

EDITORIAL



The role of information and communication technologies in socioeconomic development: towards a multi-dimensional framework*

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ABSTRACT

In this introduction to the special issue on the role of information and communication technologies (ICT) in socioeconomic development, we provide a conceptual framework that considers four dimensions that impact socioeconomic development: policy, business, technology, and society. This framework, which is systematically constructed from reviewing several earlier frameworks but more general in focus, is intended to provide context for the eight papers in this special issue, and also guidance for future-related research.

KEYWORDS



Information and communication technologies; ICT; socioeconomic development; conceptual framework

1. Introduction

Information and communication technologies (ICT) play a significant role in all aspects of modern society. ICT have changed the way in which we communicate with each other, how we find needed information, work, conduct business, interact with government agencies, and how we manage our social lives. As ICT affect everyday lives, they also impact the macroeconomic growth, which in turn further affects society by enabling infrastructure and standard of living improvements.

Although the concept of ‘socioeconomic development’ is widely applied in research and in practice, its meaning may not always be clear. The word ‘development’ implies progress or advance, and may be defined as the overall activity in a society, consciously or subconsciously undertaken, aimed at improvements in that society (Stec, Filip, Grzebyk, & Pierscieniak, 2014). The qualifier ‘socioeconomic,’ itself a combination of two words, relates to social factors, like education, and profession, as well as economic factors, like income and resources. Thus socioeconomic development can be defined as a process of changes or improvements in social and economic conditions as they relate to an individual, an organization, or society as a whole (Roztocki & Weistroffer, 2016).

The papers in this special edition all deal with the role that ICT play in various aspects of society and socioeconomic development, such as in education and training, administration, organizational relationships, project management, delivery of services, and medical care. In this editorial, we try to provide some structure around the role that ICT play in this socioeconomic development and also show how various aspects of society, technology, business, and governmental policy relate to socioeconomic development.

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Before introducing our multi-dimensional conceptual framework, we briefly review previously published frameworks that deal with socioeconomic development and discuss their merits and shortcomings. Our own framework is based in part on these earlier frameworks. After discussing our own proposed framework, we introduce the eight papers in this special issue and put them in the context of the proposed framework.

2. Existing frameworks

To assess the current research landscape on socioeconomic development, we searched the literature for existing frameworks or models. An earlier, well-conceived model is the conceptual framework by Tallon and Kraemer (2000), which relates ICT to economic payoffs and economic development. However, conceptual frameworks that simultaneously focus on social as well as economic aspects of development are rare. Overall we were able to identify only six previously published frameworks that attempt to explain the effects of ICT on some aspects of socioeconomic development. We briefly discuss these in the order of their publication, starting with the earliest one.

Madon (2000) proposed a conceptual framework that attempts to explain the interaction between the Internet and socioeconomic development in developing countries. The framework was developed based on the literature, anecdotal evidence, and conjecture. It suggests that the Internet has a mainly positive impact on four main factors: economic growth, as witnessed by economic productivity; social well-being, including health, education, and the alleviation of poverty; political well-being, viz. democracy; and the physical environment through sustainable development. Madon emphasizes the importance of intermediary institutions, including government actions, which facilitate the effect of the Internet on socioeconomic development.

Madon's framework is specific to the Internet, rather than ICT in general, thus does not consider currently trendy ICT such as Big Data, Internet-of-Things, and Cloud Computing. The framework also is limited in its focus on developing countries and does not claim to be applicable to highly developed societies. Furthermore, the framework does not explicitly show other important factors, such as human resource development, though some of these are discussed by the author in the description of the framework.

Uttama (2012) proposed a model describing the effect of foreign direct investment on socioeconomic development in countries of the Association of Southeast Asian Nations (ASEAN). The author claims that foreign capital investment is a powerful driving engine for socioeconomic development, by effecting growth in the product market, labor market, and capital market, which in turn result in improvements in income, employment, productivity, and human development.

Uttama's framework focuses on the impact of foreign direct investments and is limited to the context of ASEAN countries. Nevertheless, the framework interestingly presents an ambiguous role of foreign direct investment, revealing its positive impact on economic growth, but negative influence on social development.

