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The perspectives of service quality measurement in the Polish Armed Forces logistic system

Perspektywa zastosowania metod pomiaru jakości usług w Siłach Zbrojnych Rzeczypospolitej Polskiej

The aim of this paper is to elaborate whether there are any needs and possibilities of quality measurement in logistic services provided for the Polish Armed Forces. In order to answer this problem firstly the Polish Armed Forces Logistic System has been described as a logistic services provider. Then the quality areas of the logistic services provided for the armed forces have been identified. Subsequently the author tried to evaluate already implemented solutions for logistic services quality assurance in the light of service quality measurement methods. Finally there has been an attempt made to propose the choice of proper quality measurement methods for selected logistic services provided for the Polish Armed Forces.

Key words:
logistic services, military logistics, Polish Armed Forces Logistic System, service quality measurement, quality assurance.

Celem niniejszego artykułu jest ocena potrzeb i możliwości pomiaru jakości usług logistycznych świadczonych Siłom Zbrojnym Rzeczypospolitej Polskiej (SZ RP). W pierwszej kolejności opisano system funkcjonalny logistyki SZ RP jako usługodawcę. Następnie zidentyfikowano płaszczyzny jakościowe usług logistycznych dostarczanych wojskom. Autor dokonał również próby oceny stosowanych obecnie systemowych rozwiązań zapewnienia jakości w świetle metod pomiaru jakości usług. Na koniec zaproponowano wariant doboru metod pomiaru jakości dla wybranych usług logistycznych świadczonych dla SZ RP.

Słowa kluczowe:
usługi logistyczne, logistyka wojskowa, system funkcjonalny logistyki SZ RP, pomiar jakości usług, zapewnienie jakości.

Introduction

Throughout history the issue of quality assessment is bond with all the processes regarding manufacturing and services. This assessment is performed in different ways for a product and a service due to their different essence. A quality parameter, both of product and of service, has become the research problem but first of all it has become the issue of development of quality management systems.

The military logistics has a service nature, which imposes a thorough analysis of quality status of the logistic services for Polish Armed Forces. Such analysis is not feasible without a reliable quality measurement. It is also essential to find the system solutions for a quality improvement.

The aim of this paper is to answer the following question: What are the needs and possibilities of implementation of quality measurement methods in logistic services provided (using own or economy potential) for the Polish Armed Forces? As a hypothesis it has been assumed that: there are some needs and possibilities of quality improvement tools implementation in the Polish Armed Forces Logistic System (PAFLS), however such implementation would impose the use of quality measurements methods properly selected for each service according to its character. It would be also crucial to define the quality indicators adequately to the services provided in each logistic subsystem.

The Polish Armed Forces Logistic System as a service provider

According to the *Polish Armed Forces Logistic Doctrine D-4(B)* a military logistics is defined as „a

domain of the supplies use along with the services provision in order to maintain the troops proper combat readiness within the country and to support the troops operating abroad[1]". Such defined wide spectrum of military logistics responsibility requires performing the tasks in the frame of a system. The Polish Armed Forces Logistic System plays such role. It consists of six subsystems: command and control, technical, supply, infrastructure, transport & movement, and medical) and two functional areas (host nation support and economy mobilisation & strategic reserves). The performance of these subsystems has to be considered as a set of complex processes, which are predominantly of service character[2]. It is worth to note that these processes are performed with a use of logistic potential, which consists of logistic troops from units of armed forces and two logistic brigades (mobile potential) and the units from Polish Armed Forces Territorial Logistic Support System, i.e. Garrison Logistic Units and Regional Logistic Bases along with their subordinated units (stationary potential)[3]. There are also some elements of Polish Armed Forces Logistic System surround, which are crucial for its service provider role. These elements are related to local and foreign logistic services market, because the character of such market determines the possibilities of military logistic potential augmentation by the economy actors.

