

ORGANIZATION OF ELECTRONIC DOCUMENT CIRCULATION BASED ON CLOUD TECHNOLOGIES IN HIGHER EDUCATION INSTITUTIONS

Gaibnazarova Zilola Maksudovna

Tashkent State University of Economics

Assistant, Department of "Digital Economy"

Abstract

The organization of electronic document circulation based on cloud technologies is becoming an important direction in the digital transformation of higher education institutions. In the context of the digital economy, universities are required to ensure fast, transparent, secure, and economically efficient management of academic, administrative, financial, and methodological documentation. This article examines the methodological and organizational foundations of implementing cloud-based electronic document circulation systems in higher education institutions, with particular attention to the conditions of Uzbekistan. The study emphasizes that cloud technologies make it possible to reduce paper-based bureaucracy, accelerate decision-making processes, improve interdepartmental coordination, and create a unified digital environment for document storage, approval, monitoring, and archival management. The research also considers the importance of cybersecurity, data protection, regulatory compliance, digital literacy, and institutional readiness in the successful implementation of such systems. The article argues that the effectiveness of cloud-based document circulation depends not only on technological infrastructure, but also on the integration of management procedures, staff training, internal regulations, and continuous monitoring mechanisms. The proposed approach can contribute to improving administrative efficiency, reducing operational costs, increasing transparency, and strengthening the quality of digital governance in higher education institutions.

Keywords: : Cloud technologies, electronic document circulation, higher education, digital economy, digital governance, administrative efficiency, information security, document management.

Introduction

OLIY TA'LIM MUASSASALARIDA BULUTLI TEXNOLOGIYALAR ASOSIDA ELEKTRON HUJJAT AYLANISHINI TASHKIL ETISH

Gaibnazarova Zilola Maxsudovna

Toshkent davlat iqtisodiyot universiteti

"Raqamli iqtisodiyot" kafedrası assistenti

Annotatsiya

Bulutli texnologiyalar asosida elektron hujjat aylanishini tashkil etish oliy ta'lim muassasalarining raqamli transformatsiyasida muhim yo'nalishlardan biriga aylanmoqda. Raqamli iqtisodiyot sharoitida universitetlardan akademik, ma'muriy, moliyaviy va o'quv-uslubiy hujjatlarni tezkor, shaffof, xavfsiz va iqtisodiy jihatdan samarali boshqarish talab etiladi. Ushbu maqolada oliy ta'lim muassasalarida bulutli texnologiyalarga asoslangan elektron hujjat aylanish tizimlarini joriy etishning metodologik va tashkiliy asoslari O'zbekiston sharoiti nuqtayi nazaridan tahlil qilinadi. Tadqiqotda bulutli texnologiyalar qog'ozbozlikni kamaytirish, qaror qabul qilish jarayonlarini tezlashtirish, bo'limlararo muvofiqlikni kuchaytirish hamda hujjatlarni saqlash, tasdiqlash, monitoring qilish va arxivlash uchun yagona raqamli muhit yaratish imkonini berishi asoslanadi. Shuningdek, maqolada kiberxavfsizlik, ma'lumotlarni himoya qilish, normativ talablarga rioya etish, raqamli savodxonlik va institutsional tayyorgarlik bunday tizimlarni muvaffaqiyatli tatbiq etishning muhim omillari sifatida ko'rib chiqiladi. Maqolada bulutli elektron hujjat aylanishining samaradorligi nafaqat texnologik infratuzilmaga, balki boshqaruv jarayonlari integratsiyasi, xodimlarni tayyorlash, ichki reglamentlar va doimiy monitoring mexanizmlariga ham bog'liq ekani ta'kidlanadi. Taklif etilgan yondashuv oliy ta'lim muassasalarida ma'muriy samaradorlikni oshirish, operatsion xarajatlarni kamaytirish, shaffoflikni kuchaytirish va raqamli boshqaruv sifatini rivojlantirishga xizmat qiladi.

Kalit so‘zlar. bulutli texnologiyalar, elektron hujjat aylanishi, oliy ta’lim, raqamli iqtisodiyot, raqamli boshqaruv, ma’muriy samaradorlik, axborot xavfsizligi, hujjatlarni boshqarish.