Roztocki and Weistroffer (2016) proposed a broad framework linking ICT and socioeconomic development. The framework shows ICT, such as computing resources, Internet, mobile telephony, GPS, and Wi-Fi, enabling business activities and services, such as e-commerce, e-government, on-line social networks, on-line teaching, and so on. The framework further shows that these business activities impact the socioeconomic development of individuals, organizations, and the country as a whole. These are manifested in individuals' education, health, income, quality of life, etc., as well as organizations' global competitiveness and resources, and the country's national product, political freedom, wealth, esteem, and the labor market.

The framework further shows that these socioeconomic developments in turn influence government policies, business culture, and infrastructure, which further generate developments in business activities and services. Also, the individual, organizational, and country wide socioeconomic developments determine the human and social capital, which support the business activities and services.

Lacking in this framework is a temporal perspective, i.e. the time lag between ICT implementation and specific developments; no distinction is made between short-term and long-term impacts. Furthermore, the framework seems to focus on business and government activities, but is missing the activities and services of public institutions and non-government organizations (NGOs).

Ashraf, Grunfeld, Hoque, and Alam (2017) developed a framework to explain ICT-led socio-economic development at the community level. Specifically, the authors looked at three community centers (BRAC Gonokendra) in Bangladesh, which provide economic and social programs to people and communities in situations of poverty. The framework also includes social constraints that may present obstacles to development. Thus while ICT may provide a means for socioeconomic development, social constraints, such as religious perceptions and mobility restrictions on women, need to be addressed to achieve the desired improvements to information access, employment opportunities, social status, education, and social awareness.

The framework is very specific to ICT provided by community centers in rural communities in a developing country. In essence, it depicts some guidelines how to conduct research on ICT-led socioeconomic development at the community level.

Roztock, Soja, and Weistroffer (2017) proposed a framework that links enterprise systems (ES) technology adoption to socioeconomic development in transition economies, i.e. in economies that are in transition or have recently transitioned from a centrally planned economic system to a market driven system. The framework shows that ES implementations enable business activities, which impact socioeconomic development primarily at the organizational level. These socioeconomic developments in turn influence government policy, business culture, and business environment, as well as determine human and social capital. Government policy, business culture, and business environment also affect subsequent ES implementations, which are also shaped by the available human and social capital, thus providing a circular relationship.

This framework focuses specifically on transition economies and their special characteristics. Also, it is limited to ES technology, rather than ICT in general. Another weakness may be that it does not explicitly show the relationships between government policy, business culture, and business environment.

More recently, Palvia, Baqir, and Nemati (2018) proposed a framework that builds on Sen's capabilities approach (Sen, 1999). The construction of their framework was also inspired by the earlier described framework of Madon (2000) that focuses on the impact of the Internet on socioeconomic development. The Palvia et al. framework is based on data collected in Pakistan and tries to explain how citizens of a country view impacts of ICT on socioeconomic development. According to the authors, the citizens' views could be classified into five major categories: social contacts, economic transformation, cultural evolution, personal security, and empowerment.

According to the Palvia et al. framework, ICT have enormous effects on social capital, labeled in the framework as social contact, as ICT can be used as a means for staying in touch with family, friends, and business partners. ICT also have effects on business activities, labeled by the authors of the framework as economic transformation, as ICT allow effective management of current business and pursuing additional business opportunities by entering new market segments. The framework also shows ICT impact on cultural evolution, indicated by changes in human behavior. Furthermore, the framework shows ICT impact on personal security and criminal use. Finally, the Palvia et al. framework shows effects that ICT have on education, learning, and access to health care as well as entertainment, labeled by the authors as empowerment in life domains.

A useful feature of the Palvia et al. framework is that it also shows possible negative impacts of ICT, such as lack of attention (as part of cultural evolution) and criminal use. Missing in the framework are causal links among the various constructs included. Furthermore, the framework reflects subjective perceptions of a class of citizens in one country, and thus may not be applicable in other contexts.