Defining 'a service' term allows to understand what practically a service character of military logistic system means. Lexically a service is 'an activity of satisfying the human needs, e.g. craft works, transport of goods, their protection from rottenness, medical care, artistic performances, etc.'[4]. While scientific definitions can be divided into: enumerative (enumerating the activities which might be called services), negative (assuming that everything which is not a manufacturing, is a service), and constructive (regarding a potential, a process, and its effect)[5]. The classic service definition underscores, similarly to the lexical definition, that a service has to satisfy the human needs[6]. Some definitions assign the service recipient role not only to a human but also to other actors, e.g. institutions. It is often underlined that a service is not only an act of performing some action but also an offer or a readiness to do so[7]. The set of service features might be considered a synthesis of all service definitions. These features are: intangibility, perishability, inseparability (of provision and consumption), variability (depending on many factors), and non-ownership[8]. However it is possible to assume the existence of services, whom the inseparability condition is not applicable for (e.g. a repair of an equipment). Regarding the distinction between a tangible product and a service it seems to be reasonable to say that such border is not so clear due to the fact that almost all contemporary products are the combination of both a good and a service[9]. Thus the services have a various level of materiality: from high (e.g. goods manufacturing) through medium (e.g. catering) up to very low (e. g. insurance)[10].

In the context of the logistics, so called logistic service has to be defined as well. It is 'a form of activity based on: own logistic system potential, of an economy actor, or of another type of organisation, along with resources of entrepreneurs which provide gainfully the services of transport, storage, other related, and these supporting a process of goods flow between supply chain links'[11]. Taking into account the roles of particular subsystems of PAFLS it should be assumed that the scope of such services will be greater that this defined above. The activity of transport & movement subsystem and supply subsystem applies to the definition above. While it should be widened to include also: technical services (e.g. repair and technical inspections of the equipment) performed in the frame of the technical subsystem, medical care (in the medical subsystem), and infrastructure maintenance services (in the infrastructure subsystem). Only the command and control subsystem does not play a service role literally because it performs exclusively within PAFLS.

The pragmatics of peacetime logistic support shows that the potential of providing services by PAFLS has to be complemented in each of five service subsystems. During ally joint operations it is realised in the frame of multinational logistic support models regulated by the NATO doctrines. In case of other activities it is realised by contracting the services provided by economy actors.

For subsequent elaborations it has been assumed that the evaluation of services quality would apply for mobile and stationary logistic potential elements excluding own units' logistic troops. Therefore there is presumption that the Garrison Logistic Units, Regional Logistic Bases (stores and technical workshops), logistic brigades, and field hospitals would be evaluated.

The quality areas of logistic services provided for the armed forces

The quality of services provided by the Polish Armed Forces Logistic System is one of the primary indicators of its efficiency. A 'quality' term might be defined as a set of features characterising a thing, a phenomenon, or a process (as a contrary of quantity). Another meaning of this word is an evaluative indication how close to the ideal a particular thing (not only material one) is. In the context of goods or services quality evaluation the second definition is applicable. For further considerations the definition

of quality from ISO 9000: 2015 norm has been used as a reference. It says that quality is 'degree to which a set of inherent characteristics of an object fulfils requirements'[12]. The quality defined as above throughout history became an issue of interest of many social groups, because it is related to many areas of life. Its importance is growing parallel with goods and services supply[13]. At the same time the quality is more and more difficult to achieve due to the growth of client's requirements, growing equipment complexity (e. g. cars full of electronic modules), and increase of technological sophistication. These factors have imposed not only strict defining the 'quality' term but also in-depth understanding and description of processes which have to be run due to the aspirations of clients to get quality and providers to achieve quality. A young scientific discipline called qualitology is growing nowadays on this base[14].

The problems of precise quality defining arise inter alia from the ambiguity of 'quality' term but also from many possible perspectives of considerations of this issue. It means that a quality can be defined anthropocentrically (where some indicators difficult to measure arise, e. g. satisfaction). But it is also possible to use some technical criteria easier to be verified, when a quality evaluation is based on compare a product with a specification. Now a division of objects, whose quality is evaluated, should be considered. Thus we can talk about project quality, manufacturing quality, and exploitation quality, while the product quality is a vector of those three components[15].