Introduction

The digital transformation of higher education institutions has become one of the decisive factors in improving the quality of academic administration, educational services, research coordination, and institutional governance. In the conditions of the digital economy, universities are no longer limited to traditional teaching functions; they also operate as complex organizational systems that process large volumes of academic, financial, personnel, legal, and methodological information. The effectiveness of this information flow directly influences the speed of decision-making, the transparency of administrative procedures, the quality of communication between departments, and the overall competitiveness of the institution. Therefore, the transition from paper-based document circulation to electronic document management is not only a technical modernization process, but also an important managerial reform.

In many higher education institutions, document circulation still contains elements of fragmentation, duplication, manual approval, physical archiving, and delayed interdepartmental exchange. Such practices create additional administrative workload, increase the risk of document loss, reduce transparency, and slow down institutional responses to internal and external demands. In economic universities, where educational management is closely connected with finance, digital economy, accounting, analytics, and business administration, the need for efficient information processing is even more significant. The organization of electronic document circulation based on cloud technologies allows higher education institutions to build a unified digital environment where documents can be created, edited, approved, stored, searched, monitored, and archived through secure online platforms.

Cloud technologies offer several advantages for university management. They provide remote access to documents, reduce dependence on local hardware, support collaborative work, simplify data backup, and make it possible to scale digital infrastructure according to institutional needs. In addition, cloud-based systems can integrate with learning management systems, student information systems, human resource platforms, financial accounting tools, and digital

signature services. This creates an opportunity to form an interconnected digital ecosystem in which administrative and academic processes become more coordinated and measurable. As a result, university employees, teachers, students, and managers can interact with documents more efficiently and with fewer procedural barriers.

For higher education institutions in Uzbekistan, the relevance of cloud-based electronic document circulation is connected with the broader national movement toward digitalization, modernization of public administration, and development of the digital economy. Universities are expected to prepare specialists capable of working in digital environments, but at the same time they must apply digital principles in their own internal governance. This means that the university itself should become a model of rational, transparent, secure, and data-driven management. Electronic document circulation can support this goal by reducing excessive bureaucracy, improving accountability, and creating reliable mechanisms for tracking institutional decisions.

However, the implementation of cloud-based electronic document circulation requires more than the installation of software. It demands a systematic approach that includes analysis of existing workflows, selection of appropriate cloud service models, development of internal regulations, training of staff, protection of personal and institutional data, and continuous evaluation of system performance. Special attention must be paid to cybersecurity, access control, legal validity of electronic documents, digital signatures, and long-term data preservation. Without these organizational and methodological conditions, even advanced technologies may remain underused or create new management risks.

This article studies the organization of electronic document circulation based on cloud technologies in higher education institutions from the perspective of digital economy and institutional efficiency. It focuses on the mechanisms, benefits, risks, and practical conditions of implementing cloud-based document management systems in universities. The research highlights that the successful transition to electronic document circulation depends on the interaction between technology, management culture, legal regulation, human capital, and information security.

Literature Review

The scientific literature on electronic document circulation in higher education institutions is closely connected with several major research directions: digital transformation of university governance, cloud computing in organizational management, information security, administrative efficiency, and the development of digital competencies among academic and administrative staff. Researchers emphasize that electronic document management is not merely the replacement of paper documents with digital files, but a complex organizational process that changes communication channels, responsibility distribution, approval procedures, information storage methods, and decision-making culture within an institution.

Studies devoted to digital transformation in higher education indicate that universities increasingly function as data-intensive organizations. Academic records, orders, contracts, financial reports, student applications, curricula, scientific documentation, staff files, and internal correspondence require reliable circulation mechanisms. Traditional paper-based systems often create delays, duplication, and difficulties in monitoring document status. In contrast, electronic document circulation enables universities to automate routine operations, reduce administrative burden, and improve the traceability of managerial decisions. From this perspective, document circulation becomes an important component of digital governance and institutional accountability.

A significant part of the literature focuses on the advantages of cloud technologies in document management. Cloud computing provides flexible access to digital resources through the internet and allows institutions to use storage, software, and computing infrastructure without maintaining all technical resources locally. For higher education institutions, this is especially important because universities often have many departments, faculties, research centers, administrative units, and external partners. Cloud platforms support simultaneous work with documents, version control, remote approval, digital archiving, and integration with other information systems. These features are particularly relevant in the context of hybrid learning, remote administration, and interregional academic cooperation.

