IIETA International Information and Engineering Technology Association
Advancing the World of Information and Engineering

Ingénierie des Systèmes d'Information
Vol. 28, No. 4, August, 2023, pp. 969-974
Journal homepage: http://iieta.org/journals/isi

Developing an Information Model for E-Commerce Platforms: A Study on Modern Socio-Economic Systems in the Context of Global Digitalization and Legal Compliance

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https://doi.org/10.18280/isi.280417

Received: 14 April 2023
Revised: 27 June 2023
Accepted: 23 July 2023
Available online: 31 August 2023

Keywords:
information, E-Commerce, platform, model, modern systems, digitalization, data analysis, user experience

ABSTRACT

This research aims to establish an optimal information base conducive to the development of an E-Commerce platform within modern socio-economic systems, operating amidst global digitalization and within legal constraints. The primary scientific task involves modeling information to facilitate the growth of such an E-Commerce platform in these evolving systems. The focus of this study is on modern socio-economic systems existing within the realm of global digitalization. The adopted research methodology, pertinent to the subject matter, encompasses SWOT analysis and graphical-functional modeling, utilizing a contemporary methodological approach in the formation of an information model. As an outcome, this study offers a fresh perspective on the model of information support for the development of an E-Commerce platform within the contemporary socio-economic systems navigating through the waves of global digitalization. The novelty of these findings lies in the defined methodological approach towards constructing an information model for E-Commerce platform development. However, this study is limited by its exclusive focus on the information component, potentially leading to the neglect of other crucial elements of E-Commerce, such as financial, security, technical, and technological aspects. Future research should prioritize developing parallel models for these key E-Commerce components and optimizing them in alignment with the existing model.

1. INTRODUCTION

Unprecedented growth in the influence of scientific advancements and new technologies characterizes the current era of globalization, shaping the socio-economic progression of nations worldwide. The technologies birthed from the information revolution have claimed a central role, tracing the transition from an industrial society to an information-oriented post-industrial society.

Digitalization, a process permeating all areas of human activity, aligns with this global trend. As a product of the digital economy operating within legal constraints, E-Commerce utilizes electronic and information technologies to streamline traditional business processes in goods and services distribution, instigating profound changes.

E-Commerce presents potential advantages, including deeper participation in international supply chains, expanded market access, enhanced domestic and market efficiencies, and reduced transaction costs. Nevertheless, for a long period, E-Commerce was predominantly limited to large enterprises in developed countries due to economic, socio-political, and educational barriers.

This study aims to establish a suitable information base to foster the development of an E-Commerce platform within modern socio-economic systems operating under global digitalization. The research question addresses how to model an information base to enhance the development of an E-Commerce platform within these contemporary socio-economic systems.

The structure of this article includes:

(1) A literature review that presents current research and solutions to the problems under investigation.

(2) A methodology section that elaborately outlines the research methods employed.

(3) The main results section, which displays the established models and systematized graphical outputs of the study.

(4) A discussion segment that juxtaposes this study with similar subjects and issues.

(5) Conclusions that offer a summary of the research findings and a general review of the work.

2. LITERATURE REVIEW

The progression towards the fourth industrial revolution is propelled by a confluence of technologies, most predominantly those branching from the realm of information and communication technology (ICT) devices, software, and mechanical systems. This integration of digital technologies and processes is often viewed as potentiating far-reaching implications for work organization, production, trade, and the expansion of existing organizational and geographical fragmentation in knowledge [1, 2].

In particular, digitalization permeates all segments of global manufacturing and international companies' supply chains, from inbound logistics to final product delivery and internal process management. However, the full potential of the digital economy can only be realized when these processes mature, become integrated, and are widely adopted [1, 2]. Various factors, including security risks, pressures of data localization, and issues of data collection and privacy, are identified as hindrances to these developments.

