

# **ORGANIZATION IMPROVEMENT USING IT SYSTEMS TO SUPPORT THE HANDLING OF CASH REGISTER SERVICE COMPLAINTS**

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**Abstract:** The article describes the problem of handling service complaints connected with cash registers manufactured for the needs of the retail branch. The improvement solution proposed by the author is to implement an IT system to support the recording of reported complaints and follow the process of IT system implementation. The collected data enabled determining the casual link between the variables of selected characteristics. The conclusions based on observation confirmed the effectiveness of the proposed solution. The increased effectiveness was achieved by focusing the company's activities on satisfying the clients' needs and fulfilling their expectations.

**Keyword:** fiscal device, complaint, application handling

## **1 Introduction**

Clients are increasingly aware of their privileges in terms of consumer rights and interests protection [2], [5]. The producer's liability for the product contributes to the undertaking of actions which influence the safety of products placed on the market. However, the increasing degree of product complexity and the advancement of technological production process increases the risk related to product defects.

Complaints [1] always involve an uncomfortable situation for the buyer. Proper complaint handling may strengthen the client's loyalty and a positive image of the company. A satisfied client is a guarantee of profits, so the condition for success is developing plans of the company's activity which take clients' opinions into consideration. Improvement actions implementation in an organization is supported by a quality management system, compliant with ISO series 9000 standards [11], [12], [13]. As improving the customer service standards means adjusting the company's business processes to the needs of the environment, an important task faced by firms is monitoring buyers' satisfaction and an effective use of collected information. One of the methods for evaluating customer satisfaction is analysis of the complaint procedure [10]. The complaint management system is an integral part of the quality management system. It plays a key role in the improvement of provided services' quality. It is a source of information regarding the effects of the production activity. Consumers' comments can not only initiate the streamlining of the complaint procedure,

but they can also provide inspiration for the directions of product development and manufacturing process improvement.

In the area of complaint procedure, the most important issue from the buyer's point of view is the effectiveness of undertaken service actions, promptness of response to a notification as well as the manner of communicating. For the seller an important thing is monitoring the progress of service works and eliminating the causes of customer dissatisfaction. From the producer's point of view, the complaint management system should ensure the possibility of analysing the collected data which describes quality nonconformities, accounting for among others the frequency of events, the type of machines or the conditions of use. Proper interpretation contributes to identifying the sources of failures, streamlining the manufacturing process as well as decreasing the number of non-conforming products. For each of the subjects participating in the complaint procedure an essential issue is efficient exchange of information.

The acquisition and transmission of data using IT tools support not only the subjects' communication and coordination of activities, but also the management of complaint handling scenarios. A scenario is a pattern of behaviours. Its developing requires defining the sequence of tasks and appointing the participants. Due to the final usefulness of the solution, scenario modelling should take into account factors which influence the effectiveness of service works' completion as well as the effectiveness of the collected data. Particular scenarios can be dedicated to various merchandise assortment groups, the types of nonconformities or even single stakeholders.

## 2 Previous research

Quality nonconformity also applies to cash registers, otherwise known as fiscal devices. They are used in retail to register the turnover and sums of tax due. The obligation of using cash registers results from the Goods and Services Tax Act [6] and the regulation on exemption from the obligation to keep a record if cash registers are applied [7]. The use of a cash register requires entering the device in fiscal controls and registering in a revenue office [9] as well as subjecting it to periodical technical inspections [7], [9]. The terms of organising and performing service activities for cash registers are specified in the regulation [8]. It provides a definition of a subject running the main service and a subject in charge of authorized service; it also specifies service technicians' obligations and the manner of documenting the conducted service works. The legal aspect of the issue has been described in detailed in the publication [3]. In the study also, the stages of technical intervention carried out by an authorized cash register service point have been presented. They include the following [3]:

- recording a reported complaint as well as assigning responsibility and the case classifier;
- verifying the legitimacy of the complaint and carrying out maintenance or repair works;
- preparing a cost estimate of service works and a settlement of the reported complaint;
- issuing a decision on the case, closing the reported complaint.

