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Development of an Electronic Business Information Database to Support the Functioning of Household Services Clusters in the Kashkadarya Region

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Abstract: The digital transformation of regional service sectors requires effective information infrastructure to enhance coordination among economic actors. Starting with the information that there was an electronic business information database developed to stimulate the operation of household services clusters in Kashkadarya region, this study aims to reflect the above-mentioned idea. The study investigates how the characteristics of integrated digital data systems could enhance information transfer, resource distribution, and service efficiency of members in a cluster. Examining socio-economic scenarios in the region and present constraints on the availability and accessibility of information, the paper offers a conceptual model of a centralized e-database for decision-making, transparency, and cooperation. The results emphasize the capacity of digital platforms to bolster cluster competitive advantage, optimise service provision and enhance sustainable regional development. This study advances the theoretical and pragmatic behaviour on the role of digitised support in micro service-oriented agglomeration growth in South African context as an emerging economy.

Keywords: Electronic Business Database, Household Services, Cluster Development, Digital Information Systems, Regional Economy, Service Sector Digitalization.

1. Introduction

The rapid expansion of digital technologies has significantly transformed economic interactions, particularly within regional service sectors. Information accessibility and data-driven coordination have become critical factors influencing productivity, innovation, and competitiveness. Household services — including repair, maintenance, personal services, and other community-oriented activities — play a vital role in supporting local livelihoods and employment. However, in many developing regions, these services operate in fragmented structures lacking integrated information systems [1]. Cluster-based development approaches have been recognized as effective tools for enhancing cooperation and efficiency among interconnected enterprises. By facilitating shared infrastructure, knowledge exchange, and coordinated planning, clusters improve the resilience and performance of local service industries. Notwithstanding these merits, information management digital platforms are missing, which adversely affects household service clusters — as a consequence, it limits on-the-ground performance. Kashkadarya region is another case providing an opportunity to motivate further investigation of practical digital solutions so as to fortify service-sector integration. In order to facilitate

systematic data collection, enhance stakeholder communication and analytical support for management decisions, it is proposed the development of an electronic business information database [2]. Our study thus seeks to present the conceptual and methodological bases for designing this type of database while evaluating its possible contribution to the functioning of clusters and regional development.

Cluster based economic development has been a very popular phenomenon recognized as a mechanism for improving competitiveness, innovation and knowledge transfer among firms. An overview of early bibliometric studies on clusters suggests that these gradually shifted from policy oriented management and efficiency issues to knowledge networks and innovation systems of interlinked companies. This change acknowledges the fact that clusters enable variety and learning (Scott,1998) and are thus important for productivity and technological advancement. Cluster research reviews showcase its multidisciplinary (between economics, management, planning and geography) and establishes its relevance for regional competitiveness and spatial organization of industry. Research further indicates that innovation capability in clusters is driven by knowledge transfer, institutional quality, and technological diffusion that enhance firm productivity and collaboration.

Digitalization have emerged as an important dimension of cluster development It is now suggested by research that that regional competitiveness relies on more localized digital platforms meant to enhance service effectiveness and productivity. Strategies of digital convergence facilitate technology based policy assessment and enhance coordination. Research in the realm of Industry 4.0 further highlights whilst digital transformation transforms relationships for work and production systems — clusters continue essential to local development. The literature on digital transformation emphasizes the significance of technological capabilities and digital tool adoption — especially for small- and medium-enterprises— while enterprise digital management research recognizes the increasing relevance of digitalization in organizational processes and information flows.

From the perspective of technology, it highlights well-organized knowledge bases and service platforms for collaborative work. Data mesh leadthoughts — Research on web service clustering and importance of scalable data infrastructures and organized service repositories [3]. However little research has been conducted governing electronic business information databases focused specifically on regional household service clusters, even though the theoretical basis for them is strong.