In the economical aspect a quality is contemporarily considered the obligatory main strategic aim of a manufacturer or a service provider. Therefore it should be perceived as a decisive factor of acquiring the client. It might be also noticed that the quality is 'invisible'. It means that often a client becomes aware of the quality only when it is not provided[16]. On the other hand there is an aspiration to precisely identify the client's expectations (including these which he/she is not aware of) in order not only to satisfy but also to fascinate him/her[17]. It is also essential to anticipate the changes of clients' expectations and needs in order to be prepared for meeting them in the future. Nevertheless it is worth underscoring that there is a significant difference between attempts of fulfilling not existing needs and attempts of exceeding expectations. The second case might result in an economic losses. Thus an another quality definition describes it as 'meeting fully client's requirements with minimal cost'[18].

The characteristics of a service distinguishing it from a tangible product (intangibility, perishability, inseparability, variability, and non-ownership) imply the necessity of finding the differences between product quality and service quality evaluation. It is also essential to compare hitherto developed methods of quality evaluation. It is important because nowadays a purchase of a product is often a purchase of a service at the same time (e. g. equipment repair which has an impact on a mentioned exploitation quality).

A quality indicator which instinctively comes to mind is a client's satisfaction. It applies to a tangible product buyer as well, but in case of a service it becomes more relative term and more difficult to measure. Moreover, apart from complete needs fulfilment and requirements meeting, there are some factors which may have influence on a level of satisfaction (e. g. weather, client's mood, etc.). These factors cannot be avoided easily[19].

The problems of defining a quality and the particular features of a service distinguishing it from material product make the models of quality more meaningful than one-sentence definitions of quality. One of them is the *five gaps service quality model* developed by A. Parasuraman, V.A. Zeithaml and L.L. Berry. It is based on their research (focus groups interviews with executives and consumers)[20]. This concept's core is a thesis that during the process of service there are five main gaps between how it is perceived by a client and a provider. This would be the main obstacle for providing a service highly evaluated by a consumer. The first gap is defined as the gap between consumer expectations and management perceptions of those expectations. The second is the gap between management perceptions of consumer expectations and the firm's service quality specification. The third is the gap between service quality specifications and actual service delivery. The fourth lays between actual service delivery and external communications about the service. And finally the main gap is a function of the magnitude and direction of the gap between expected service and perceived service[21]. Parasuraman, Zeithaml and Berry, as their research result, give also ten determinants, which customers evaluate the services according to. But they also underline that those determinants may interpenetrate. These are the following: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing the customer, and tangibles[22].

Another model of service quality is Ch. Grönroos's theory, which is based on an assumption that a service quality has to be considered in two aspects: its technical quality and functional quality[23]. It means that a service quality has two dimensions. The first of them, technical, can be described as an outcome dimension. The second, functional, means a process-related dimension. So the first of them answers, *what* the customer receives (predominantly it is a service's material part), while the second determines, how the customer perceives a process of the service. *Ergo* the customer experiences the service quality in those dimensions and evaluates it by comparing with what he/she expected.

Table 1

The services contracted and performer using own potential in the frames of particular logistic subsystems (Polish national approach)

Subsystem	Type of service	Contracted	Performed using own potential
Supply	Supplying (class I–V)	x	x
	Tailor services	x	
	Laundry services	x	
	Dining services	x	x
	Kitchen waste disposal	x	
Technical	Equipment repair and overhaul	x	x
	Technical maintenance	x	x
	Spare parts supply	x	x
	Vehicles technical inspections	x	x
Transport & Movement	Transport of equipment (rail and road)	x	x
	Transport of personnel	x	
Medical	Periodic medical examinations	x	
	Medical care	x	x
	Provision of medical supplies	x	x
Infrastructure	Constructions, renovations x		
	Infrastructure maintenance services	x	x

Source: Author's own elaboration.

In the light of Grönroos's theory it is worth to emphasise that each service is designed and performed as a process. Moreover, one of the service features distinguishing it from a tangible product, namely inseparability of delivering and consuming, allows to assume that the service quality will be evaluated not only as a final product, but rather as a whole process[24].

The cited definitions of quality and service along with the models of service quality allow to identify the quality areas of logistic services provided in the frame of PAFLS. It is crucial to define the set of such services for the further considerations. Taking into account the potential of particular logistic units and the scope of services contracted by them, it is possible to identify the services, whose quality can be and should be measured. Table 1. shows the juxtaposition of own and contracted services provided to the troops in the frame of peacetime logistic support (national approach).

