

## TRANSITION TO DIGITAL SERVICE THROUGH QR CODES

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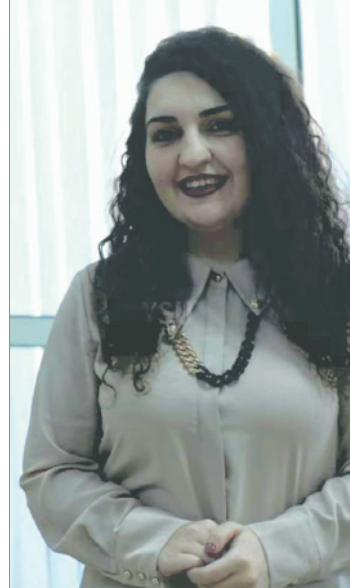
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*The paper examines the role of QR codes as a digital tool for improving service delivery. QR codes offer significant benefits: fast access to information, convenience, time efficiency, decision-making support, and reliable customer identification. These advantages make QR codes valuable for modern service systems, which must quickly adapt to constant change. The paper connects QR code implementation with the broader I-IT-ICT-ITGS concept, showing how information evolves — from simple data to global digital society. Integrating QR codes into service processes can help transition toward ITGS by enhancing communication, accessibility, and global information exchange.*

*The research concludes that QR codes can serve as an effective digitalization tool for improving service quality, increasing efficiency, meeting customer needs, and supporting the development of a digital society. With proper awareness and correct application, QR codes can play a key role in modern service systems across various sectors.*

**A** QR code (Quick Response) is a two-dimensional square matrix barcode composed of black and white pixels. These pixels are interpreted with the help of smart devices such as mobile phones or similar tools. By scanning the code, users can directly receive information about objects or access services on their mobile devices<sup>1</sup>. The encoded


<sup>1</sup> Senthil V., Singh A. K., Madhusudhan M., Application of Quick Response (QR) Code and its Usefulness in Library Services // Gas Turbine Research Establishment, DRDO, Bengaluru Dept. of Library and Information Science, University of Delhi, 2019, 12 pages



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information in a QR code is two-dimensional — both horizontal and vertical — unlike traditional barcodes that are one-dimensional. Therefore, QR codes can contain more information than barcodes<sup>2</sup>.

However, like all technologies, QR codes also have their advantages and disadvantages. Before implementing them widely in any field, it is necessary to thoroughly examine their essence, understand their potential, and identify possible risks. According to the German web-hosting company IONOS, the main advantages of QR codes are speed and functionality, while the key disadvantages involve invisible benefits and security risks.

Many factors may encourage people to use QR codes even when their use has limited practical purpose. In such cases, QR codes can quickly become gimmicks, and users may not interact with them. A QR code must be placed in a static location so the graphic image can be scanned. When placed on moving objects, such as cars, scanning becomes nearly impossible.

QR codes also carry potential security risks. In public places, QR codes can be placed or manipulated without authorization. Anyone who scans such a code may be exposed to a harmful URL, and at first glance it is difficult to determine whether the code is legitimate. Only by approaching the code closely can one see whether it has been tampered with.

In some Asian countries, QR codes have become part of daily life. Whether used for payments or accessing marketing materials, nearly everything is possible with QR codes. After the initial global hype, their popularity decreased in other regions of the world. Yet when used effectively, standardized processes —such as network access — can be significantly accelerated. They can also be beneficial for marketing campaigns<sup>3</sup>.

Research: A survey was conducted using an online questionnaire to assess how the population of the Republic of Armenia

perceives QR codes. A total of 116 respondents participated (100 females, 16 males), mostly aged 18–25, with higher education backgrounds.

According to the results, 92% of respondents were aware of QR codes. However, when asked what exactly they knew about them, most participants mentioned only basic functions and benefits, such as identification, efficiency, or access to information. Some responses incorrectly described QR codes as applications, links, or labels suggesting that the respondents lack a full understanding of what a QR code truly is. Therefore, before implementing QR codes more broadly, awareness-raising activities should be conducted among young people regarding the nature, content, need, and use of QR codes.