2. Methodology

The combination of qualitative and analytical methods used in this research reflects a mixed methodological approach. The theoretical base of the study was determined by theoretical study comprised of conceptual analysis of cluster theory and information system design principles. A comparative analysis of existing digital database models was applied in order to identify best methods for applications to specific regional service sector conditions [4]. To analyze the structural features of household services in the Kashkadarya region, some secondary data sources, such as regional economy reports and statistical publications, were reviewed. We used system modeling techniques to propose a framework describing database architecture, functional components and information flows between stakeholders. The design of the study is descriptive-analytical and is not testing but aims to suggest recommendations. Synthesis and abstraction were used, logically, to thread theoretical insight and contextual observation; thereby, creating an electronic database development model.

3. Results and Discussion

The use of information and communication technologies as a means of supporting a prosperous life and improving business processes in the provision of services, as well as protecting personal data and key objects of the service infrastructure, increasing the level of security and digitizing various types of services, is of great importance. The introduction of digital technologies in the service sector serves to increase management efficiency, improve the quality of services, and take interactions with consumers to a new level. According to McKinsey Global Institute reports, the modern smart services cluster model involves not only the use of innovative technological solutions in various forms, but also the active involvement of consumers and service providers from the early stages of their development. This approach allows for the formation of a service ecosystem, acceleration of digital transformation processes, and sustainable development in the services market. According to the views put forward by Anil Menon, a leading expert on globalization at the multinational Cisco company within the framework of the “technological approach”, a smart services system is a set of integrated services based on digital technologies and information and communication tools aimed at solving problems in interconnected networks [5]. These problems can directly affect processes related to the continuity of service provision, logistics, transport, outdoor lighting, resource management, security, education and healthcare services. A smart services cluster relies on technological solutions aimed at more effective support and optimization of these processes, reducing resource consumption, controlling costs, and ensuring effective digital communication between service providers, consumers and business representatives. Every electronic business information system exists for the purpose of executing particular functional jobs targeting a specific management issue. Only in this case can the organization management develop effective action to tackle the issue, make the necessary decision, apply the needed information technologies, carry out organizational changes and establish a modern electronic information system [6]. A good insight on the nuances of the housing services industry and the process by which consumers assess these services is a critical source of competitive advantage. It was concluded that within the framework of the “Digital Cluster Platform for Household Services” proposed in the first and second chapters of the dissertation, it is necessary to form an electronic business information base for the service sector in order to ensure its effective operation [7]. It is recommended to develop this information base based on the conceptual model presented in Figure 1.

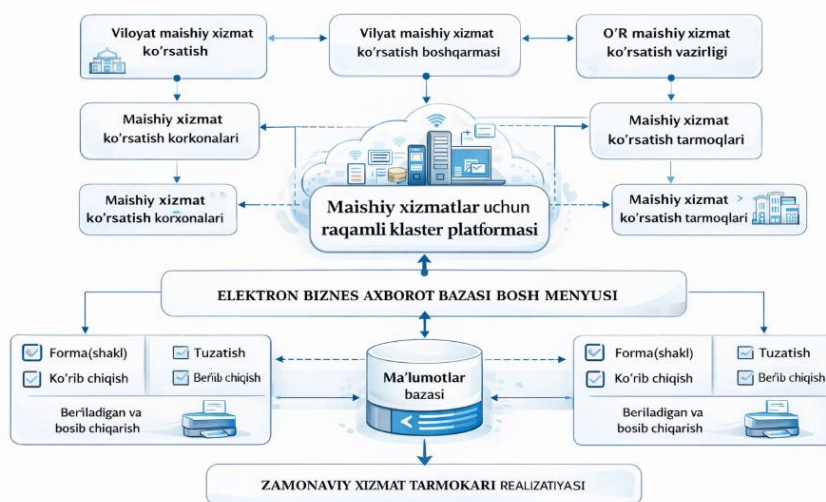


Figure 1. “Conceptual model of a digital cluster platform for household services in the Kashkadarya region.