The advancement of key technologies underpinning the digital economy, such as robotics, artificial intelligence, the Internet of Things, cloud computing, big data analysis, 3D printing, and electronic payments, are revolutionizing conventional approaches to the organization and management of international production systems [3, 4]. These technologies catalyze new opportunities for remote coordination of business processes, expedite communication within business systems, enhance resource turnover, and fast-track product and technology life cycles.

In the digital system, practical implementation at the macro level is characterized by decentralization. In this setting, the activities of the state, business, and service market are influenced by ICTs. This influence aids in reducing transaction costs and expenses for electronic communications among economic relation participants.

E-Commerce, when viewed as an efficient form of business process, introduces electronic transactions on the Internet into business processes. These processes include information exchange, interactions between potential participants (seller and buyer), Internet marketing, pre-sales and after-sales services, electronic payment, online advertising, logistics services, insurance services, and administrative services.

The digital economy's development is marked by the emergence of ecosystem platforms of digital products and services, evolving through continuous measurement and data collection over IP [5, 6]. Automation systems and pervasive Internet connectivity generate voluminous data, which, when consolidated and analyzed, can provide insights into concealed patterns and correlations.

Despite the potential benefits E-Commerce offers, such as deeper participation in international target chains, increased market access, improved domestic and market efficiency, and lower transaction costs, its adoption remains largely confined to large enterprises in developed countries [7, 8]. Barriers to E-Commerce have been classified as economic, socio-political, and educational.

The transition to E-Commerce is transforming the behaviors of businesses and consumers alike [9, 10]. The role of ICT programs and services is expanding throughout the entire E-Commerce chain, which can be divided into four stages: information gathering, approval, transaction, and delivery.

Yet, the concept of digital technologies is broad and varies across different socio-economic systems. It is therefore crucial to clearly distinguish and specify different digital technologies within the modern legal framework.

In light of the literature review, E-Commerce platforms emerge as a highly topical subject. Accordingly, the scientific task of this study is to model information to facilitate the development of an E-Commerce platform in modern systems operating within the bounds of global digitalization.

2. METHODOLOGY

The purpose of the methodology involves the description and transcription of what methods were involved in the proposed methodological approach.

Graphic-functional modeling and the IDEF0 approach are best suited for the development of an E-Commerce platform of modern systems, therefore, only in this format, in our opinion, it is possible to better select key processes.

It is best to build an information model through graphical-functional modeling. The description of a system using IDEF0 is called a model. The basis of the IDEF0 methodology is a graphical process description language that will provide information on the development of the E-Commerce platform of modern systems. The model in IDEF0 notation is a set of hierarchically ordered and interconnected information diagrams for the development of the E-Commerce platform of modern systems. The skin diagram is a unit of system description and is placed on a separate sheet. The model can contain four types of charts.

Starting modeling means creating E0 diagrams that fully describe the development of the E-Commerce platform of modern systems, with a minimum degree of detail.

The correct arrangement of blocks is the most important step in building a diagram of the development of the E-Commerce platform of modern systems. Blocks are placed in accordance with their dominance (in order of importance or in sequence). The most dominant block is usually located in the upper left corner, and the least dominant in the lower right. This results in an arrangement in which dominant blocks constrain less dominant ones, forming a staggered pattern. Dominance is essential for a clear representation of the process.

One of the most common problems that arise during the implementation of IDEF0 projects is when should the construction of a particular information model be completed. This question is not always easy to answer, although there are some heuristics for determining a reasonable degree of completeness. It is generally recommended by most IDEF0 authors to stop modeling when the level of detail of the information model satisfies its purpose. In other words, you should end the simulation when you feel that further progress will not satisfy the information needs of the project (E-Commerce platform development of modern systems) or will conflict with them. Although this rule is intuitively clear, it is difficult to follow without evaluating the information model.

You can't just build an IDEF0 model. Weaknesses and strengths of the system should be determined for the purpose of installation, so that should be taken into account in the model and what is not. That is why SWOT analysis is necessary for the development of an E-Commerce platform of modern systems.

It should be noted that any information model should be based on certain data on the activity of a particular system for which it was created. Apply the SWOT methodology.

