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INTELLIGENTALIZATION OF BUSINESS PROCESSES IN TRADE

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Аннотация
Savdoda xizmatlar ko'rsatish jarayonini intellektuallashtirish imkoniyatlari ko'rib chiqilmoqda. Modernizatsiya qilingan o'z-o'ziga xizmat ko'rsatish kassasining tavsifi berilgan. Xarid qilish jarayoni uchun to'lovning samaradorligi ikkita texnologik jarayonning qiyosiy tahlili misolida ko'rsatilgan. Yangi to‘lov tizimining xususiyatlari va xaridlar uchun to‘lov biznes-jarayonini qo‘llab-quvvatlash uchun tizim intellektualizatsiyasini amaliy qo‘llash misoli keltirilib, uning afzalliklari aniqlangan. Qayd etilishicha, zamonaviy axborot-kommunikatsiya texnologiyalari asosida amalga oshirilayotgan intellektualizatsiya zamonaviy raqamli iqtisodiyotni modernizatsiya qilish va innovatsion rivojlantirishning zarur shartidir.

Аннотация
Рассматривается возможность интеллектуализации процесса услуг в торговле. Дается описание модернизированного self-service кассового аппарата. Показана эффективность процесса оплат за покупку на примере сравнительного анализа двух технологических процессов. Приведены особенности новой системы оплат и пример практического применения интеллектуализации системы для поддержки бизнес-процесса оплаты покупок и определены ее преимущества. Отмечается, что интеллектуализация, осуществляемая на основе современных информационно-коммуникационных технологий является необходимым условием модернизации и инновационного развития современной цифровой экономики.

Abstract
The possibility of intellectualizing the process of services in trade is being considered. A description of the modernized Self-service cash register is given. The effectiveness of the payment for purchase process is shown using the example of a comparative

analysis of two technological processes. The features of the new payment system and an example of the practical application of system intellectualization to support the business process of paying for purchases are given and its advantages are identified. It is noted that intellectualization carried out on the basis of modern information and communication technologies is a necessary condition for the modernization and innovative development of the modern digital economy.

Kalit so'zlar
axborot texnologiyalari, intellektual tizimlar, biznes jarayonlarni intellektuallashtirish, self-service kassa terminali, operativ-tahliliy ma'lumotlarni qayta ishlash, savdo sektori, chakana korxonalar, mijozlar tajribasi.

Ключевые слова
информационные технологии, интеллектуальные системы, интеллектуализация бизнес-процессов, self-service кассовый терминал, оперативно-аналитическая обработка данных, торговый сектор, предприятия розничной торговли, клиентский опыт.

Keywords
information technology, intelligent systems, intellectualization of business processes, cash terminal, self-service cash register terminals, operational-analytical data processing, trade sector, retail enterprises, customer experience.

Introduction

As is known, the main challenges of the 21st century are the growth of volumes of heterogeneous data, increased competition, the introduction of new information technologies in all spheres of society, and the high speed of changes in the external environment. Therefore, the success of any organization depends on the speed of reaction to these changes - effective management of these changes. One of the areas where this trend can be realized is trade enterprises. The development of information technology makes it possible for these enterprises to modernize business processes in order to increase their competitiveness. Therefore, modernization of the trade sector, which is a component of the digital economy, is an important task.

An important direction in the development of information technologies at present is their intellectualization. The development of intelligent enterprise information systems is closely related to the field of artificial intelligence, which refers to the science and technology of creating intelligent computer applications that support business process performers in an enterprise [1-6].

Literature review

In the process of working on the article, scientific works were reviewed that addressed the issue of intellectualization of information technology. The works of both foreign and domestic scientists such Liu Hongzhe, Liu Meng, Fu Kai. , Zhong Huizhi, Peng Gaoxiang, Zhang Wen, Yan Baining, Zhang Wei, Zou Yanbi, Чегодайкин А and etc. A review of the literature showed the importance and timeliness of the problem of intellectualization of information technologies, and

made it possible to identify important areas of intellectualization and practical solutions.

Methodology

The research methodology is a set of steps that must be performed in a certain sequence. So, the first stage is related to defining the problem. Then it was necessary to collect and systematize information about this problem, to create the basis for the theoretical and practical basis of the article. The collected material made it possible, based on analysis and synthesis, to draw conclusions and create solutions related to the problem. Next, a practical implementation for these solutions was proposed. This research methodology is aimed at providing individual solutions for organizations in terms of intellectualization of information technologies and systems, highlighting the main and most important areas for their stable and effective development.