The collected knowledge allowed mapping the logical relationships between process participants and recording the effect of work in the form of a collaboration diagram in BPMN 2.0 [3]. The research continuation was developing a conceptual model enabling the recording and handling of reported service complaints, run by an authorized fiscal devices service point. The model diagram has been presented in the publication [4]. The need for designing a tool to support the complaint procedure additionally forced formulating the implementation requirements. Safety and data integrity were identified as important factors. The distinguished functionality was both authorization and concurrent access of users to the data. The mapping of limitations influenced the use of classifiers to describe an event and the models of serviced devices. A design of a database

structure has been included in [4]. The solution to improve the process proposed by the author is creating variants in the handling of complaints by defining a set of scenarios. Harmonization of the type of activities undertaken in authorized service points was achieved by providing an initially configured implementation.

### 3 Evaluation of the effectiveness of the designed solution

The software implemented, supporting comprehensive complaint handling and processing of service requests, performs the following tasks:

- registering complaints and service requests based on defined classifiers describing, among others, models of serviced devices, types of events, types of non-compliances;
- gathering attachment documentation in the form of files;
- registering the customers' notes and remarks;
- handling the flow of information related to the coordination of activities carried out between authorized service points and the manufacturer;
- documenting the performance of service works;
- estimating the cost of an action, final account of the application;
- handling of expertise orders;
- informing the customer about the progress of the service works;
- generation of alerts initiating: information flow actions, reminders and warnings;
- transmission of messages informing the supervising stuff of transgressions and abuse;
- generation of periodic and statistical reports in a by-type format;
- generating summaries in graphical form;
- defining information flow paths;
- personalization of user permissions.

The effectiveness of the designed tool was assessed in two stages, through in-depth interview with representatives of system users and an analysis of system data collected when handling service and complaint requests. Three points of the authorized cash register service where dedicated software was implemented were selected for the study. The first stage of this study included defining the following:

- the dominant user group that uses the application;
- the system functionality with the highest utility for the unit;
- the way in which users respond to notifications and alerts;
- area of use of sheets, reports and summaries.

Tab. 1 Summary of the interview with representatives of the IT system users.

No.	Entity name	Dominant user group	Prospective system functionality	Reaction to prompts	Area of report use
1	ASO 1	Service supervision staff	Documenting service works	Insignificant	Control of service technicians' working time
2	ASO 2	Service technicians	Estimation of repair cost	Moderate	Admissibility of complaints
3	ASO 3	Service technicians	Documenting service works	Insignificant	Model failure reate

Source: author's own study

In each organization, this stage was conducted in the form of an interview with a senior management representative responsible for maintaining and improving the quality management system in accordance with the requirements of ISO 9001: 2015-10 [12]. The application use report is presented in tab. 1.

As part of the second stage of the study, data were analysed that had been collected during the handling of complaints in the previously selected authorized service points. Estimates of the following characteristics were made:

- quotient of the quantity of accepted complaints to the sum of the number of accepted and dismissed complaints;
- the average cost of handling a complaint;
- quotas of quantities accepted for execution, to completed service requests;
- the average total service time of service personnel associated with the execution of a single service request;
- the failure rate of cash registers in relation to the number of registered devices, taking into account the conditions of their use.

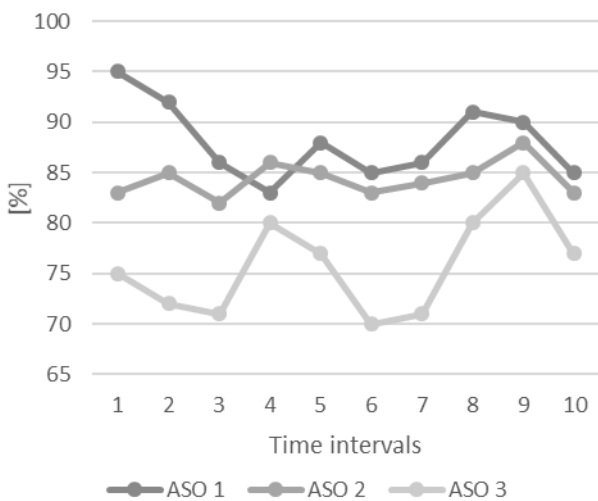


Fig. 1 Complaint acceptability [%].