Given this study, SWOT analysis allows you to form a general list of information regarding effective modeling. The widespread use and development of this method are explained by the fact that management is associated with large amounts of information that needs to be collected, processed, analyzed, and used, so there is a need to search, develop and apply methods for organizing such work. The purpose of using SWOT analysis in the implementation of modeling.

The development of the E-Commerce platform in the activities of modern systems is to demonstrate the capabilities of a systematic approach to planning. This approach makes it possible to determine possible aspects of influence, medium-term strategic goals, and objectives, assess the chances of

success and possible threats, and rationally allocate the available resources necessary to achieve these goals.

For example, we have chosen the socio-economic system to which the simulation will be directed - this is the company "Sweet TV". In which the entire business model is built based on an E-Commerce platform. This socio-economic system operates to provide a service for watching movies and TV content.

3. RESULTS OF RESEARCH

To begin with, the first result of the study as part of the disclosure of our purpose of the article is the SWOT analysis matrix. As can be seen from Table 1, one of the weaknesses in the operation of the selected "Sweet TV" system is an inefficient E-Commerce platform. That is why it needs a proper information base to better plan the development of its own E-Commerce platform.

Table 1. The results of the conducted SWOT-analysis in the activities of the selected system

S	W	O	T
Strong position in the domestic market	Poor efficiency of the E-Commerce platform	Opportunities for improving information support	Increasing competition
Application availability worldwide	The complexity of the electronic payment	E-Commerce Platform Development Opportunities	Low skill level of workers
Strong customer support	Low information support system	Opportunities to enter new markets	Rising inflation
Large selection of electronic services	Problems with technical means	Opportunities to expand e-services	High price

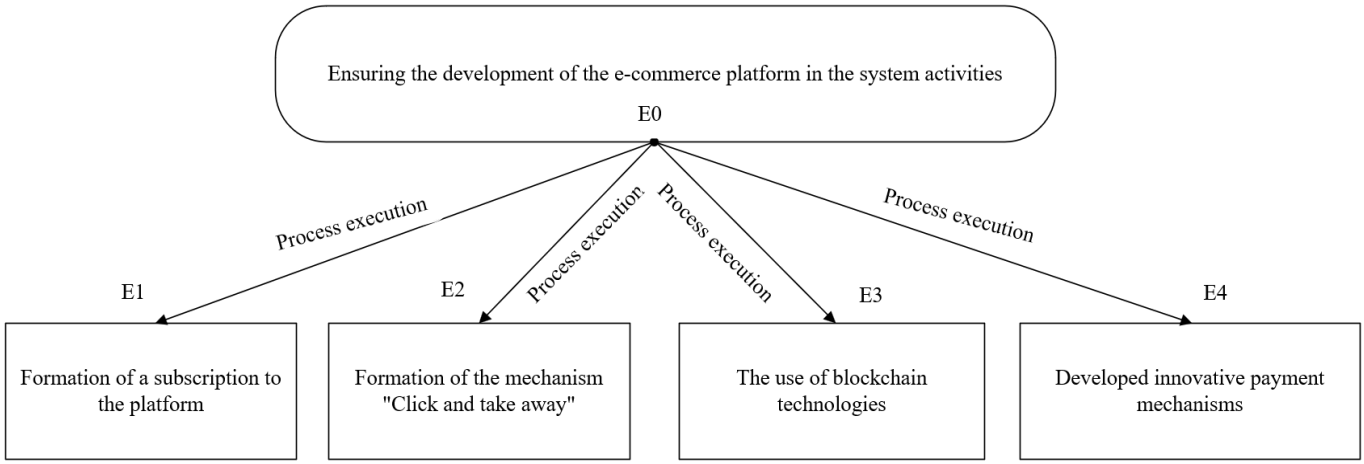


Figure 1. The diagram of a tree of nodes (author's work)