Most respondents (102 people) had used QR-code-based services, primarily related to the service sector: online libraries, payment systems, information retrieval, online stores (Wildberries, Menu.am), product authenticity checks, customer identification, and banking services. Only 8% of participants felt that QR codes are ineffective, mainly due to concerns about sharing personal data. The remaining 92% highlighted their effectiveness, noting that QR codes enable users to:

- Make decisions more easily
- Quickly access necessary information
- Complete payments faster and more simply
- Save time
- Increase convenience
- Access large amounts of information
- Make inaccessible data accessible
- Complete identification processes

However, several challenges were also identified by users:

- Scanning high-quality images sometimes can cause difficulties.
- Some smartphone operating systems do not support scanning directly through the camera, requiring additional applications.
- Respondents encountered cases where

<sup>1</sup> Senthil V., Singh A. K., Madhusudhan M., Application of Quick Response (QR) Code and its Usefulness in Library Services // Gas Turbine Research Establishment, DRDO, Bengaluru Dept. of Library and Information Science, University of Delhi, 2019, 12 pages

<sup>2</sup> Gambari, Stefano, Quick Response Code in Library Services, Italian Journal of Library Archives and Information Science, 2010, Vol. 1.,

<sup>3</sup> <https://www.ionos.com/digitalguide/online-marketing/online-sales/what-is-a-qr-code/>

QR codes were worn or damaged, making scanning impossible.

- Technical issues sometimes lead QR codes to display incorrect links instead of the required destination.

These obstacles can be addressed not only on local and national levels but also globally.

Thus, QR codes offer many advantages for application in the service sector. Considering that service is a rapidly changing system, QR codes are well suited for responding quickly to such changes. They are also highly versatile and can be used across various fields—from education to agriculture (e.g., for agricultural service delivery). Although QR codes have certain disadvantages and challenges, correcting them is feasible and generally low-risk. Nonetheless, unresolved issues may lead to significant consequences and serious harm to organizations.

From this perspective, QR codes can serve as a digitalization tool for improving service delivery. Their implementation can be viewed through the transition to the I-IT-ICT-ITGS concept.

Information acquisition, processing, preservation, and use have passed through

several stages, represented by the following concept: “I-IT-ICT-ITGS.”

- I (Information): In the first stage, the focus was on information itself. However, possessing information alone does not ensure understanding of a field or enable communication, which requires tools and technologies.
- IT (Information Technology): The second stage emerged to facilitate the exchange of accumulated information. However, this process was one-directional; the technology existed, but communication was still limited.
- ICT (Information and Communications Technology):<sup>4</sup> This stage emphasized communication, making information exchange a two-way process. Technical tools were developed that allowed users to access, store, transmit, interpret, and manipulate information. (See Figure 1 for ICT components.)

Although this stage seems complete, in the era of globalization, human activities require access to a global network. For this purpose, the concept of ITGS (Information Technology in a Global Society) was developed, meaning that people can obtain information



FIGURE 5

**Distribution of the European gross microloan portfolio by institutional type and sub-region<sup>5</sup>**

<sup>4</sup> Pratt M. K., ICT (information and communications technology, or technologies), Information Comprtance (ICT521), Namibia University of Science and Technology, 2019  
<sup>5</sup> <https://www.techtarget.com/searchcio/definition/ICT-information-and-communications-technology-or-technologies>

from anywhere in the world.

To ensure effective service delivery, information must be transferred to the customer according to this concept. That is, customers should not only receive services but also become active carriers of those services, which will subsequently increase customer flow. Many modern public administration systems aim to create a global society (ITGS), which, in our view, can be achieved through QR codes. Today, QR codes are one of the rare digital tools through which innovative ideas can be implemented and we can “think into the future.”

The research shows that applying QR codes in service can significantly improve its quality. Why specifically QR codes? The answer is clear: building trust is one of the biggest challenges in the service sector. QR codes create transparency, which in turn ensures reliability — an essential condition for high-quality service.

This raises the question: How should QR codes be implemented?

The effective use of this tool requires correct application — not merely focusing on the technical component, but also on the technological one. QR codes must not be viewed only as technical symbols but as a technology that supports service processes. Many researchers study the structure of QR codes, but few explore their content. To properly apply them in service, it is necessary to identify their content, define the problem and purpose, then determine relevant areas of application, and only afterward implement QR codes in service delivery.

If these conditions are met, we will achieve a digitalized service system that increases efficiency, improves service quality, better satisfies customer needs, and ultimately contributes to the creation of a digital society. This will promote the development of a global information environment within the service sector — enhancing informational interactions, increasing access to global information resources, and fulfilling people’s needs with informational products and services.

Conclusion: As the research demonstrates, ensuring diversity in any environment

creates opportunities for customers to make choices. The variety of ICT tools in the service sector provides these opportunities. Each field chooses the most effective form of information technology for its needs, and in recent years — especially due to factors such as the pandemic — digital technologies have become the most widespread.

Digital progress can accelerate the achievement of all 17 Sustainable Development Goals — from poverty reduction to lowering maternal and child mortality, promoting sustainable agriculture, decent work, and universal literacy. Digital tools can be used almost everywhere: agriculture, industry, construction, healthcare, education, and more. However, they are used most extensively in the service sector.