Though these existing frameworks show that research on better understanding the effects of ICT on socioeconomic development is alive and well, there are also clear gaps that call for further investigation. All the frameworks seem to agree that the impact of ICT on socioeconomic development is

substantial, but the frameworks differ in what they cover and in detail. Most of the frameworks cover only very limited aspects of socioeconomic development.

Almost all the frameworks were developed in the context of developing, emerging, or transition economies, though we conjecture that many of the aspects apply to highly developed economies as well. The reason that most of the frameworks and research on this topic are in the context of less developed economies is likely because these economies seem to be in greater need for socioeconomic development. However, socioeconomic development is a continuous process, taking place in all countries and societies, and ICT is likely having an impact in all these contexts, though the type and degree of development may differ.

Some of the frameworks described above were developed in the context of narrowly defined communities and are useful especially in the understanding of the dynamics in those communities, though some of the causalities likely apply also in a more general setting. Some of the frameworks look at specific types of ICT, rather than ICT in general, which allow for more specific findings. When expanding to general ICT, some of the relationships likely still apply, though some of the detailed results may not be applicable.

In developing our own multi-dimensional and broadly applicable framework, we took from these existing frameworks only those aspects that seem to apply in general contexts. In constructing the framework, we followed a systematic procedure as proposed by Jabareen (2009). In essence, we reviewed the existing frameworks for common elements or constructs. We also looked at overlaps in reported relationships between the various frameworks, as these overlaps boost the certainty inherent in the relationships. In addition, we examined the papers within this special issue with respect to these concepts and the relationships between them. The purpose of our framework is to provide some structure for future research into the role of ICT in various types of socioeconomic development.

3. Framework for the role of ICT in socioeconomic development

As stated in the Introduction, we define socioeconomic development as a process of changes or improvements in social and economic conditions as they relate to an individual, an organization, or society as a whole (Roztocki & Weistroffer, 2016). Thus analysis of socioeconomic development can be conducted at various levels, viz. individuals, organizations, or countries. We emphasize that socioeconomic development plays the role of the dependent variable in our framework. It should be noted that the precise definition of socioeconomic development varies in the literature and is the subject of much discussion by developmental economists. Nevertheless, our framework is intended to be broad, encompassing various levels and interpretations of socioeconomic development.

In some way, our framework shows the reverse directions of the various models related to technology acceptance that have been proposed in the literature, as those models look at factors that explain acceptance and use of ICT, whereas our framework includes ICT as an explaining factor for socioeconomic development. While UTAUT (Venkatesh, Morris, Davis, & Davis, 2003) is perhaps the most prominent among these technology acceptance models, the models that appear to be most relevant to our framework are the van Dijk (2005) and SATUM (Spatially Aware Technology Utilization Model) models (Pick & Sarkar, 2015, 2016), as they capture multiple issues related to society, economy, culture, and politics.

In developing our framework, we considered four important dimensions relevant to socioeconomic development: society, technology, business, and policy. These four dimensions represent independent or explanatory variables, which explain changes in the dependent or response variable, socioeconomic development. The framework is summarized in Figure 1. We explain the various concepts in our framework within each of these four dimensions.

3.1. Policy dimension

In this dimension, we include three areas for policies that strongly affect socioeconomic development: capital resources/market, international organizations, and government.