The information and analytical results obtained as a result of the activities of the information system serve to identify and effectively solve the problems facing the organization (Figure 1). The availability of wide access to the Internet and the ability to quickly and conveniently carry out various transactions on it have led to the rapid development of electronic commerce. Electronic commerce (EC) is a form of economic activity that represents the implementation of the processes of selling and purchasing goods and services through the use of computers and information systems. This process also includes advertising and marketing activities, customer service, acceptance and delivery of orders, as well as operations related to making payments. Also, algorithms are developed that allow automating the specified tasks of the described electronic business information base, managing information flows within the household services cluster, and monitoring payment processes [8]. As a result of the algorithms formed on the basis of these functional requirements, an independent electronic database structure is formed, as shown in Table 1.

Table 1. Creation of an electronic business information database of a digital cluster platform for household services in the Kashkadarya region.

№	Descriptive indicators	Descriptive characters
1	Base name	Electronic business information base of the digital cluster platform for household services
2	Keywords	Household services, digital cluster, electronic business information base, database, software packages, service entities, electronic payment systems, information base in Uzbek, Russian and English
3	General tasks	Development and implementation of the concept of an electronic business information base of the digital cluster platform aimed at improving the quality of services in the household services sector
4	Technical requirements	Computer equipment, Internet connection, screen resolution of 800×600 and higher, necessary software tools; Compatibility with Mozilla Firefox, Google Chrome, Opera and other modern browsers
5	Software tools	PHP, MySQL, HTML, CSS, WordPress
Structure of the electronic business information base of the digital cluster platform for household services		
6.1	Main menu	The platform logo and main menus will be located at the top. In the middle part there will be functions for entering, editing, changing (correcting) and viewing data. The bottom part will display user rights, information about the platform and copyright.
6.2	Functional modules	User registration and authentication; acceptance and processing of orders for household services; management of electronic payments; monitoring and control of services; statistical analysis and reporting; acceptance of complaints and suggestions
6.3	User roles	Platform administrator; representative of a household service enterprise; financial operator; consumer
6.4	Information security	Data protection, encryption of personal data, restriction of user rights, use of authentication and authorization mechanisms
6.5	Integration capabilities	Integration with commercial banks, electronic payment systems, mobile applications, regional and other information systems

6.6	Performance indicators	Improving the quality and speed of services, ensuring transparency of payments, increasing competitiveness in the household services market
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The table systematically presents the structural, functional and organizational aspects of the electronic business information base established on the basis of digitization and clustering of household services in the Kashkadarya region. The main modules of the platform, user roles, security and integration mechanisms are highlighted in the table, which serve to automate the processes of providing services and increase the efficiency of management [9]. Due to the replacement of manual and paper activities with electronic analogues and the use of electronic commerce information exchange systems, it is possible to significantly accelerate the processes of ordering, delivering and paying for any goods and significantly reduce overhead costs. In order to improve the quality of services in the field of household services, before creating an electronic business information base, it is necessary to clearly define the functional requirements for this system. The issue of developing and implementing an electronic business information base has its own characteristics, which are as follows:

- Incompleteness and uncertainty of initial information about resources and the risks they pose, which requires a flexible and adaptive approach to the system design process;
- Multi-criteria tasks associated with the need to take into account many specific indicators, that is, the need to simultaneously assess technical, organizational, economic and informational factors in the household services cluster [10].

Also, in the process of developing and implementing an electronic business information base, it is necessary to take into account a set of quantitative and qualitative indicators to ensure the effective functioning of the system. These indicators serve to manage information flows, monitor services, and optimize decision-making processes within the household services cluster (Table 2).

Table 2. Functional structure of the centers of the digital cluster platform for household services and its functional requirements.

№	Request Name	Description	Action
1	Authorize Users	Users should be registered, authorized, and identification and authentication should be provided at subsequent stages	When the <Register> function is selected, the system registers a new user with the appropriate requirements.
2	Start Process	The user should initiate the process	The <Login> function performs user authentication and identification
3	Create a Protection Object Profile	The system creates a profile in the SCS, and the user should be able to confirm, change, and enter new information	The system is in standby mode until the user selects the <Start Process> function
4	Identify Resources	The user should be able to select those to be identified from the set of recommended resources or enter new ones	The system provides the information specified in the DIGITAL SERVICES profile and asks the user to confirm this profile

6	Stop	The user should receive information about the importance assessment of SCS resources	The system displays a form with the ability to select the necessary ones from the resource catalog. At the same time, it displays the function to enter a new resource type
7	Issue Recommendations	The user can stop the learning process at each stage and exit the program with or without saving records	After evaluating all resources, the system calculates the overall importance score for each resource type or the entire SCS.