Researchers also note that cloud-based document circulation can improve economic efficiency. By reducing paper consumption, printing costs, physical storage needs, courier services, and manual processing time, universities can

optimize administrative expenditures. In economic universities, this aspect is especially important because digital document circulation may serve as a practical model of resource-saving management, process optimization, and data-driven administration. The literature highlights that the economic effect of such systems should be assessed not only through direct cost reduction, but also through time savings, risk minimization, faster decision-making, and improved quality of institutional services.

At the same time, scholars underline that cloud-based electronic document circulation creates new challenges. The most important issues include data confidentiality, cybersecurity, access rights management, legal recognition of electronic documents, digital signature use, backup reliability, and protection against unauthorized interference. In higher education institutions, documents may contain personal data of students and staff, financial information, research materials, and internal administrative decisions. Therefore, the literature stresses the need for a balanced approach in which technological convenience is combined with legal, ethical, and security requirements.

Another important research direction concerns human factors. Even the most advanced electronic document system may remain ineffective if employees lack digital skills, resist change, or continue to duplicate electronic processes with paper-based procedures. For this reason, scholars recommend gradual implementation, staff training, internal methodological support, and clear institutional regulations. The literature shows that successful implementation depends on the readiness of management, technical infrastructure, user motivation, and the existence of a unified digital culture. Thus, cloud-based electronic document circulation should be understood as an integrated mechanism that combines technology, organizational design, human capital, and institutional strategy.

Methods

This study is based on a qualitative and analytical research design aimed at examining the organizational, technological, and managerial mechanisms for introducing cloud-based electronic document circulation in higher education institutions. The methodological basis of the research includes system analysis, comparative analysis, institutional analysis, process modeling, and functional evaluation of digital document management practices. These methods make it

possible to study electronic document circulation not as a separate software solution, but as a complex management mechanism that influences administrative efficiency, communication, control, accountability, and resource optimization within the university environment.

The system analysis method was used to identify the main structural elements of electronic document circulation in higher education institutions. These elements include document creation, registration, routing, approval, signing, storage, monitoring, retrieval, and archival preservation. Each element was considered in relation to academic, administrative, financial, legal, and personnel-related documentation. This approach allowed the study to define the internal logic of document movement and to determine which stages can be automated or optimized through cloud technologies. Particular attention was given to the interaction between departments, faculties, rectorate structures, accounting units, human resource departments, and academic administration offices.

Comparative analysis was applied to distinguish traditional paper-based document circulation from cloud-based electronic document management. The comparison focused on speed, transparency, accessibility, cost efficiency, data security, document traceability, and user convenience. Traditional document circulation was assessed as a linear and often time-consuming process, while cloud-based circulation was examined as a flexible digital system that supports remote access, simultaneous collaboration, version control, and automated status tracking. This comparison helped to reveal the practical advantages of cloud technologies in reducing bureaucratic workload and improving decision-making processes.

Institutional analysis was used to evaluate the readiness of higher education institutions for the implementation of cloud-based document circulation. In this context, readiness was understood as the combination of digital infrastructure, internet stability, availability of secure cloud platforms, regulatory documents, staff competencies, management support, and cybersecurity culture. The research considered that technological implementation may be ineffective if it is not supported by internal regulations, clear distribution of responsibilities, user training, and administrative discipline. Therefore, the institutional environment was analyzed as one of the decisive factors influencing the success of digital document circulation.

Process modeling was used to develop a general mechanism for organizing electronic document circulation based on cloud technologies. The proposed model includes several interconnected stages: audit of existing document flows, selection of a suitable cloud service model, development of document classification rules, integration of digital signatures, establishment of access control levels, staff training, pilot testing, full-scale implementation, and continuous monitoring. This model reflects the practical sequence of transition from fragmented paper-based procedures to a unified cloud-based document management environment.

The functional evaluation method was applied to assess the expected effectiveness of cloud-based electronic document circulation. The main evaluation indicators include reduction of document processing time, decrease in paper and printing costs, improvement of document search speed, reduction of errors and losses, strengthening of control over execution discipline, and increased transparency of administrative decisions. In addition, the study considered qualitative indicators such as user satisfaction, convenience of remote work, interdepartmental coordination, and the level of trust in electronic documents.