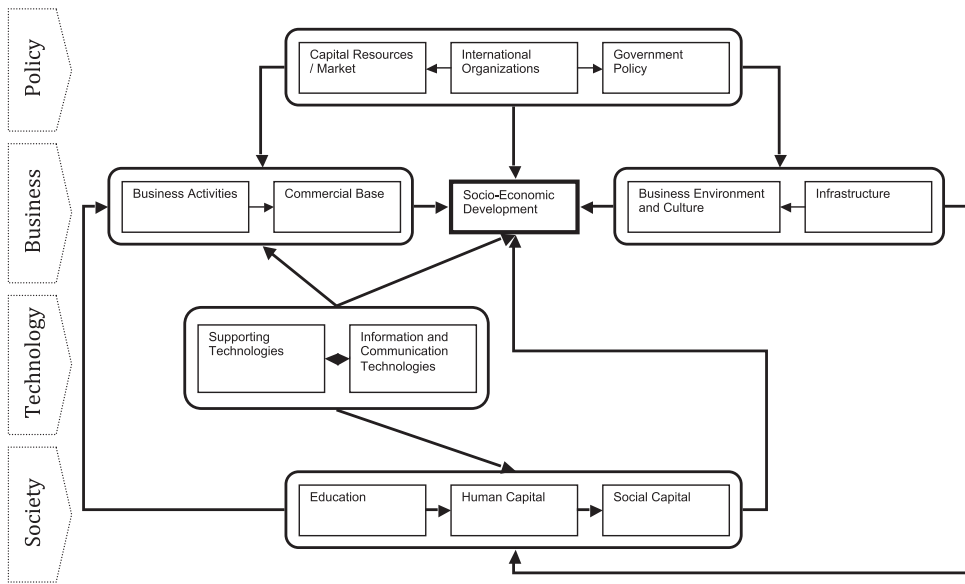


Figure 1. Multi-dimensional framework for the role of ICT in socioeconomic development.

By capital resources or market, we refer to the overall availability and structure for financing of business activities. These resources enable businesses and government organizations to finance the creation or expansion of production or services. How these capital markets are operated and regulated has a strong bearing on business activities.

International organizations are influential on socioeconomic development as they are endowed with substantial resources and can determine loan conditions and organize bailouts for distressed economies (Broome, Homolar, & Kranke, 2017), thus having a major impact on availability of capital resources. Moreover, international organizations using international agreements may exercise power over particular countries and force changes to local government policies (Broome et al., 2017). As suggested by Béland and Orenstein (2013), international organizations frequently change their strategies and policies. Except for relatively short periods of time where they may exhibit ideological consistency, it is difficult to describe their policy approaches as stable. International organizations, such as the World Bank and OECD, produce global benchmarks that measure national performance across a range of issues. Such benchmarking can be a significant source of indirect power in world politics (Broome et al., 2017).

In the context of this paper, we define government policy as a system of regulations, laws, funding priorities, and procedures of corrective actions, which are conducted by governments and their officials.

3.2. Business dimension

Within the business dimension, we differentiate between what is going on, i.e. the business activities and the commercial base established by these activities, and the foundation that enables these happenings, i.e. the business environment and culture and the physical infrastructure.

Business activities are undertakings performed by various entities such as individuals, companies, and institutions, with the potential to create economic gains. Segessemann and Crevoisier (2016) classify business activities into residential and productive activities. Residential activities are business activities focused on local customers, while productive activities are directed towards extra regional demand, generating the basic income for a given region. Extensive studies of economic activities in large cities (Haig, 1926) have led to the development of various related theories. According to the

economic base theory (Hoyt, 1954; Tiebout, 1962), only productive activities improve the economic position of a region, as they generate cash flows from outside of the region (Roberts, 2003). Nevertheless, residential activities are important for socioeconomic development at the individual and organizational level, as they create employment and generate sales revenues for local firms.

The commercial base, sometimes also called economic base, represents the total sum of business activities, but it also is a facilitator for specific income-generating business activities (Roztocki & Weistroffer, 2016). A central idea of economic base is that an economy in a given region is supported by the exports to the outside of the region and that this external demand for a region's products drives its economy (Nesse, 2014).

In general, the understanding of business environment can be very broad and is best defined as a complex system of policy, legal, institutional, and regulatory conditions that govern business activities (DCED, 2008). In other words, business environment can be considered as a set of influential external factors imposed on enterprises. These factors are outside of the direct influence of the manager, company owner, or the entrepreneur (Davari, Zehtabi, Negati, & Zehtabi, 2012). Business culture refers to the collective values and beliefs of business actors that influence the way business is conducted. Business culture relates to management style, but is also affected by national culture, religion, and history.