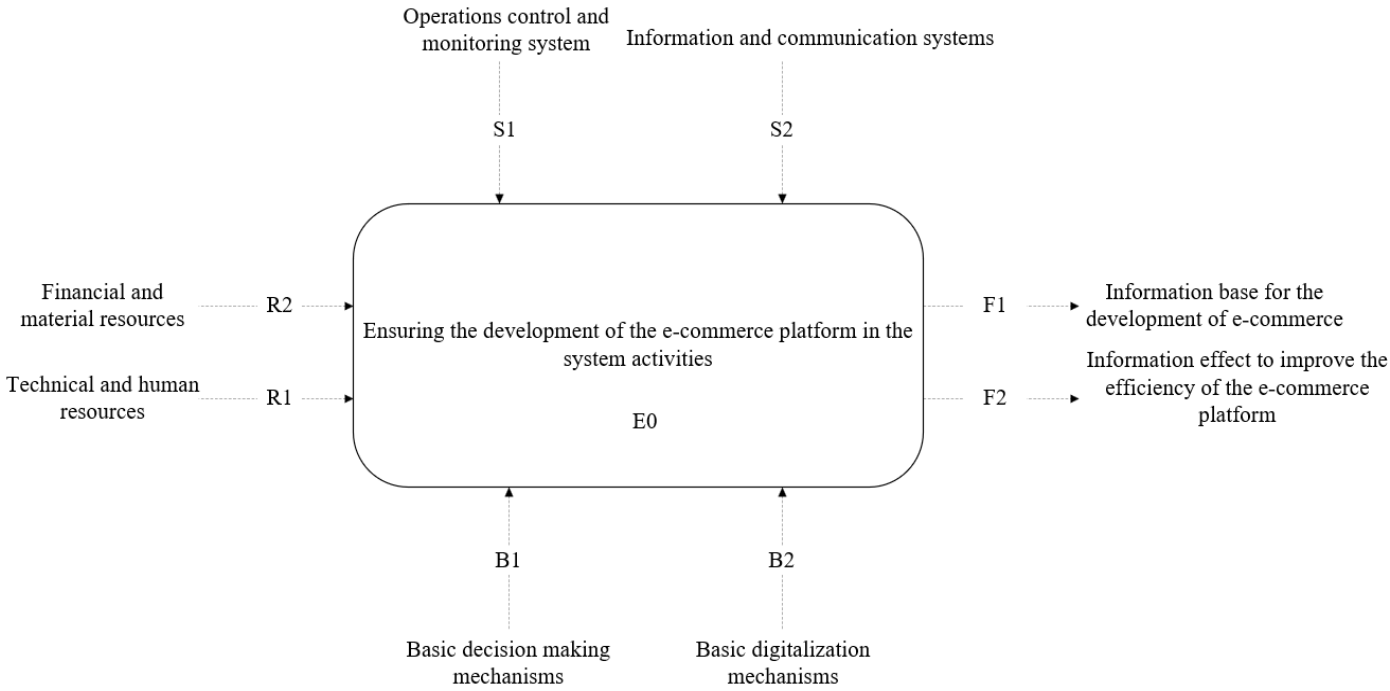


Figure 2. The diagram of the functional components of achieving E0 (author's work)