Service activity without information technologies — especially without digital technologies — is unimaginable. The 21st century is the era of digitalization, and digital technologies have become essential for ensuring efficiency. In service provision, it is often stated that “it is better not to provide a service at all than to provide it poorly.” High-quality service requires continuous improvement, and the best means of achieving this is digitalization. In the 21st century, high-quality service is increasingly associated with digital service.

Considering all this, the aim of our research was to identify the need for digital technologies in service, their potential during the service delivery process, and the implementation of the I-IT-ICT-ITGS concept through QR codes — in other words, the transition from simple information provision toward the formation of a digital society. The results suggest that the research objective has been achieved.

In summary, our findings show that service is a rapidly changing system, and QR codes are well-suited for responding quickly to these changes. Many modern public and private governance systems aim to create a global society (ITGS), which can be achieved through QR codes. Digitalized service will increase efficiency, improve service quality, satisfy customer needs, and help create a digital society that supports global information exchange and access to informational resources and services.

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## Մարիամ ՏԱՇՅԱՆ

ԵՊՀ դասախոս, ՀՊՏՀ քոլեջի դասախոս

ԿՐԹՈՒԹՅՈՒՆ, ՆՈՐԱՐԱՐՈՒԹՅՈՒՆ, ԳԻՏԵԼԻԲ

## ԱՆՅՈՒՄ ԹՎԱՅԻՆ ՍԵՐՎԻՍԻ՝ ՊՐ ԿՈՂԵՐԻ ՄԻՋՈՑՈՎ

Հոդվածում ուսումնասիրվում է ՊՐ կոդերի կիրառումը որպես թվային գործիք՝ ծառայությունների մատուցման արդյունավետությունը բարձրացնելու և կազմակերպություններում գործընթացներն օպտիմալացնելու նպատակով: ՊՐ կոդերը ապահովում են տեղեկության անմիջական հասանելիություն, օգտատիրոջ հարմարավետություն, ժամանակի տնտեսում, որոշումների ընդունման օժանդակություն և հաճախորդների վստահելի նույնականացում՝ դառնալով կենսական բաղադրիչ ժամանակակից փոփոխվող սերվիսի պայմաններում:

Աշխատանքում ցուցադրվում է ՊՐ կոդերի ինտեգրումը I-IT-ICT-ITGS հայեցակարգի շրջանակներում՝ արտացոլելով տեղեկատվության զարգացումը պարզ տվյալներից մինչև զլորալ թվային հասարակություն: ՊՐ կոդերի նպատակային ներդրումը ծառայությունների մատուցման գործընթացում կարող է նպաստել տեղեկատվության փոխանակմանը, հաղորդակցության և հասանելիության բարելավմանը՝ հեշտացնելով ITGS իրականացման գործընթացը:

Հետազոտության արդյունքում պարզվում է, որ ՊՐ կոդերը, որպես թվայինացման արդյունավետ գործիքներ, բարելավում են ծառայությունների որակը, բարձրացնում համակարգերի արդյունավետության մակարդակը, բավարարում հաճախորդների պահանջները և նպաստում թվային հասարակության զարգացմանը: ՊՐ կոդերի կիրառումը անհրաժեշտ նախապայման է ժամանակակից ծառայությունների արդյունավետ կառավարման և նորարարական գործընթացների իրականացման համար:

**Հիմնաբառեր.** ՊՐ կոդ, I-IT-ICT-ITGS հայեցակարգ, թվային ծառայություն, զլորալ թվային հասարակություն

## Մարիամ ՏԱՇՅԱՆ

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## ПЕРЕХОД К ЦИФРОВЫМ УСЛУГАМ С ПОМОЩЬЮ QR-КОДОВ

В статье исследуется применение QR-кодов как цифрового инструмента, направленного на повышение эффективности предоставления услуг и оптимизацию процессов в организациях. QR-коды обеспечивают мгновенный доступ к информации, удобство для пользователей, экономию времени, поддержку принятия решений и надежную идентификацию клиентов, что делает их жизненно важным компонентом в современных, динамичных условиях предоставления услуг.

В работе демонстрируется интеграция QR-кодов в рамки концепции I-IT-ICT-ITGS, которая отражает развитие информации — от простых данных до глобального цифрового общества. Целенаправленное внедрение QR-кодов в процессы предоставления услуг способствует улучшению обмена информацией, коммуникации и доступности, тем самым облегчая реализацию ITGS.

По результатам исследования установлено, что QR-коды являются эффективным инструментом цифровизации для повышения качества услуг, увеличения эффективности систем, удовлетворения потребностей клиентов и содействия развитию цифрового общества. Применение QR-кодов является необходимым условием для эффективного управления современными услугами и реализации инновационных процессов.

**Ключевые слова:** QR-код, концепция I-IT-ICT-ITGS, цифровая услуга, глобальное цифровое общество