Infrastructure refers to the fundamental facilities and services available for an economy to function. This includes communication networks like roads, railways, telephone, and Internet availability, as well as the institutions that provide services like health care, education, and law enforcement. This infrastructure has a major impact on the business environment as it builds foundation for streamlining business processes and inter-organizational cooperation.

3.3. Technology dimension

In the technology dimension, we include ICT as well as supporting technologies that enable people and organizations derive the maximum benefits from ICT.

The meaning of technology has changed over time and the issues which are discussed in terms of technology were in the past framed in such terms as useful arts, manufacturing, industry, invention, applied science, and the machine (Schatzberg, 2006). Moreover, technology in a narrow sense can be understood as an ensemble of machineries and procedures (Borgmann, 2006). Nevertheless, we adopt a much broader definition of technology, which is in line with the ideas of an American philosopher, John Dewey, who claimed that technology cannot be limited to a few outer and comparatively mechanical forms (Hickman & Alexander, 1998, p. 24). In our understanding of supporting technologies, we follow the idea of Haug (1992), who broadly defined technology as 'anything, tangible or intangible, that could contribute to the economic, industrial or cultural development of a country.'

The term ICT is largely used as an extension of or synonymously to information technologies (IT). Broadly conceived, ICT are understood as a combination of hardware, software and communication networks (Borgmann, 2006) that enable electronic information capture, storing, processing, and transfer. ICT and supporting technologies work in synergy in sustaining business activities and socioeconomic development.

3.4. Society dimension

The society dimension includes education, human capital, and social capital. Degnan and Jacobs define education as 'the life-long acquisition of knowledge, skills, and abilities that promote personal growth and fulfillment, economic viability (at both the individual and community level), and community enrichment' (Degnan & Jacobs, 1998). This definition emphasizes that education is a process that can be conducted in formal and informal settings, inside and outside schools and universities.

Goode (1959) defines human capital as 'knowledge, skills, attitudes, aptitudes, and other acquired traits that contribute to production' or specific work, which results in economic value. Human capital

is the skill and knowledge base necessary to generate a specific output. Its creation and maintenance require financial expenditures and time. These expenditures on education and health, for example, are frequently difficult to distinguish from consumption (Schultz, 1961).

In the context of this framework, and in line with Baron and Markman (2003), we define social capital as the capability to have access to persons important for success of a given project. In essence, social capital is the goodwill available to individuals or groups, and its source lies in the structure and content of the individual actor's social relations (Adler & Kwon, 2002).

Within the society dimension, the paper by Stal and Paliwoda-Pękosz illustrates how ICT-enabled education may help people improve their soft skills, an important facet of human and social capital. The authors, in their paper, highlight the role of teaching methods in developing human and social capital, by building students' soft skills.

3.5. Relationships within the framework

The relationships between the concepts in our framework were derived from the existing frameworks described earlier, literature review, as well as our own reasoning. There are the impacts of the four dimensions on socioeconomic development, then there are the impact relationships between the four dimensions, and lastly, as discussed earlier, there are relationships between constructs within each of the four dimensions. Some of these relationships are illustrated by the papers in this special issue. It should be noted that while illustrating the relationships between the relevant concepts, or between the explanatory variables, we focused on what we consider the most important relationships, which in the vast majority of cases yielded unidirectional relationships; only the relationship between supporting technologies and ICT is conceived as bidirectional. We realize that many other relationships may actually be bidirectional in specific contexts; however, we decided to illustrate the most significant associations relevant for various settings.

The policy dimension impacts the business dimension both in the context of business activities and commercial base, as well as in the context of the business environment and infrastructure. For example, through monetary and fiscal policies, governments affect overall spending and thus business activities (Lim & McNelis, 2018). Also, capital resources are essential to enable business activities, and international organizations impact trade, which affects both the commercial base, as well as the business environment and culture. Government policies also strongly affect the general infrastructure. For example, motivated by environmental consideration and to reduce air pollution, governments may push sales of electric vehicles while investing in charging infrastructure (Lopez-Behar et al., 2019).