It should be borne in mind that for particular logistic units the scope and types of delivered services might be different, depending on their specialization, potential and the requirements of supported units and institutions. The identified exemplary set of services (table 1) can be used for defining their quality areas. The basic criteria of logistic services evaluation are these from the '*7R rule*', which means the right product delivered to the right customer in the right place, in due course, in good condition, in the right quantity and with optimal cost. However these criteria do not describe the services provided in the frame of PAFLS, where inter alia some technical, medical and infrastructure processes are performed. Generally these are not included into civilian logistics. Thus it is reasonable to use the service quality models to identify the quality areas of military logistic services. First of all these services should be divided into two groups. The first group will consist of the services, whose final product is more tangible and their inseparability is less. In such case the technical quality will be crucial. The second group will consist of the services of less tangibility and high inseparability. In this case the functional quality role will be more significant, yet the role of technical quality will not lose its importance. In case of the first group the quality evaluation is simpler due to the possibility of use of the standardized criteria by the specification of detailed requirements for a particular service with their measures. While in case of the second group the service quality evaluation should be based on customer's satisfaction, which, what was mentioned earlier, often depends on the factors not related with a service itself. So the problem is to find proper indicators and measures of satisfaction. Table 2. shows a variant of the services division into two mentioned groups.

Summarizing the considerations above it is worth to underscore that the identification of quality areas for the logistic services provided for troops should be conducted separately for each service due to their various character, i.e. inter alia their different tangibility and inseparability. An attempt of identification of other service features should be also made. It would facilitate the development of quality model for each service. The appointment of quality evaluation criteria with their importance levels is very significant as well.

Table 2
The logistic services division according to quality criteria importance and to inseparability

Low importance of functional quality. Low inseparability	High importance of functional quality. High inseparability
■ Tailor services ■ Laundry services ■ Equipment repair and overhaul ■ Technical maintenance ■ Infrastructure constructions, renovations	■ Supplying in class I to V, spare parts and medical supplies ■ Dining services ■ Kitchen waste disposal ■ Vehicles technical inspections ■ Transport of personnel ■ Transport of equipment ■ Periodic medical examinations ■ Medical care ■ Infrastructure maintenance services

Source: Author's own elaboration.

The logistic services quality — its assurance and measurement in the Polish Armed Forces

The lessons learned of Polish Armed Forces Logistic System show that there is a wide area of possible service quality improvement. This applies to the services provided with the use of own logistic potential, but also to these contracted. The service quality improvement need is proven by the conclusions drawn from the performance of both Polish Armed Forces Territorial Logistic Support System and Polish Armed Forces Service Contracting System[25]. The majority of problems regards Garrison Logistic Units, which play a crucial role in Polish Armed Forces Territorial Logistic Support System because these units are both logistic services direct providers and important agents of services contracting. Thus the lack of coherent system solutions for quality improvement of the logistic services provided by own units with their potential seems to be a very vital issue. While for contracted services the main quality solution is the Quality Assurance System regulated by the Decision of Minister of National Defence No. 427/MON of 29th of October 2014. The procedures for this system have been described in the Decision of Minister of National Defence No. 447/MON of 10th of November 2015. The first of mentioned documents defines the quality assurance as 'the activities planned with the risk assessment and threats analysis of a situation of not fulfilling the requirements identified by the equipment decisive authority, the Central Logistic Organization, the acquirer, or the Regional Military Representative Office, in order to enhance the certainty that the product, which has been ordered for the Polish Armed Forces, meets the requirements defined in the contract'[26]. While the second Decision defines a defence product as 'a product designated for defence needs, designed according to the requirements of technical specification, and manufactured in pursuance of technical documentation, regardless of its processing level; it is a service, a tangible good, processed materials, an intellectual creation, or their combination'[27]. The fact of engaging the equipment decisive authority in the Quality Assurance System allows to draw the conclusion that in the matter of services the performance of this system regards mainly technical services. The limited potential of Regional Military Representative Offices has also to be taken into account. Therefore this system is engaged not in every contracted service. In other cases (services from subsystems other than technical, contracts without quality clause, contracts without ISO/AQAP certificate requirement) the responsibility for quality assurance lays with the acquirer. However the acquirer acts according to the public procurement law which limits the set of tools and possibilities of the quality assurance of contracted service. In case of contracted services the quality evaluation before its providing is not possible what might be considered as one of the essential issues. Thus the acquirer has to describe all material and non-material features of a service in the most detailed way in the *Terms of Reference*.

