledge production and dissemination in society, encompassing Training, Lifelong and Practical learning, R&D activities, as well as Information and coordination, shows a significant positive and direct influence on the emergence of a knowledge society. As society actively engages in training programs, continuous and practical learning endeavors, and robust research and development initiatives, a multifaceted framework for knowledge cultivation is forming. The dissemination of information combined with effective coordination mechanisms further reinforces this transformation process. It is within the synergy of these components that the basis of a knowledge society is established,

Table 3 - Discriminant Validity HTMT of Measurement Model, SmartPLS 4.

Constructs	ITI	PROD	EP	TRAN	KS
ITI	-				
PROD	0.701	-			
EP	0.671	0.815	-		
TRAN	0.626	0.624	0.585	-	
KS	0.533	0.599	0.606	0.650	-

Table 4 - Hypothesis results, SmartPLS 4.

Hypothesis	Path coefficient (β)	Standard deviation (STDEV)	T Statistics (O/ STDEV)	P values	VIF	Decision
H1: ITI -> KS	0.213	0.061	3.620	0.001	1.260	Supported
H2: PROD -> KS	0.361	0.055	3.570	0.000	1.611	Supported
H3: EP-> KS	0.222	0.071	1.762	0.003	1.701	Supported
H4: TRAN -> KS	0.331	0.077	4.292	0.000	2.005	Supported

Table 5 - Variance Explained R², SmartPLS 4.

Dependent Variable	Variance explained (R ²)
Knowledge society emergence	85.2%

Table 6 - Effect sizes, SmartPLS 4.

Construct	f ²
ITI	0.490
PROD	0.355
EP	0.432
TRAN	0.505

Table 7 - Construct Cross-Validated Redundancy, SmartPLS.

Total	Sum of squared observations	Squared prediction errors	Q ²
Knowledge society emergence	249.000	89.002	0.721

where the exchange, creation, and application of knowledge become not only inherent but also pivotal to societal progress and development. The positive correlation between the comprehensive spectrum of knowledge-related activities and the evolution of a knowledge society underscores the indispensable role played by continuous learning, innovation, and collaborative information dissemination in shaping the dynamics of modern societal structures. The results of this study are supported by previous studies as Vålmaa & Hoffman (2008), Malik (2018) and Hopkins (2011) where authors argue that knowledge production can influence the conceptualization of modern societies and that evidence shows that knowledge explosion has led to phenomenal changes in the modern society, therefore it represents one of the main pillars of knowledge society. Moreover, the study of Serpa et al. (2020) supports also our findings arguing that the process of knowledge production influence it impacts on a digital society.

Moreover, our results highlight that economic performance of a society on knowledge society emergence ($\beta = .222$, $t = 1.762$, $p < .005$). These results support that the emergence of a knowledge society is closely linked to the multifaceted dimensions of a society's economic performance. Comprising direct economic performance, market presence, and indirect economic impact on society, this composite framework plays a pivotal role in shaping the trajectory towards a knowledge-based paradigm. Direct economic performance reflects the efficiency and productivity of a society's economic activities, serving as a foundation for knowledge society emergence by providing the necessary resources and infrastructure. Market presence, on the other hand, underscores the global interconnectedness and competitiveness of a society, influencing its ability to participate in the exchange of knowledge on a broader scale. The indirect economic impact, encompassing factors such as social welfare and equitable distribution of resources, contributes to the inclusive nature of a knowledge society. In essence, the profound interplay between these components illuminates the intricate relationship between economic prowess and the unfolding of a society characterized by the cultivation, dissemination, and utilization of knowledge. This result is in harmony with a study by Ranga & Etzkowitz (2015), where authors argue that the triple helix thesis represent a potential for economic development in a knowledge society. Furthermore, our findings further support the work of Baporikar (2016), Stehr (2012) and Fukuda (2020) who affirm that the economic growth in a modern society lead to transform it into a knowledge society.

Our results also acknowledge the significant direct and positive effect of social transformations on knowledge society emergence ($\beta = .331$, $t = 4.292$, $p < .005$). Therefore, the emergence of a knowledge society is profoundly influenced by the dynamic contours of social transformations within a given community. Comprising social challenges, environmental challenges, mass media, and cultural attitudes, these interconnected

components shape the fabric of societal evolution towards a knowledge-centric paradigm. Social challenges act as catalysts for change, driving adaptations and innovations in response to shifting dynamics. Environmental challenges, reflecting the interface between society and its environment, underscore the imperative for sustainable practices and the incorporation of ecological considerations into the knowledge society framework. Mass media serves as a conduit for the dissemination of information, fostering a culture of connectivity and shared knowledge. Cultural attitudes, deeply ingrained in societal values, play a pivotal role in shaping the receptivity and openness towards diverse forms of knowledge. In essence, the complex interplay of these elements illuminates the path of transformation towards a knowledge society, where the dynamism of social transformations becomes the driving force for the continuous cultivation, exchange, and integration of knowledge. The findings of this research further support the work of Stehr (2007) who argue that social transformations represent the foundation for the transformation of modern societies into knowledge societies. As well as by Meier & Meier (2012) and Snellman (2015) who argue that changes on the market, progress in the social transformations demand for setting out in the direction of a knowledge society. According to another study by Turnhout et al. (2020), the empowerment of societal transformation lead to strengthen politics of co-production within a society.