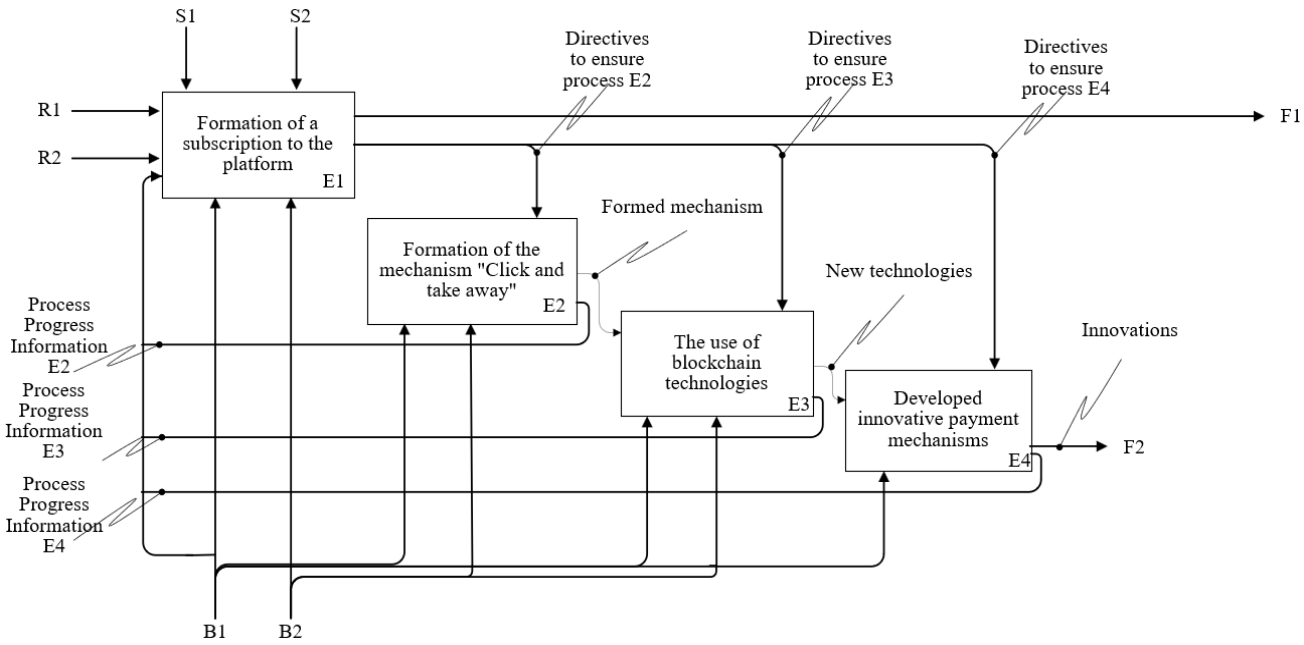
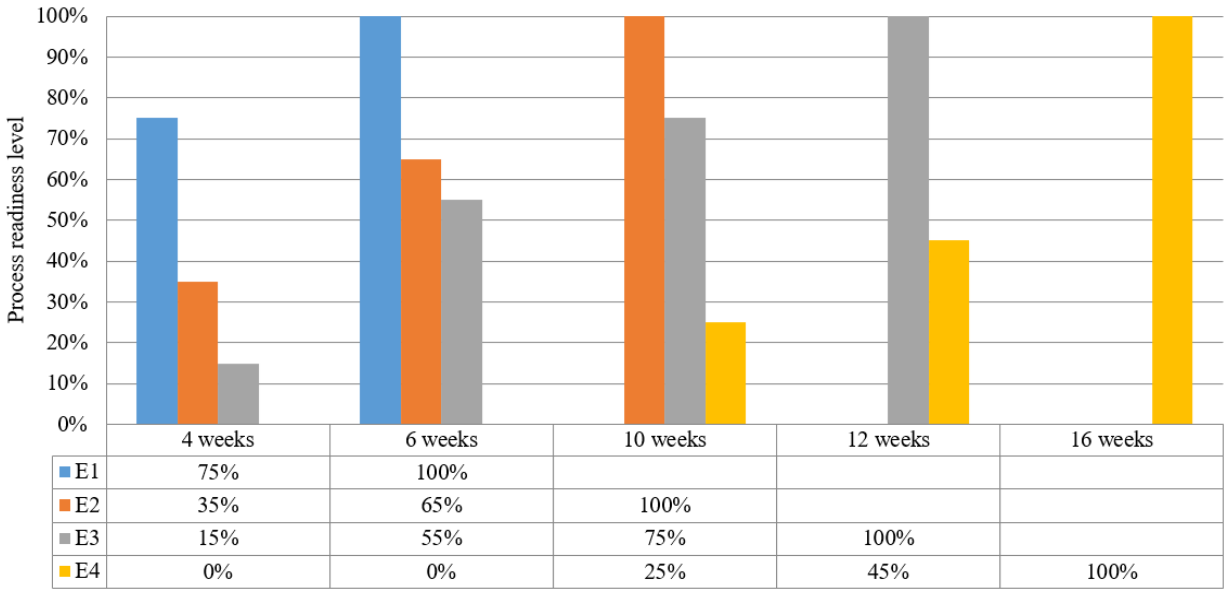