Despite mentioned obstacles in the services perfecting process it is reasonable to measure their quality. The results of such measures could be the base for evaluation of a whole system performance, and then they could become the foundations of logistic services quality management systems. This applies for both 'own' services and these contracted. In the subsequent phases of service quality improvement process such measures could be an inseparable element of already performing pro-quality systems.

Assuming that the customer (in military case — the soldier) is a final service beneficiary, it is possible to evaluate the service quality by the measure-

Figure 1
The service feedback terminal used by US Government

Source: https://feedback.usa.gov (accessed on 31.07.2018).

ments of customer-soldier satisfaction. For the benefit of service providers performing in the environment of free market competition there have been numerous methods of customers satisfaction measurement developed. The SERVQUAL is one of the most popular and fully described method. It was designed by A. Parasuraman, V. A. Zeithaml and L.L. Berry — the authors of five gaps model, which in fact this method is based on. The concept of this method is first of all to survey the customer's expectations (his or her imagination of a service), and then to allow the customer to evaluate the received service. This survey is conducted with the use of two? section questionnaire (section of expectations and section of perceive) with the answers on Likert's scale. The acquired results are analysed with statistical methods. This analysis allows to identify strengths and weaknesses of the service offered by a particular provider[28]. The SERVQUAL method is often adapted to the particular practical applications. Another customer satisfaction measurement method is the *Importance — Performance Analysis* (IPA) developed by J. Martill and J. James. It depends on the evaluation of properly selected particular satisfaction factors. This evaluation is performed by the customer. Each factor is evaluated on Likert's scale according to two criteria: its importance and how it was fulfilled (performance). The results are then analysed with a four-field matrix (high importance — high performance, high importance — low performance, low importance — low performance, low importance — high performance)[29]. The subsequent method is the *Critical Incident Technique* (CIT). It involves the direct survey with the customers in order to collect the opinions concerning critical incidents (diminishing the service quality). An incident is considered critical when there was a customer-provider interaction, the event was either very satisfying or very disappointing, and it was a separate event easy to imagine by the interviewer. This method allows to find out, which service components are crucial for the customer and have to be improved[30]. Apart from quantitative methods there are some qualitative methods also used, e. g. complaints analysis or *mystery shopping*, which is a practical use of the service by a 'mystery shopper' preparing after that a feedback report.

During the service quality evaluation not only the analysis of collected data is important, but also the way this data is acquired. The data collection method selection depends inter alia on a service's characteristics. It is also essential to make the survey as simple as it is possible in order to avoid respondents discouragement. It can be achieved by using the electronic systems connected to the network. So it seems to be reasonable to use the mobile applications or simple terminals allowing the customer to choose a service rating at the place this service is delivered (see figure 1).

The ISO 100004[31] norm published in 2012 can be considered the most comprehensive tool for the customer satisfaction measurement. It is a compendium of basic customer satisfaction measurement methods. The aim of such measurements and the term 'satisfaction' itself have been defined in this norm by describing the model of customer satisfaction. The measurement process has also been described along with quantitative methods (face-to-face interview, telephone interview, mail survey, online survey) and qualitative methods (in depth personal interviews, discussion groups). The sources of information have been pointed out as well, inter alia: frequency and trend in product returns, customer complaints handling, reports in the media, comments and discussions in social media. The analysis of such data broadens the knowledge about indirect custo-

mer satisfaction indicators. The authors of this norm have also proposed the methods of data analysis and the ways the obtained results may be used. The document has not been translated into Polish so far.

The selection of service quality measurement methods for a military purpose

In the civil environment the service providers permanently measure customer satisfaction, because the client decides (depending on his or her needs fulfilment) if to change a service provider or not. So the customers have the choice. A soldier, the beneficiary of services provided by military logistic system, has no choice. Of course in a battle field the priority is the task. But, assuming that a soldier is not a worse customer, one may say that in the peacetime he or she should be satisfied and feel comfortable as well (apart from the situation that the conditions are deliberately worse in order to adapt the troops to the battle field conditions).