A sample payment architecture of a mobile application was proposed to be implemented during the implementation process of the proposed platform services and newly created services in the "Digital Cluster Platform for Household Services" center, so that they do not spend unnecessary time and costs.

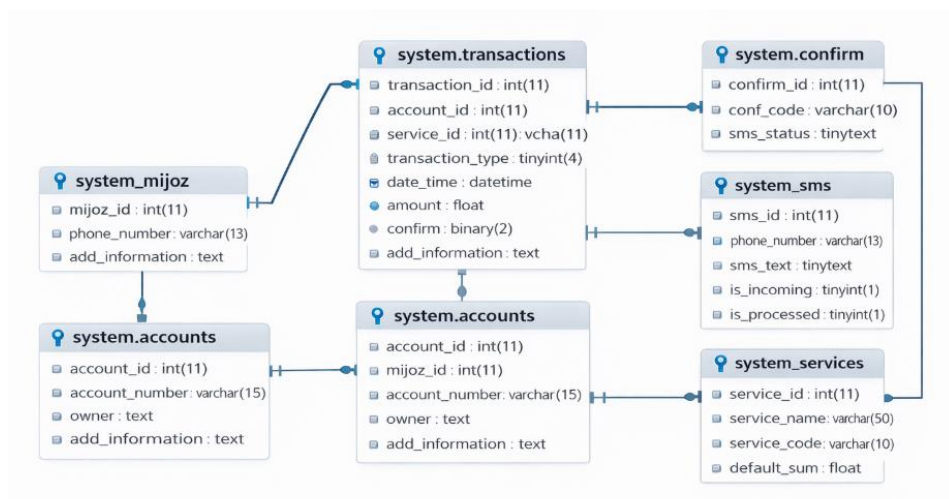


Figure 2. Database Architecture of the Digital Cluster Platform for Household Services.

The functions included in the database of this payment architecture can be explained as follows (Figure 2):

The "Client" table - contains information about SCSC users, namely, mobile phone number ("phone_number") and personal information ("add_information").

The "Accounts" table - contains information about virtual accounts registered in the SCSC, namely:

- Virtual account type indicator ("is_private", "FALSE" - for legal entity accounts, "TRUE" - for individual accounts);
- Client identifier of the virtual account ("client_id");
- Unique virtual account number ("account_number");
- Basic information about the account holder ("owner"); auxiliary information about the account holder ("add_information").

The "Transactions" table - contains information about operations performed by clients, namely:

- Client identifier of the transaction ("client_id");
- Virtual account identifier ("account_id") containing the transaction [11];
- Type of transaction ("transaction_type", 1 – new client registration, 2-new account registration, 3-add funds to the account, 4-withdraw funds from the account, 5-confirmation request, 6-delete account, 7-satisfy the client's request);
- Transaction - date and time ("date_time"), transaction amount ("amount", the field is used only in cases of financial transactions);
- Id code confirmation ("conf_id", the field is used only in cases where confirmation is required);
- Auxiliary information about the transaction ("add_information").

The "Services" table - contains information about goods and services provided by users - legal entities within the SCSC, namely:

- Product service name ("service_name");
- Virtual account identifier containing the product service ("account_id");
- "default_sum" ("default_sum") is the value of the product service;
- A unique (in the context of the corresponding virtual account) product service code for use in the scsc ("service_code") commands [12].

The "Sonfirm" table is a table that contains information about the operations on confirmation of the sent data, the presence of which (confirmation) is received, i.e. the confirmation code ("conf_code") is required by the user (group agreement of the context) to confirm the status ("conf_status") ("conf_status" is 0 for unconfirmed operations, 1 for confirmed).