Figure 3. The information model for the development of an E-Commerce platform for the selected modern system (author's work)



	4 weeks	6 weeks	10 weeks	12 weeks	16 weeks
E1	75%	100%			
E2	35%	65%	100%		
E3	15%	55%	75%	100%	
E4	0%	0%	25%	45%	100%

Figure 4. Trend dynamics of the implementation of the proposed information model by the selected system (author's work)

For modeling purposes, E0 "Ensuring the development of the E-Commerce platform in the system activities" is defined. But this is not enough, since the achievement of E0 involves the execution of several processes in the form of a set (E1, E2, E3, E4). We represent them in the form of a diagram of a tree of nodes (Figure 1).

Separately, one should understand the reaction of the system when fulfilling and achieving E0 "Ensuring the development of the E-Commerce platform in the system activities". What we mean by a reaction is what needs to be put to perform E0 in addition to its processes and what we get as an output. Here, through conditional, mathematical notation, we will establish R-resource provision; S-systems that regulate the execution of processes; B-basic control mechanisms; F is the final effect of the performance of E0. We will present all this in the form of a diagram of the functional components of achieving E0 (Figure 2).

The results of the study made it possible to build an information model for the development of an E-Commerce platform for the selected modern system (Figure 3).

To perform E0 "Ensuring the development of the E-Commerce platform in the system activities", the following processes should be performed:

E1. Formation of a subscription to the platform. E-Commerce subscription services have become mainstream, driven by both the digitalization of society and the advent of the COVID-19 pandemic. Subscriptions are becoming an increasingly common business model for E-Commerce, both nationally and internationally. Implementation of two options for viewing content on the platform "Sweet TV" (Standard and Premium). At the same time, the existence of various payment options in a simplified and understandable mode for the user is important. Such an opportunity to get an affordable streaming service within the current legal field will allow users

to move from offline services to online services.

E2. Formation of the "Click and collect" mechanism. For example, many firms actively use features of click-and-collect services that allow consumers to order and buy goods online. This mechanism includes the entire complex of obtaining a product or service, so the consumer will not waste time planning the process of payment, delivery, or installation. So, a streaming service "Sweet TV" can offer it's streaming viewers access to recently released movies and series, paying for them individually, but watching from the comfort of their homes. In addition, an option for this mechanism on the streaming service may be offered to purchase branded consoles for better service provision. The use of such a set of services provided within the legal framework will greatly facilitate the user to receive the service and distinguish the service from others.

E3. The use of blockchain technologies. Blockchain technology allows you to increase the security level of E-Commerce. The stimming service "Sweet TV" is no exception, since it works on a prepaid basis. The use of this system in a streaming service "Sweet TV" will improve the security of the subscription payment process, as well as avoid the involvement of third-party systems for receiving payments. Other potential blockchain-related programs could include the development of a portable and decentralized reputation system for a streaming service "Sweet TV".

E4. Innovative payment mechanisms have been developed. In our opinion, the streaming service "Sweet TV" can use the following innovative forms of payments that can facilitate E-Commerce, including digital wallets, mobile money, and cryptocurrencies. The use of these innovative payment methods allows you to attract new customers and expand the financing limits of the "Sweet TV" system. All innovative payment methods must take place within the current legal framework of the country

The proposed methodological approach should be applied in the practice of the selected system. In general, the execution of each of the E0 processes for the selected system takes a certain period, which, according to the results of the biased analysis, took a total of no more than 4 months (Figure 4).