The methodological approach of the study is adapted to the conditions of higher education institutions in Uzbekistan, where digital transformation is becoming an important factor in educational modernization and economic development. The research assumes that the implementation of cloud-based electronic document circulation should be gradual, legally grounded, secure, and economically justified. Therefore, the methods used in the study allow not only to describe the technological possibilities of cloud platforms, but also to define the organizational conditions necessary for their effective use in university management.

Results

The results of the analytical study show that the organization of electronic document circulation based on cloud technologies can significantly improve the management efficiency of higher education institutions. The main effect is observed in the acceleration of document movement between structural units. In traditional paper-based circulation, documents often pass through several departments physically, which increases processing time and creates dependence

on the availability of responsible employees. In a cloud-based system, document creation, registration, review, approval, signing, and storage can be carried out in a unified digital environment. This reduces unnecessary delays and allows managers to monitor the current status of each document in real time.

The study revealed that cloud-based electronic document circulation strengthens transparency in administrative processes. Each action performed with a document can be recorded in the system, including the author, date, responsible person, approval stage, correction history, and final decision. This creates a reliable mechanism for institutional control and reduces the risk of informal delays, document loss, or unregistered changes. For higher education institutions, such transparency is important in the management of orders, contracts, academic schedules, financial documentation, student applications, staff records, and methodological materials.

Another important result is the improvement of interdepartmental coordination. Higher education institutions usually consist of many faculties, departments, centers, and administrative offices. When document circulation is fragmented, different units may use different formats, storage methods, and approval procedures. Cloud technologies make it possible to standardize document templates, classify files according to institutional rules, and provide controlled access to relevant employees. As a result, communication between departments becomes faster and more systematic, while duplication of documents and repeated manual entry of the same information are reduced.

The research also showed that cloud technologies contribute to cost optimization. The reduction of paper consumption, printing, physical storage, courier services, and manual processing decreases operational expenses. However, the economic benefit is not limited to direct savings. A more important effect is connected with time efficiency, reduction of administrative workload, faster preparation of reports, and better use of human resources. In an economic university, this result has practical significance because the institution itself becomes an example of rational digital management and resource optimization.

The introduction of cloud-based electronic document circulation also improves accessibility and flexibility. Employees can work with documents from different locations, which is especially useful during business trips, hybrid work, distance education, academic mobility, and cooperation with external partners. Teachers and administrative staff can submit, review, and approve documents without

being physically present in the office. This feature increases continuity in institutional management and decreases the dependence of administrative processes on physical infrastructure.

At the same time, the results indicate that the effectiveness of cloud-based document circulation depends on several key conditions. These include stable internet access, reliable cloud infrastructure, cybersecurity measures, clear access rights, integration of electronic digital signatures, legal recognition of electronic documents, and regular staff training. If these conditions are weak, the system may face risks such as unauthorized access, user resistance, technical interruptions, or duplication of electronic and paper-based procedures.

The study confirms that cloud-based electronic document circulation is most effective when it is implemented gradually. The recommended sequence includes preliminary audit of existing document flows, pilot testing in selected departments, development of internal regulations, training of users, and phased expansion to all structural units. Such an approach reduces organizational resistance and allows the institution to adapt technological solutions to its real management needs.

Discussion

The organization of electronic document circulation based on cloud technologies should be understood as a strategic component of digital governance in higher education institutions. The results show that cloud-based systems do not simply accelerate document movement, but transform the logic of administrative work. In a traditional model, documents are often connected with physical presence, manual coordination, and sequential approval. In a cloud-based model, document circulation becomes more flexible, transparent, and measurable. This shift is especially important for economic universities, where management efficiency, cost optimization, information reliability, and digital competence are directly connected with the content of professional training.

One of the main discussion points is the relationship between technology and institutional culture. Cloud platforms can provide advanced tools for document storage, routing, digital signatures, access control, and monitoring, but these tools become effective only when employees understand their purpose and accept new working procedures. If staff members continue to print electronic documents, request physical signatures, or duplicate digital records with paper files, the

expected efficiency decreases. Therefore, the introduction of electronic document circulation must be accompanied by changes in administrative habits, internal regulations, and professional responsibility. Digital transformation requires not only software, but also a new culture of document discipline.

