DESIGN AND IMPLEMENTATION OF ELECTRONIC PAYMENT SYSTEM IN THE SPECIFIC CASE STUDY

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Abstract: The aim of the article is to present the methodology, components, the benefits of introducing an electronic payment system in the specific case study. Through the case study, we attempt to prove the hypothesis, to show the system of electronic payments, required computer equipment, ICT infrastructure, information system and the benefits that such a system of electronic payments has made. The advantages are shown in economic, technical, social aspects regarding all the participants in the exploitation of this system.
Keywords: Electronic payment systems, Information system, ICT project, Computer network, Implementation.

INTRODUCTION

The installation of the electronic payment system can provide a number of benefits for all participants in this process. The system of electronic payment of meals in the RMU "Banovići" d.d. Banovići covered the entire process from the receipt of goods in the central warehouse to issuing the goods or ready-made meals to workers in restaurants. RMU Banovići has 9 restaurants where employees have the opportunity to purchase a meal, which is associated with the sector that made the purchase, storage, preparation and distribution of meals. The introduction of the electronic payment of meals required the following activities:

- Supply and installation of necessary computers and computer equipment;
- Supply and creation of a computer network between computers and peripheral equipment;
- Creation and implementation of an information system for electronic payment of meals and establishing the necessary communication with other information systems;
- Entering the required information, testing, training, and commissioning;

The system is designed so that those in charge can check the state of goods in restaurants via the Internet or local network. The transition from the present system of payments of meals using the meal vouchers to the system of electronic payments with credit cards was initiated due to the emergence of counterfeit meal vouchers, the problem of rounding and purchases for a total price of the voucher, problems with reporting, accounting, analysis and control which was time-consuming and required additional human resources. The aim of introducing electronic payments is to eliminate the previously mentioned problems and disadvantages of the previous methods of payment and provide cost savings, better control, analysis, timely information which is a prerequisite for better management and decision-making.

DESCRIPTION OF THE ELECTRONIC PAYMENT

The new system of payments of meals with credit cards instead of meal vouchers involves using RFID cards, which are less prone to damage, stains, and do not need to be physically brought into direct contact with the card reader (it is possible to use them in a protective film hung on the neck or in the wallet).

Personnel affairs officers compile the lists of wages and fill the wages ledger. The wages ledger certified by technical executives, department managers, and other authorized persons is delivered to accountants. Using the information form the wages ledger accountants write the hours for the payroll and automatically enter the corresponding amount of money on the card for paying the meals through a central database. There is a possibility that personnel affairs officers at the facilities load the appropriate amount of money on the card which would accelerate the process of loading the cards for about five or six days.

Central warehouse 'Standard and Services' receives goods from a supplier on the basis of delivery notes which are the basis for making receipts. Upon the receipt of goods, each item gets its own code with the corresponding bar code that is recorded on Receipts, which are generated by a computer. After checking the quality and quantity of

goods the storekeeper certifies the receipt and verifies it in the computer program. This system would electronically connect the warehouse and material accounting which would result in the automatic receipt of the stock (without an unnecessary and slow transmission of documents, and physical input) and the automatic removal from the stock. A simplified diagram of the system of electronic payments is shown in the following figure.

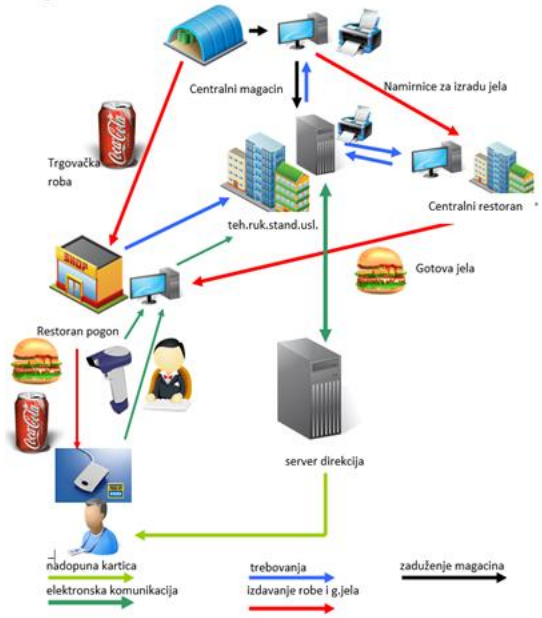

Figure 1. The system of electronic payments of meals

The restaurant manager electronically issues a requisition for goods from the central warehouse and electronically forwards it to the technical manager of the Standard and Services by using the application similar to an e-mail which approves the requisition and the automatic forwarding to the central warehouse. On the basis of the received approval by the technical supervisor OJ Standard and Services manager the warehouse manager electronically issues a requisition for the distribution of goods to a certain restaurant. This requisition also has its physical form signed by a storekeeper.