Main part

A significant expansion of the volume of initial information and the list of tasks to be solved in the context of a more complex external environment has led to the need to change methods for solving them. In these conditions, not only data and information about the analyzed processes are required, but also expert assessments based on experience, as well as the determination of relationships between the initial data.

The need to effectively solve such problems was stimulated by the development of new intelligent information technologies and systems, namely, information collection tools, methods, algorithms and programs for operational-analytical data processing, forecasting and assessment of the processes under study, making tactical and strategic decisions.

The main functional components of the information systems under consideration are the subsystems: collection, accumulation and preliminary processing of data from the external environment, systematization, structuring and storage of data (electronic information resources), operational intellectual analysis and assessment of the current and predicted states of the processes under study, decision support, interface for users, as well as a communication subsystem for interaction with information systems of other organizations and corporations: suppliers, shareholders, investors and other interested parties.

Such systems allow a more in-depth analysis, forecasting and assessment of conditions and make decisions adequate to the analyzed situations at the strategic and tactical levels. Such systems have begun to be actively developed and used in all areas, and the trade sector is no exception.

Let's consider the example of a self-service cash register, which, using specially developed programs, allows for pattern recognition, which then, in the form of data, enters a data warehouse and is analyzed, i.e. is a data collection subsystem. Using the example of a comparative analysis of technological payment processes, the advantages of the new device are shown.

Self-service cash register is an emerging retail format. It originated from the application of self-service settlement terminals with cash modules and bank card modules produced by German company WINCOR NIXDORF in supermarkets. Without changing the structure and operating mode of the store, the self-service cash

register terminal not only plays a fast and convenient role in cash register settlement, but also has good value in improving the quality of retail enterprises, consumers' experience of technology shopping, improving the economic efficiency of enterprises, and convenient and fast payment.

Let's look at the main features of a cash register terminal [2-6].

1) Self-service cash register terminals improve the level of retail enterprises and enhance the consumer experience

High-end shopping malls and supermarkets are reflected in providing consumers with an elegant shopping environment, colorful product trials and readily available product education. As well as details such as beautiful, distinctive and creative product display. Today's consumers are more about demonstrating their pursuit of a higher quality of life. The cash register link is a very important customer experience and transaction link in shopping malls and supermarkets. Traditional cash register consumers face the opposite side of the cash register, and there is a sense of distance; after the cashier prints the receipt, the goods must be checked one by one, and there is a lack of trust. The self-service cash register terminal can not only reduce the cash register pressure of the cashier and reduce the waiting time in line, but also has a strong sense of technology, which can satisfy customers to enjoy the experience of using high-tech self-service.

2) Self-service cash register improves operational efficiency and creates good economic benefits.

Self-service cash register terminals are generally introduced in a mixed mode with traditional cash register. The use of self-service cash register terminals can improve the operating efficiency of retail enterprises; it can save cashier labor costs and create good economic benefits.

For comparison, we present the technological processes of paying for a purchase using a Manual cash register and a Self-service cash register.

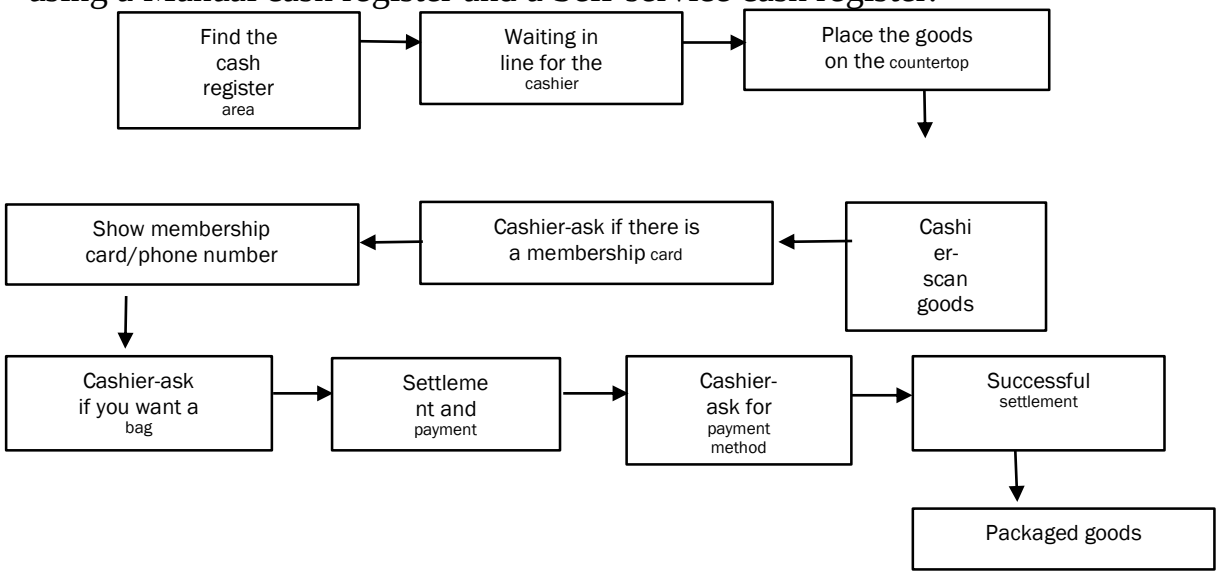
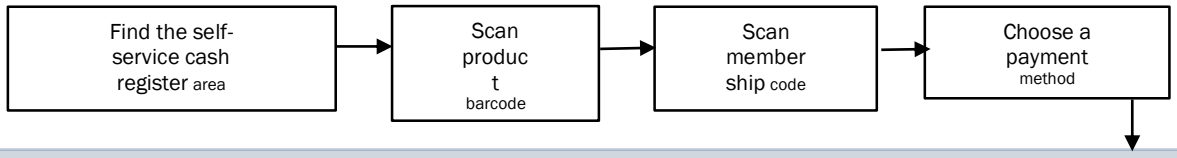