In order to contrast the research results with the sample studied, i.e. Moroccan innovation ecosystem, we can argue that this ecosystem, composed of public organizations, private organizations, professional associations, chambers of commerce, and co-working spaces, plays a pivotal role in fostering the emergence of a knowledge society. Public organizations lay the foundation by crafting and implementing policies that promote education, research, and innovation. These institutions provide the necessary funding and regulatory frameworks that not only encourage innovation but also facilitate collaboration across various sectors. By establishing and supporting educational institutions and research centers, public organizations ensure the continuous production of knowledge, which is essential for building a knowledge society.

This groundwork is complemented by private organizations, which inject capital, resources, and a market-oriented approach to innovation. By translating academic research into practical applications, products, and services, private organizations play a crucial role in making knowledge accessible and beneficial to society. Their partnerships with educational institutions and public research bodies further drive the commercialization of new technologies, bridging the gap between theoretical knowledge and its real-world applications.

Professional associations act as vital connectors within this ecosystem, linking academia, industry, and government. They facilitate the exchange of knowledge, skills, and best practices among professionals, ensuring that the workforce remains informed and aligned with global standards. Through their advocacy efforts, these associations also help shape policies that support the continuous professional development of their members, thereby enhancing the overall skill level within the society.

Chambers of commerce add another layer of support by fostering connections between businesses and academic or research institutions. They provide essential platforms for networking, knowledge exchange, and partnerships, which are crucial for the innovation process. By advocating for business-friendly policies and supporting entrepreneurial activities, chambers of commerce contribute to creating an environment that nurtures innovation and the dissemination of knowledge.

Co-working spaces further enhance this ecosystem by serving as dynamic hubs of creativity and collaboration. These spaces bring together a diverse array of individuals – entrepreneurs, freelancers, researchers, and startups – creating opportunities for the exchange of ideas and expertise. Through events, workshops, and mentoring sessions, co-working spaces accelerate the innovation process, facilitating the growth of knowledge-based initiatives.

Together, these components of Morocco's innovation ecosystem create a synergistic environment where knowledge is continuously generated, shared, and applied. This dynamic interplay supports the growth of a knowledge economy by fostering innovation, improving skills, and enabling the flow of information across different sectors. As a result, this ecosystem plays a crucial role in the gradual emergence of a knowledge society, where knowledge becomes the primary driver of economic development, social progress, and cultural advancement.

6. Concluding remarks

In conclusion, this article endeavors to formulate a conceptual framework elucidating the factors influencing the emergence of knowledge society. The study systematically examined the impact of indicators specific to various facets of knowledge society as delineated in the existing literature. After the development of a conceptual model as the foundation, a quantitative study was carried out to clarify the causal links between independent variables and the dependent variable. The questionnaire, tailored to expound upon the variables within the conceptual model, utilized items measured through categorical scales. Rigorous assessments of construct validity and content validity were then conducted to ensure the questionnaire's robustness. Our data analysis was based on a PLS Analysis. The findings of our study substantiate a

noteworthy contribution from variables within the conceptual model. Results show that there is an influence of information technology integration, knowledge production and dissemination in society, economic performance of a society and social transformations on a knowledge society emergence. This research has two main theoretical implications. Firstly, it narrows existing conceptualizations by clearing up ambiguity in the literature; and secondly, it extends theoretical frameworks by incorporating validated relationships between different influencing factors. On a managerial level, the insights derived from this study offer actionable guidance for decision-makers tasked with navigating the multifaceted challenges posed by societal transitions, emphasizing the strategic leverage of technological innovation, educational paradigms, and societal dynamics. From a policy perspective, the findings underscore the imperative for adaptive strategies that harness the transformative potential of these identified catalysts. However, it is essential to acknowledge certain limitations, including potential challenges in generalizing findings to diverse contexts and the inherent dynamism of societal shifts. As a foundation for future research pursuits, this study advocates for further exploration into contextual nuances, encourages longitudinal analyses to capture evolving trends, and promotes interdisciplinary approaches to comprehensively enhance our understanding of the constantly evolving landscape of knowledge societies.

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