The "SMS" table - contains all messages sent and received by the SCSC, including information about the phone number from which (or to which) the message was sent ("phone_number"); the text of the sent and received message is in the form of ("sms_text");

- The message type is indicated by the indicator ("is_incoming", "FALSE" - outgoing sent, "TRUE" - received processed);
- The message processing status is indicated by the flag ("is_processed", "FALSE" – message). We propose the following algorithm for performing the sequence of these functions (Figure 3):

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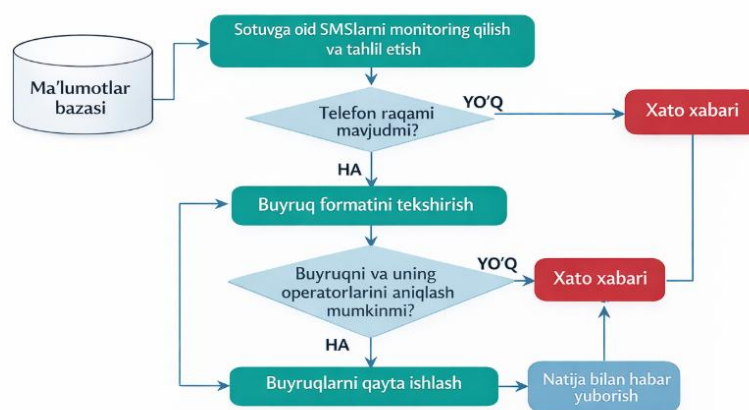


Figure 3. The "SMS" table

We believe that it is appropriate to formulate a set of tasks aimed at using information systems in the field of household services as follows:

- Increasing the efficiency of dispatching and management in the processes of providing household services [13];

- Collection and processing of data on the technical condition of household service facilities and infrastructure in the region;
- Remote monitoring and management of household service facilities and processes;
- Simulation of service provision processes and possible situations;
- Accounting, automated calculation and control of payments for household services;
- Improving the quality of interaction with consumers and improving customer service;
- Providing information and analytical services for territorial government bodies and organizations involved in the development of the service sector;
- Introduction of web services for data exchange and integration processes;
- Optimization of costs and increasing financial efficiency through rational use of resources.

Thus, as a result of the research conducted, it was proposed to create an “Electronic Database Management System (MySQL)” that would improve the quality of household services through the use of digital services [14]. This electronic database will collect information about all entities operating in the household services sector in the Kashkadarya region, as well as the types of household services provided in the region and their main indicators, in a single system. Through this electronic database, consumers will have the opportunity to quickly and reliably obtain information about the activities of entities providing household services, their types of services, prices and quality indicators. As a result, the opportunity will be created to sustainably improve the quality and efficiency of household services in the Kashkadarya region, centrally manage service delivery processes, and more fully meet consumer needs [15].

4. Conclusion

This study examined the theoretical and methodological foundations for developing an electronic business information database aimed at supporting the functioning of household services clusters in the Kashkadarya region. The analysis showed that digital information infrastructure is necessary to improve coordination, transparency, and efficiency in the cluster. Leveraging structured data management including but not limited to tools and instruments inside individual cluster activities opens up better opportunities for stakeholders to make smarter decisions, efficient use of available resources, and better service quality. The literature review has confirmed that a relatively new dialogue around the role of cluster-based development in driving regional competitiveness, especially when linked to digital transformation and low-carbon economy and information system integration, continuity in recent research. Nevertheless, previous studies do not focus specifically on the use of electronic databases in regionalised household service clusters. The study, addressing this gap, proposed a conceptual framework emphasizing that collaborative work between service providers, institutions, and consumers should be supported by centralized storage, accessibility, and analytical functionality of data.

The implications of the research findings indicate that an electronic business information database can promote operational efficiency, market presence, and innovation capacity within the service sector at the regional level. These digital platforms can similarly empower policy planning and tracking by providing robust statistical and analytical knowledge to decision-makers. In the future, empirical tests can be conducted to assess the validity of the proposed construction framework, such as system prototyping, user acceptance analysis, and quantification of economic impacts. At a practical level, tasks to mitigate the resource-food value gap should focus on stakeholder capacity building, infrastructure readiness, and institutional synergy to achieve safe, consistent, and broad-based digital transformation in household service clusters.

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