Figure 1. Technological process of payments using a manual cash register



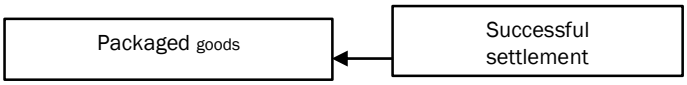


Figure 2. Technological process of payments using a self-service cash register

As the figures show, if in the first case the process consists of ten steps, then in the second - the number of steps has decreased by two.

3) Self-service cash register is conducive to new business development and full scene coverage function

The screen of the self-service cash register terminal is not just a simple cash register and bookkeeping function. It has the characteristics of large screen, high integration, and capacitive touch screen. Due to the large display screen of the self-service cash register terminal, it is generally between 21 inches and 32 inches, which is a good advertising medium. Full-screen advertising can be played when there is no cash register for settlement; full-screen advertising can be controlled by the cloud. Different personalized advertisements are sent at different times, in different shopping malls or supermarket locations; and the advertising content can be accurately delivered to different shopping groups at different times. Generally speaking, commodity suppliers in shopping malls and supermarkets have a strong interest in placing new products and promotional advertisements on self-service cash register terminals. Many shopping malls and supermarkets can easily obtain considerable economic benefits without even having to look for advertising customers.

4) Self-service cash register can easily respond to a variety of payment needs of consumers, and payment is convenient.

Payment is an indispensable and ultimately the most important part of the transaction. In recent years, Internet technology has developed rapidly. With the maturity and diversification of third-party payment platforms, its service scope has been continuously expanded, and it has established a very close connection with the lives of consumers. Payment methods are also constantly innovating. The traditional cash and credit card collection model is far from meeting the needs of consumers.

The self-service cash register terminal has a binocular camera with face recognition and a two-dimensional code scanning platform; in addition, some self-service cash register terminals have external bank card payment terminals. Because the self-service cash register terminal has the above modules, it can easily support multiple payment methods.

The arrival of self-service cash register terminals has led to a significant increase in the per capita efficiency output of retail enterprises, and ultimately achieved the goal of improving shopping efficiency, reducing labor costs, and improving the customer experience!

The content of the business payment process based on intelligent technologies is as follows.

To meet the needs of combined payment, the system should submit product information and payment step by step. Pay for information. The product information contains the barcode and quantity of the product purchased by the customer. Customers buy enough things, this may be a lot of data. After completing the

electricity before sub-or cash payment, these data are uploaded to the server first, because once the payment is made, the data is uploaded to the server. Upload the data after payment. If these data are lost during the upload process, it is possible can be permanent.

Therefore, the order information, including the product barcode and product quantity, should be submitted to the server first. After the server receives the commodity information data, it saves it to the database and generates the order number. The order number is returned to the cashier terminal, and the cashier terminal submits the payment information. The payment information is first sent to the merchant server, which is forwarded by the merchant server to the third-party payment server, and finally the payment result is gradually returned. The data submission process is shown in the figure 3.

In order to make the transmission of data more lightweight and concise, the system uses JSON data as the data transmission format.