One of the conditions of service quality improvement is the gaining of knowledge about their actual quality. Some of them might be evaluated by the analysis of owned data, i.e. technical quality measures or complaints statistics. The Quality Assurance System of the Polish Armed Forces is helpful as well. But for the other services it should be examined, how much the customers (troops) are satisfied.

The selection of service quality measurement method depends mainly on the character of a service. Taking into account the division from table 2. it is possible to notice that for the first group of services the methods of a tangible product quality evaluation may apply. For instance, a tailor service can be evaluated by the technical acceptance of a sewed uniform (the rules described in the Decree of Minister of National Defence of 11 January 2013 apply[32]). While, in case of the second group, where the functional quality and the inseparability has a high importance, the methods based on the customer (soldier) satisfaction measurement should be used. The variant of the service quality measurement methods selection has been described in table 3.

The considerations above can be only the beginning of service quality measurement implementation because the method selection should be more detailed, preceded by thorough analysis of the character of a particular service in the light of chosen measurement method's whole process.

Conclusions

The Polish Armed Forces Logistic System is a service provider. The quality of logistic services provided by this system nowadays might be improved. The proof of such possibility is inter alia the feed-

Table 3

The variant of the service quality measurement methods selection for both own and contracted services in the frame of particular subsystems of the Polish Armed Forces Logistic System

Subsystem	Type of service	Methods based on customers survey	After-service technical acceptance	Methods used in the frame of QAS*
Supply	Supplying (class I–V)	x		x
	Tailor services		x	x
	Laundry services		x	
	Dining services	x		
	Kitchen waste disposal	x		
Technical	Equipment repair and overhaul	x	x	x
	Technical maintenance	x	x	x
	Spare parts supply	x		x
	Vehicles technical inspections	x		
Transport & Movement	Transport of equipment (rail and road)	x		
	Transport of personnel	x		
Medical	Periodic medical examinations	x		
	Medical care	x		
	Provision of medical supplies	x		x
Infrastructure	Constructions, renovations		x	
	Infrastructure maintenance services	x		

* — Quality Assurance System
Source: Author's own elaboration.

back published by soldiers in social media (e.g. images of poor quality meals). Also some lessons learned from contracting system performance show that the services provided by civilian actors not every time meet the requirements. In order to improve the quality first of all it should be measured. There is no system solution for such measurement in the Polish Armed Forces for all services. Thus some of already existing quality measurement methods might and should be implemented in military logistic system. The method selection for each service should be based on the analysis of its character.

However there are some issues emerging when we analyse the possibilities of service quality measurement in the armed forces. The first one is how to motivate the personnel to improve their service when it turns out after quality measurement that a service should be performed better. This applies to the services provided by own logistic potential. The second problem is how to motivate a contractor to do his service the best possible way (in case of contracted services). The third is how to encourage the customers (soldiers) to give their feedback (to convince them that their voice is important and may contribute to services improvement). The fourth issue is how to measure the service quality with no structures enlargement (how to avoid hiring a costly 'army of inspectors'). And finally the fifth problem is how to effectively use the obtained service quality measurement results in order to really improve the service quality.

Despite the problems enumerated above it is possible to affirmatively answer for the research problem of this paper — yes, there are the needs and possibilities of measuring the service quality in the Polish Armed Forces.

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[30] See J. Frąś, Wybrane instrumenty pomiaru jakości usług logistycznych, 'Zeszyty Naukowe Uniwersytetu Szczecińskiego' nr 803 (66/2014), p. 307.

[31] International Standard ISO 10004, Quality Management — Customer Satisfaction — Guidelines for monitoring and measuring, First edition 2012-09-15.

[32] Rozporządzenie Ministra Obrony Narodowej z dnia 11 stycznia 2013 r. w sprawie szczegółowego wykazu wyrobów podlegających ocenie zgodności oraz sposobu i trybu przeprowadzania oceny zgodności wyrobów przeznaczonych na potrzeby obronności państwa (Dz. U. z dnia 29 stycznia 2013 r., poz. 136).

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