The policy dimension also impacts socioeconomic development directly. For example, Heeks, Foster, and Nugroho (2014) illustrate how various political initiatives may affect socioeconomic development. In our special issue, the impact of the policy dimension on socioeconomic development is illustrated by Mahmood et al., who describe the effect of transparency and accountability in e-Government on political participation, an important facet of socioeconomic development (Tibben, 2015).

The business dimension impacts the society dimension as it creates demand for human resources and allows investments in human and social capital (Palvia et al., 2018). The business dimension also impacts socioeconomic development directly, as it creates jobs and more income, which leads to higher standards of living (Palvia et al., 2018).

Technology changes the way businesses operate, and thus has a strong impact on business activities and the commercial base. In our special issue, the impact of the technology dimension on the business dimension is illustrated by Lech, who in his paper asserts that enterprise information systems are used in developing and transition economies to improve efficiency and to increase the pace of business activities.

The technology dimension also has major impact on the society dimension, as technology is often the main driver for societal transformation, as discussed by Lee, Shao, and Vinze (2018). In our special issue, the impact of the technology dimension on the society dimension is illustrated for example by Stal and Paliwoda-Pękosz, who in their paper demonstrate the impact of e-learning on education.

There is wide agreement that ICT together with supporting technologies make a substantial contribution to socioeconomic development (Sein, Thapa, Hatakka, & Sæbø, 2018). In their paper, Sein et al. give an example of telecommunication investments as a driver of socioeconomic development. Palvia et al. (2018), in turn, describe an example that the use of cellular phones is beneficial to small businesses in gaining additional customers. In our special issue, the impact of the technology dimension on socioeconomic development is illustrated for example by Mengesha and Garfield. In their paper, they demonstrate how the use of a specific technology, telemedicine, may improve people's well-being. Technology also affects various economic metrics, such as gross domestic product (GDP) (Lee et al., 2018).

In our special issue, the impact of the society dimension on the business dimension is illustrated for example by Kowal et al., who show how human capital influences the commercial base. In particular, the authors demonstrate the role of citizenship behavior in the job market. Also in our special issue, the impact of the society dimension on socioeconomic development is illustrated in the paper by Jacobs et al., who demonstrate the role of stakeholder capabilities in political participation, an important facet of socioeconomic development (Tibben, 2015).

4. Papers in this special issue

Our special issue has eight papers that examine various aspects of socioeconomic development. The papers are based on research conducted in diverse economic settings, including developing countries, transition economies, and highly industrialized countries. The research settings also represent various geographical regions, such as Africa, Middle East, and Europe.

The first paper, *A contextualized IT adoption and use model for telemedicine in Ethiopia*, by Geta-chew Hailemariam Mengesha and Monica J. Garfield, examines the adoption and use of telemedicine and its potential for socioeconomic development. The data was collected from 205 questionnaires completed at the Black Lion Hospital, Addis Ababa, Ethiopia. The results of this study suggest that the adoption and use of telemedicine is affected substantially by 'facilitating conditions' and 'compatibility with medical practice,' which maps into business environment and culture in our framework.

The second paper, *Developing capacity through co-design: the case of two municipalities in rural South Africa*, by Carl Jacobs, Ulrike Rivett, and Musa Chemisto, explores how co-design methodology may affect the implementation of an ICT system and its impact on socioeconomic development. Co-design methodology involves participation of various stakeholders in the implementation project and better utilizes the available human capital in synergy with the technology. The results indicate that positive effects of using the co-design methodology are more substantial than reported in the literature. The authors put forward that co-design, as an approach to developing ICT solutions, should be considered by all governments, ICT practitioners, and researchers in the ICT4D field.

The third paper, *Organizational citizenship behavior of IT professionals: lessons from Poland and Germany*, by Jolanta Kowal, Alicja Keplinger, and Juho Mäkiö, focuses on the relationship between the social dimension and the business dimension. Specifically, the paper reports on a study of potential differences in organizational citizenship behavior (OCB) of female and male IT professionals in Poland and Germany. Poland is an example of a transition economy, while Germany is one of the most developed countries in the world. The data was collected using an on-line survey among 282 Polish respondents and 80 German respondents. The results indicate that female IT professionals view their supervisors more positively than their male counterparts, but female IT professionals were also more demanding of their subordinates than their male counterparts. Moreover, the results of this research indicate that organizational citizenship behavior is appreciated more in Germany than in Poland.