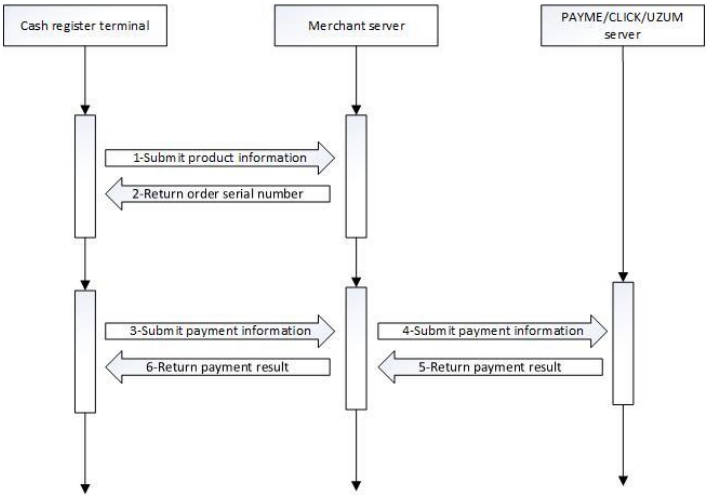


Figure 3. Processing of data

JSON is a lightweight data exchange format. Its concise and clear hierarchical structure makes JSON an ideal data exchange language, easy to read and write, and easy for machines to parse and generate, which can effectively improve network transmission efficiency. The JOSN data format of product information is shown below.

```
{
“bar_code”:”231241”,
“amount”:3
},
{
“bar_code”:”731241”,
“amount”:5
}
]
```

The cash register terminal queries product information by scanning the barcode, and uses an array to save product information. When submitting the order

information, the array is first serialized into JSON data, and then uploaded to the server. After the server receives the data, it is deserialized and then saved to the database. The data processing is shown in the figure 4.

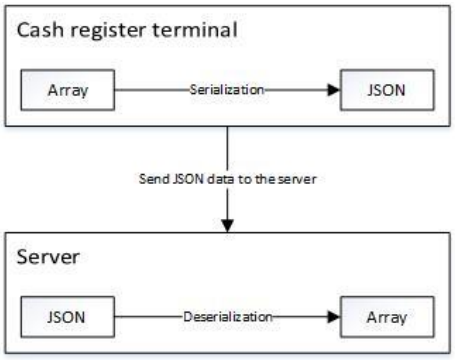


Figure 4. Third-party platform payment

The system has submitted the product information before payment. After the product information is successfully submitted, the server will return the order number of the order. The order number is a unique string of the system generated by the server. When paying, three kinds of data must be submitted to the server, namely the order number, payment amount, customer payment code and salesperson number. The payment process is shown in the figure 5.

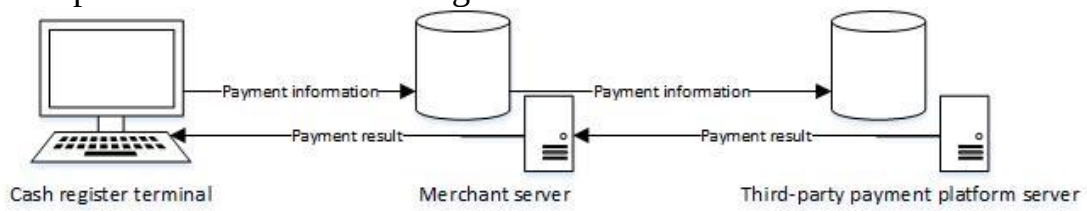


Figure 5. The scheme of the order process

The key code for submitting payment information is shown below. When the payment result is returned to the cashier terminal, the on response method will be called if the payment is successful, and the On Failure method will be called if the payment fails. The cashier terminal processes the corresponding logic in two callback methods.

```
Call=apiService.paymePay(payCode,orderID,sellerID,mondy);
Call.enqueue(new Callback(){
@Override
Public void onResponse(Call call,Response resonse){
        // The logic of successful payment processing
}
@Override
Public void onFailure(Call call,Throwable t){
        // The logic of processing payment failures
}});
```

Conclusions

Artificial intelligence has long been a breakthrough technology that allows businesses to remain competitive in the market. These enterprises also include trading enterprises. The implementation of intelligent systems to support business processes of payment for purchases will allow:

improve the quality of customer service;
increase operational efficiency and create economic effect;
promote the development of new types of business;
easily respond to different payment needs of consumers;
ensure a given level of reliability of the outputs of the intelligent system.

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