In the last ten years, the E-Commerce platform has been the most active, which is due to the rapid growth in the number of Internet users, the increasing influence of social networks and other interactive online platforms, the dynamic development of electronic payment systems, and the transition of leading web services from the Web 1.0 technology platform to the Web 2.0 platform.

Thus, for modern systems, E-Commerce is a new and not yet common type of commerce, given a certain mentality and resource constraints. At the same time, E-Commerce has a great future. The rapid spread of the Internet affects the development of this business and, accordingly, changes the consumption model and, finally, the structure of the consumer market.

4. DISCUSSIONS

As part of the discussion of the study, consideration should be given to comparing our study results with similar ones. Most scientists have formed a number of directions for the further development of state policy in the field of digital transformations [11, 12], namely: the introduction of initiatives for the digitalization of public institutions, taking into account such technological concepts as multi-channel informing and engaging citizens, Open Data, the Internet of things, digital government platforms, blockchain; integration into international agreements and initiatives to regulate the digitalization of the global economy; development of digital payment systems and the spread of cashless payments; the introduction of digital technologies in secondary education should be of a multi-platform cross-cutting nature; development and implementation of a comprehensive educational program for the acquisition of digital competencies and skills; development of digital infrastructure; development and implementation of the Industry 4.0 development program, improvement of the legislative regulation of electronic commerce in terms of liability of sellers for dishonest actions [13-15].

Other scientists presented a quantitative toolkit for modeling the effectiveness of a virtual integrated platform in the field of E-Commerce in services, which, based on the use of correlation-regression, and cluster analysis, made it possible to determine the most important triggers of the business model of a virtual enterprise, as well as to model causal relationships. company and environmental factors [16, 17].

A certain group of scientists confirmed the hypothesis about the impact of E-Commerce on the inclusive component of the sustainable development of countries, in particular, the prerequisites for the development of E-Commerce, including affordable mobile communications, access to broadband Internet, the relationship between services and devices, effective regulation of the telecommunications market, as well as skills and the infrastructure necessary to ensure transactions expands the "hard" and "soft" opportunities to attract wider sections of the population to economic activity, social services, and information, reduce the "digital divides" between rural and urban areas, as well as different age and social groups, which ultimately contributes to the achievement of sustainable development goals [18-20].

Discussing the results of our study, it should be noted that we sought to create such a model, which made it possible to provide information for the development of an E-Commerce platform for a modern system operating within the framework of global digitalization. The current methodological approach carries a new way of modeling the development of an E-Commerce platform in modern socio-economic systems in the context of global digitalization within the legal framework. It makes it possible not only to present a simple list of necessary actions, but also to systematize and present them in such a way that it will be structurally, and graphically better perceived at the level of practical implementation.

5. CONCLUSIONS

Thus, as a result of the study of the development of the E-Commerce platform in the activities of modern socio-economic systems operating in the context of global digitalization within the legal framework., we have identified the building blocks of E-Commerce, including the formation of an accessible service for ordering services, payment, continuous service and the use of innovative methods. provision of E-Commerce services. In addition, it is important to ensure effective management of the telecommunications market in the country, which would stimulate the development of E-Commerce. Competitive and interoperable information technology markets supported by independent regulators help

deliver better, more reliable, and more affordable services.

The activation of E-Commerce is actively leading to the transition of offline users to online services (including in the Sweet-TV system). Further improvement of the E-Commerce system, improvement of its information component, and the system of accessibility of use and payment will lead to the further transition of users to E-Commerce.

As a result of the study, we presented a modern view of the model of information support for the development of the E-Commerce platform in the activities of modern socio-economic systems operating under the conditions of global digitalization. The study has a limitation due to the narrowing of the focus only on the informational component. The consequence of this limitation is the partial or complete disregard in the current model of other important components of E-Commerce (financial, secure, technical, and technological). In the future, an important and key stage in the study will be the formation of similar models for other key components of E-Commerce and the optimization of these models with the existing one.

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