The warehouse manager uses a program to send an electronic document about the restaurant's debt and a written document to the restaurant manager. By checking the consignment the restaurant manager confirms the receipt with YES or NO by using the software and his signature of the accompanying document, which automatically includes accounting entry in the commodity program for accounting.

With the arrival of the user to the cash desk and the selection of merchandise the restaurant employees through an adequate system of entry (bar code reader) issue the goods to customers, who complete the order by bringing their "contactless" card to the reader and receive the bill which contains the information about the quantity and type of the merchandise and the amount of money left on their cards.

Barcode reading of the food items issued to the employees automatically eliminates those goods form the stock. The turnover is recorded by the facilities cross-check officers in OJ Standard and Services.

The committee that carries out a regular or non-regular listing of goods in restaurants, takes the stocks statement at the restaurant electronically from the cash box. The committee makes the list of the goods found in the stock adding the information about the quantity and type of goods remaining in the restaurant. These documents are submitted to the facilities cross-out officer in OJ Standard and Services, who then performs the cross-check and makes the minutes that are later submitted to the company's accounting service.

The write-off of goods is recorded through the computer module in the program with the standard procedure and documentation.

Integration into a single system enabled us to control the process of feeding of the employees, each step between business activities and to have the possibility of keeping records and doing analyses.

Some of the reports that are created are:

- turnover (daily, monthly, semi-annual, annual)
- the current state of the stock in restaurants,
- exact amounts of the ingredients used for the preparation of the meals,
- monitoring requested and less required food - reducing write-offs due to the expiry date,
- monitoring of expenditure by the amount and type of goods at factories, for months - planning supplies,
- other reports required by the management.

In case of losing electronic cards, or their permanent damage they can be replaced without employees losing the amount of money on the cards. As in the case of ATM cards a new card is issued with the same name, with no possibility of the parallel use of the canceled card and the current card.
When the employee in charge is informed about the loss of the card he/she performs the necessary procedure, i.e. cancels the lost card and issues a new card.
The system administrator can choose an automatic or manual mode of protection and backup of data about input and output transactions for specific periods.

ICT INFRASTRUCTURE AND INFORMATION SYSTEM OF ELECTRONIC PAYMENT

Electronic payment is realized in two stages when the implementation of ICT equipment is concerned. The first phase is the purchase of computers and computer and network equipment, installation of computers, computer equipment, and computer networks. ICT infrastructure is shown in the following figure.