Source: author's own study

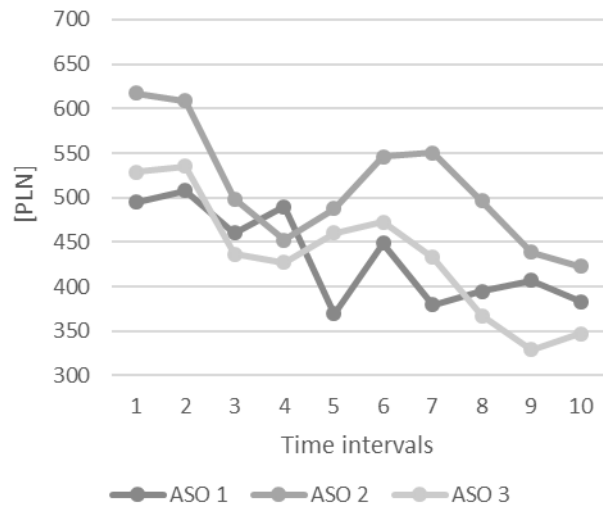


Fig. 2 Average cost of handling a complaint [PLN].

Source: author's own study

To illustrate the changes in each characteristic (Fig. 1 - 5), a linear graph was used. Placed on the horizontal axis are time intervals in which observations were made. An even distribution of time was assumed. Due to the confidentiality of data, variable scale unit lengths were used for each graph. Data aggregation was used for the spread of data along the vertical axis. The data series shown in Fig. 1 - 4 represent measurements taken at selected points of the authorized service. The data series shown in Fig. 5 describe the groups of devices that were created by the Polish cash register manufacturer.

Examining the effectiveness of the designed solution showed correlation of the complaint acceptance rate with the authorized service point as the receipt site. There was a clear downward trend for the complaint handling cost. The analysis of the effectiveness of service request execution has shown a cyclical nature of interferences that delay the completion of the work. Unfortunately, comparing the collected values describing the working time of the service technicians, neither a trend line nor the cause-effect relationships of the changes were identified. This is probably due to

the fact that the handling of a complaint constitutes a small percentage of the actions taken compared to periodic technical inspections.

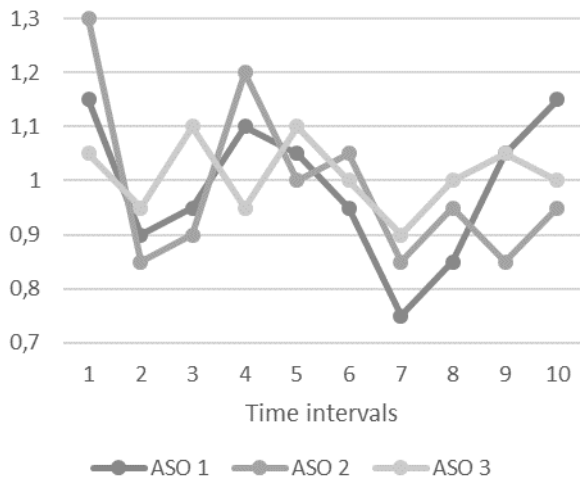


Fig. 3 Effectiveness of service request execution.  
Source: author's own study

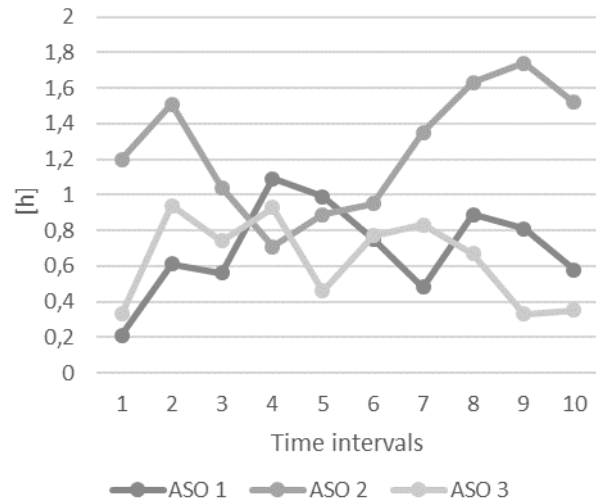


Fig. 4 Average total working time of service personnel per service request [h].  
Source: author's own study