The fourth paper, *Fostering development of soft skills in ICT curricula: a case of a transition economy*, by Janusz Stal & Grażyna Paliwoda-Pękosz, uses a multiple case study approach to examine the effects of changes in teaching methods. The paper proposes a framework for ICT-supported university courses to help design courses that also develop business and soft skills of students, and thereby improve students' prospects in the job market, which is especially important due to rapidly changing

business environment and technology evolution in developing and emerging economies. Thus this paper also highlights the relationship between the social dimension and the business dimension.

The fifth paper, *The influence of transformed government on citizen trust: insights from Bahrain*, by Mohamed Mahmood, Vishanth Weerakkody, and Weifeng Chen, examines the adoption of e-government and the effect of transforming government on trust in public institutions. The data for this study is collected by a survey with 313 respondents, conducted in Bahrain. The results indicate that citizen trust and confidence is positively influenced by government transformation, as long as this transformation is accompanied by improved government performance, transparency, and accountability. Thus this paper deals with the relationship of technology together with government policy on socioeconomic development.

The sixth paper, *Discovering the determinants and predicting the degree of e-business diffusion using the decision tree method: evidence from Montenegro*, by Biljana Rondović, Ljiljana Kaščelan, Vujica Lazović, and Tamara Đuričković, uses a decision tree method to assess the impact of technical, organizational and environmental factors on e-business in Montenegro, a transition economy. The results show that level of significance of observed influential factors depends on the specific industry and business type. For example, in the finance sector, the technical factors seem to be the strongest determinants for e-business diffusion, whereas in trade and tourism companies, the organizational factors are most influential. The paper highlights the importance of all four dimensions in our framework on socioeconomic development, as technology factors, as well as business factors (business environment), society factors (education and human capital), and policy factors (regulations) are influential in varying degrees on e-business diffusion.

The seventh paper, *An exploratory study of the determinants of information technology hardware production: a country-level analysis*, by Namchul Shin and Jason Dedrick examines the factors that impact hardware production in various countries. The results of this research indicate that hardware production in a country is related to its IT demand, GDP per capita, its openness for exports and imports, labor quality. Moreover, the results show that production of IT hardware classified as electronic data processing is likely to be moved to low wage countries, while IT production of hardware classifies as medical and industrial equipment is likely to remain in mature economies. The paper thus illustrates the impacts of the society dimension and the policy dimension on a specific business activity.

Finally, the eighth paper, *Enterprise system implementations in transition and developed economies: differences in project contracting and governance*, by Przemysław Lech, is a view from practice. In this article, the author point out differences in enterprise system implementations in transition and developed economies, showing that projects in highly developed countries tend to be performed in a more co-operative and benign way, while in less developed countries the approach is based more on a client-supplier, 'muscular' way of managing the relationship, which may cause additional problems during project execution and result in higher transaction costs. Thus the paper reveals the importance of the business environment and culture in completing a complex project like enterprise system implementation.

5. Directions for future research

The intention of the multi-dimensional framework for ICT-supported socioeconomic development, presented in this paper, is to provide inspiration for researchers in the ICT for development (ICT4D) field. We encourage researchers to conduct investigations aimed at validating and enhancing the framework, as there may be additional dimensions that should be considered, and other concepts and relationships. It would also be useful to establish a better theoretical foundation to justify the relations in our multi-dimensional framework. Developing new theories or using existing theories is particularly valuable, as much of the research on socioeconomic development is currently lacking theoretical lenses (Sein et al., 2018).

As far as enhancing our framework, especially worthy of investigation may be looking into the complementary or contradictory relationships between the various concepts. Thus it may be interesting to

explore if shortcomings in a specific concept could be compensated by an extraordinary performance of some other concept. In addition, the time-related perspective of the impact on development appears especially vital, i.e. examining the short- and long-term effects of the proposed considerations.