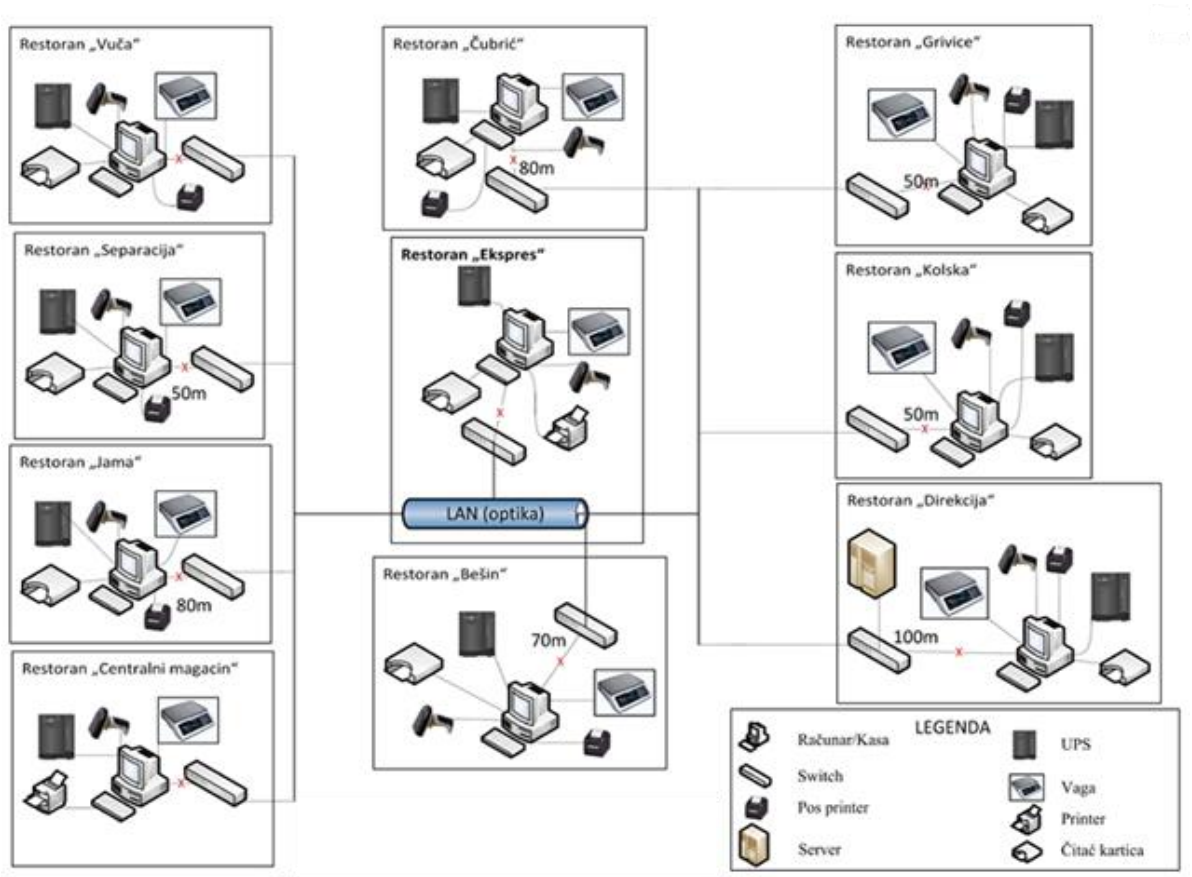

Figure No.2. ICT infrastructure system for electronic payment of meal allowances

The system infrastructure for electronic payment of food allowance includes the following elements:

1. Information technology
   - HARDWARE
     - Cards
     - Computers
     - Card Readers
     - Server
     - Various network equipment
   - SOFTWARE
     - Software for Monitoring Central Unit, the central restaurants, and the facilities restaurants
     - Operating system
     - Additional service applications
2. Human resources
   - Employees in the system
   - storekeeper
   - Supervisors of the restaurants
   - Other employees in the OJ Standard and Services
   - CUSTOMERS - WORKERS
   - Employees of RMU "Banovići" d.d

The scheme in the Figure No. 2 shows the computer - communication network and the elements necessary for the implementation of electronic charging of meals. The scheme shows all the facilities and their restaurants which run the service of providing meals, with all the elements necessary for electronic charging of the meals, a place to store and centrally manage all data and information system (Server) located in the Directorate, and all the necessary network infrastructure for the whole system to function successfully. The scheme is shown in a manner that optics is taken as the communication medium because there is a project of the optical linking of RMU Banovići in the unique information - communication system the first stage of which is realized and it networked all the facilities, and thus the restaurants except for the restaurant and the central warehouse in OJ "Standard and Services" that were networked later.

The objective of the optical networking of the facilities of the company RMU Banovići is the implementation of high-quality communication structure that should allow the implementation of a series of information and communication services at the level of the mine, and which is aimed at improving management of the company, as well as the costs, increasing the number of IT services to be used by all employees in the RMU Banovići for a longer period of time. In order to achieve a full automation of the process of charging it was necessary to replace the existing scales with the digital scales.

The proper integration of these elements set up a system that enabled employees to achieve a better meal service, and the mine to optimize the cost and increase the quality of services.

The information system of the electronic payments of meals consists of applications for monitoring of the Central Unit, the central restaurants and restaurants in the facilities, which are installed and configured on a single server. In addition to these applications, the application for the entry of wages was also created. These above-mentioned applications are created on the basis of one database. User segment application is installed on each computer on which the individual processes input, verification, reporting, and payments are made. The information system is connected with the business information system for accounting and warehouse operations. Application part is developed C # and the base in Microsoft SQL Server.

The system of data protection is realized through access levels and the security settings on the firewall. Updating the data is done timely, and in the case of failure on a computer network, i.e. unavailability of the server, a special application is activated, which is immediately after the establishment of a link synchronized with the base on the server and performs a differential backup.

Applications of the information system are located in various locations in all the OJ Mine, where the restaurants are, as well as applications to enter working hours. In addition, most of it is located in the Directorate where the servers with the necessary equipment are and where there is a base with all applications of the information system. A number of applications related to planning, supplies, storage, analysis and supporting documents are installed on computers in the OJ Standard and Services.

The information system is stable and it is being operated in the last four years without any problems recorded.