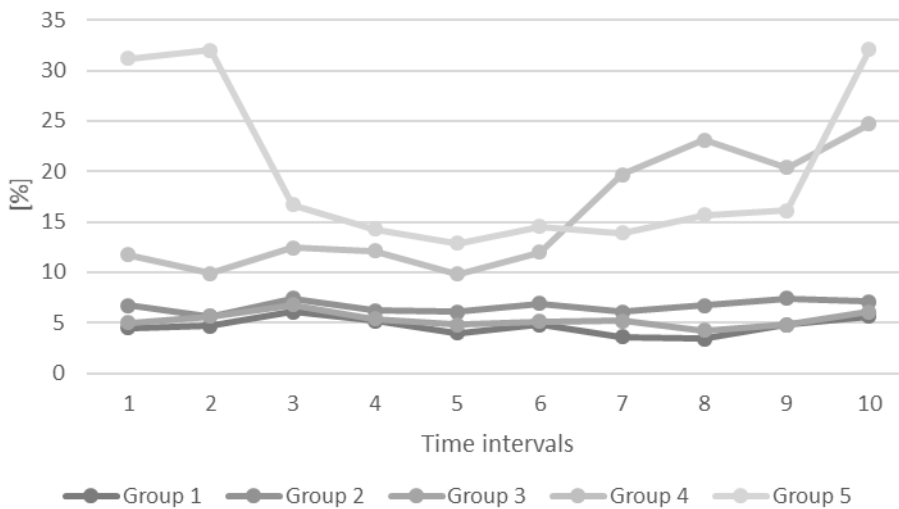


Fig. 5 Failure rate per number of registered devices [%].  
Source: author's own study

## Conclusions

The need to actively influence the quality of the services provided and the products supplied forced cash registers manufacturers to seek ways of eliminating the effects of quality noncompliance of cash registers and eliminating the causes behind the defects. Because complaint management plays a key role in the improvement of quality, an attempt was made to build a tool to

support the registration of complaints and documentation of the service works. When creating the dedicated tool, the author used an analysis of the legal regulations in force in Poland as well as the identified needs of the Polish manufacturer of cash registers, produced for the retail industry. The implementation of the IT system was carried out in the company running the main service as well as in the entities running its authorized service. Analysis of the collected data revealed the existence of cause-and-effect relationships influencing the course of selected characteristics. The effectiveness of the solution was assessed by identifying the causes of non-compliances discovered during the operation of cash registers.

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## Doskonalenie organizacji z wykorzystaniem systemów informatycznych wspomagających obsługę zgłoszeń serwisowo-reklamacyjnych kas rejestrujących

**Streszczenie:** W artykule opisano zagadnienie obsługi zgłoszeń serwisowo-reklamacyjnych urzędów fiskalnych, wytwarzanych na potrzeby handlu detalicznego. Jako rozwiązanie doskonalące proces, autor zaproponował wdrożenie systemu informatycznego, wspomagającego ewidencjonowanie zgłoszeń i śledzenie przebiegu prac serwisowych. Zgromadzone dane umożliwiły wyznaczenie zależności przyczynowo skutkowych występujących pomiędzy zmiennymi wybranymi charakterystyk. Wnioski z obserwacji potwierdziły skuteczność zaprojektowanego rozwiązania. Zwiększenie efektywności uzyskano poprzez ukierunkowanie działań przedsiębiorstwa na zaspokojenie potrzeb i spełnienie oczekiwań klientów.

**Słowa kluczowe:** urządzenie fiskalne, reklamacja, obsługa zgłoszeń