Future research, besides substantiating (or refuting) the relationships depicted in our framework, may focus on examining so-far under-investigated links between concepts within our framework, such as relationships between technology-related constructs and societal factors. The impact of various concepts on infrastructure would also be of significant interest.

We also believe that the policy dimension, capturing the impact of government, international organizations, and available financing, is particularly worthy of more research. The role of global entities, such as international organizations and multinational corporations (MNCs) in socioeconomic development, is particularly interesting. As suggested by some prior research, the long-term effects of foreign capital might be negative. For example, Tausch (2010) claims that MNC penetration 'significantly increases inequality and unemployment, and lowers life expectancy, and doubtlessly contributes to a high tertiary emigration rate, to a higher infant mortality, and to significantly less social security expenditures.' Also within the policy dimension, the article by Jacobs, Rivett, and Chemisto in this special issue interestingly suggests the need for researching governmental and political perspectives on citizen trust.

Another important area for future research is the role of age in ICT implementation and acceptance. Population ageing is a global phenomenon that will continue to affect all regions of the world (Harper, 2014; Tams, Grover, & Thatcher, 2014), and may affect the success and contribution of ICT on socioeconomic development. Prior research indicates that depending on age, people may experience various sentiments related to ICT acceptance, such as technology anxiety (Hardy & Castonguay, 2018), perceptions of risks and impediments (Soja, 2017; Soja & Soja, 2017), and lack of confidence in computer knowledge (Marquié, Jourdan-Boddaert, & Huet, 2002). The need for more research into the role of age in the process of ICT acceptance is also expressed in papers in the current special issue. In particular, Kowal et al. suggest the need to research the impact of age on organizational citizenship behavior, and Stal and Paliwoda-Pękosz point out the necessity of researching the role of age in designing and delivering ICT-based educational programs.

We strongly believe that future investigation into the role of ICT in development must be framed within a multiple stakeholder perspective. In this regard, as suggested by Jacobs et al. in their paper in this special issue, understanding of information systems success and evaluating the impact of ICT systems should be done in a wider context, through engagement with all stakeholders. The authors also interestingly suggest avoiding the dominating role of ICT specialists. Kowal et al. in their paper in this special issue, while also touching upon multiple stakeholder perspective, emphasize the need for investigation of multicultural considerations.

Another important direction for further research is the alignment of the ICT adoption process with a country's level of development. Two papers in our special issue illustrate this research need both in settings where adoption is voluntary and where it is mandated by an employer or by law. With respect to the former, Mengesha and Garfield indicate the need for further work on acceptance of telemedicine, with the purpose of strengthening their proposed model with better explanatory and predictive power. As regards ICT acceptance in a mandatory business setting, a particularly interesting research issue is revealed in the paper by Lech, related to aligning an approach to project management and governance with a country's special characteristics.

6. Conclusion

In this introduction to the special issue on the role of ICT in socioeconomic development, we provide a conceptual multi-dimensional framework that considers four dimensions that impact socioeconomic development: policy, business, technology, and society. This framework builds on several earlier frameworks but it is more general in context and focus, considering all ICT, rather than specific types of ICT, and applying to all economies and regions, rather than only less developed

economies. We assert that development takes place in both underdeveloped economies, as well as in highly developed economies, and while the effects of specific factors may vary in the strength and focus of their impact, the general concepts and relationships in our framework still apply.

We also relate the papers in this special issue to our framework, and we encourage future researchers to consider our framework, as well as perhaps one or more of the other, more specialized frameworks, in structuring their studies. Thus we are confident that our framework will serve as an aide to future researchers in directing and focusing their work, dealing with technology for socioeconomic development. To that intent, we provide suggestions for several future research directions that appear to have major gaps and require more examination. Those include, among other things, investigating the role of international organizations and large corporations, addressing challenges of population ageing, and aligning the ICT adoption process with a country's level of development.

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No potential conflict of interest was reported by the authors.

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