DISADVANTAGES OF THE PRIOR SYSTEM OF MEALS PAYMENT

The main motive for the implementation of a system of electronic payments of meals is a forgery, abuse, and deterioration of meal vouchers. There are some other disadvantages as mentioned below:

- Fixed price of a meal voucher (impossibility of giving change),
- Frequent unrealistic calculation of the goods,
- Losing meal vouchers,
- Tearing meal vouchers,
- The crowd at the time of distribution of meal vouchers,
- The inability to efficiently monitor the movement of goods (by hand),
- Reduced possibility of optimization of supplying processes,
- Possible errors (counting about 2,000 meal vouchers per day),
- Providing on credit (creating the problem in the financial monitoring of the employees' food costs).

Solving the problem of charging the meals without the integration of all parts would be incomplete and inefficient business because the integration of IT, in this case, gives a pragmatic possibility of "cheap" and not very complex, feasible and complete connection of the entire food system of the employees in RMU "Banovići" d.d. Banovići.

ADVANTAGES OF THE ELECTRONIC PAYMENT SYSTEM OVER THE CURRENT PAYMENT SYSTEM

Meal vouchers have long been an inevitable segment for the employees of RMU "Banovići" d.d. as the personification of the mine and the miners, but with improved technology scanners and printers meal vouchers have become the subject of illegal actions and means of trade and smuggling, and therefore it was necessary to look for an alternative solution.

The system of charging meals via electronic cards is a logical solution that replaced the use of meal vouchers around the world. First of all, because each employee is given an electronic card the possibility of any kind of abuse is reduced to a minimum. By monitoring employees' needs and taking care of their fulfillment we increase employees' satisfaction and optimize the supplies in accordance with the wishes of our employees. Thereby we achieve a greater productivity and cost savings in the write-off of "undesirable" goods.

By providing visual elements of belonging to RMU "Banovići" d.d. Banovići (card with the name and a photograph, the facility and workplace, hanging on the neck) affects the psychological sense of belonging to the company.

The connection and integration of the "System for charging meals" in the IT system of the mine, which every month becomes more complicated and more complex, we get the possibility of realistic and accurate monitoring, spending and planning of the volume of supplies, as well as the dynamics and quality of supplies purchases.

By integrating into existing accounting programs we can achieve a greater degree of fairness of the financial results from month to month and we can check their status more easily at the level of the day, month, quarter, etc.

The cards provide maximum security because each card has its own "code" that is generated in the production process of the card so that no two cards in the world can be identical.

Providing the workers with e-cards and linking them with the employees' names and personal passwords gives the possibility of the complete control of activities of employees during working hours (control of entering and exiting, working in the machines, and using computers, printers, etc.). The features listed are presented only as a possibility of being used in the future.

Experience from the implementation of this system and its development have provided the experience and forms which can serve as the basis for the possible computerization of all business activities of other warehouses and their integration in the material accounting for which certain initiatives already exist. This would make significant savings in the development of the system of connecting the warehouses because the business information system of issuing goods from warehouses to restaurants is done in almost the same way.

Some of the benefits that employees get from the introduction of electronic payments for meals:

- A fair charge,
- Automatic entering of the amount on the card,
- Adapted choice of food based on the research

- Clear expenditure monitoring,
- The possibility of exceeding the specified amount,
- If the card is lost a new card can easily be issued...

The investor (the mine) has achieved the following benefits from the introduction of electronic payment of meals:

- The inability of forging cards,
- Saving money, time, resources,
- Automatic notification of the number of meal vouchers,
- Monitoring the number of ingredients for meals,
- Monitoring the restaurant,
- The inability of abuse - smuggling,
- Stock control,
- Output recapitulation (by day, in shifts)
- Facilitated lists ...

CONCLUSION

The example of the case study enabled us to realize that the implementation of the electronic payment system of meals is related to the implementation of projects in the field of ICT infrastructure, information systems and related equipment, and other programs related to the process of the electronic payment. All technical segments were developed so that there are no risks in the process of implementation.

Economic and social justification is displayed through the elimination of the disadvantages of the present system of payment, as well as by providing a range of benefits that can make the savings and profit, and through other benefits for all the parties involved. Based on all the facts related to the case study that was presented it was found that the electronic payment of food allowance is technically feasible, economically and socially justified.

The article has confirmed the hypothesis. With the introduction of an electronic payment system, we have achieved savings, higher profits, faster and better service, protection of the system and user system, better planning, analysis and control in the function of the aforementioned objectives and results.

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