Another important issue is information security. Higher education institutions work with sensitive data, including personal information of students and employees, financial documents, contracts, examination records, research materials, and internal management decisions. Cloud technologies increase accessibility, but at the same time they require strict cybersecurity mechanisms. Access rights should be differentiated according to position and responsibility. Important documents should be protected through authentication, encryption, backup systems, and digital signature verification. In this context, the university must balance openness and protection: documents should be available to authorized users, but closed to unauthorized access.

The economic aspect of cloud-based document circulation is also significant. At first glance, the implementation of such systems may require financial investment in software, infrastructure, staff training, cybersecurity, and technical support. However, in the long term, these costs can be compensated by reduced paper consumption, lower printing expenses, less need for physical archives, faster document processing, and improved productivity of administrative staff. For institutions preparing specialists in the digital economy, this creates an additional educational value: the university demonstrates in practice how digital tools can optimize organizational processes and improve resource management.

The introduction of cloud-based document circulation also supports managerial transparency. Since every document action can be recorded, the system strengthens accountability and reduces the possibility of uncontrolled delays or informal changes. This is particularly important in processes related to academic orders, student applications, contracts, financial approvals, and personnel management. Transparent circulation increases trust among employees and students because procedures become more predictable and traceable.

At the same time, implementation should be gradual and realistic. A sudden transition to a fully digital model may create resistance, technical errors, and confusion among users. A more effective approach is to begin with the most frequently used document categories, test the system in selected departments, collect feedback, improve internal regulations, and then expand the system to the

entire institution. Such a phased model allows the university to reduce risks and adapt cloud technologies to its actual administrative structure.

Thus, cloud-based electronic document circulation can become a practical mechanism for improving digital governance in higher education institutions. Its success depends on the integration of technology, legal support, cybersecurity, staff training, and managerial commitment.

Conclusion

The organization of electronic document circulation based on cloud technologies is an essential direction in the modernization of higher education institutions and the development of digital governance. The study shows that cloud-based document management creates new opportunities for improving administrative efficiency, reducing bureaucratic workload, accelerating decision-making, and strengthening transparency in institutional processes. For higher education institutions, especially economic universities, this approach is important because it connects technological modernization with practical principles of the digital economy, resource optimization, and data-driven management.

Cloud technologies allow universities to move from fragmented and paper-based document circulation to a unified digital environment where documents can be created, registered, approved, signed, stored, searched, monitored, and archived electronically. This process increases the speed of communication between faculties, departments, administrative offices, accounting units, and management structures. It also reduces the risk of document loss, duplication, informal delays, and uncontrolled changes. As a result, electronic document circulation becomes not only a technical tool, but also a mechanism for improving institutional discipline and managerial responsibility.

The research confirms that the effectiveness of cloud-based electronic document circulation depends on several interconnected conditions. These include reliable digital infrastructure, stable internet access, secure cloud platforms, internal regulatory documents, electronic digital signatures, clear access control, cybersecurity measures, staff training, and continuous monitoring. If these elements are not developed systematically, the implementation of cloud technologies may lead to partial digitalization, duplication of electronic and paper procedures, user resistance, and information security risks. Therefore, the

transition to cloud-based document circulation should be organized as a gradual and institutionally supported process.

An important result of the study is the identification of the economic and organizational benefits of electronic document circulation. The use of cloud technologies reduces paper consumption, printing costs, physical storage needs, and manual processing time. At the same time, it improves the productivity of administrative staff, simplifies the preparation of reports, supports remote work, and increases the accessibility of documents for authorized users. These effects are especially valuable in the context of higher education management, where timely and accurate information exchange directly influences the quality of academic and administrative decisions.

The successful implementation of cloud-based electronic document circulation also requires the development of digital culture. University employees should not perceive the system as an additional technical obligation, but as a practical instrument that simplifies work, improves control, and increases institutional transparency. For this reason, staff training, methodological support, user-friendly interfaces, and clear procedural instructions are necessary. Management support is equally important, because digital transformation must be coordinated at the institutional level and reflected in internal policies.

In general, cloud-based electronic document circulation can serve as a strategic mechanism for improving the quality of university governance. It supports transparency, accountability, flexibility, cost efficiency, and information security. In the conditions of Uzbekistan's digital development, the implementation of such systems in higher education institutions can contribute to the formation of modern administrative practices and strengthen the role of universities as active participants in the digital economy.

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