

# THE IMPORTANCE OF AFTER-SALES ACTIVITIES IN THE MARKETING OF MEDICAL PRODUCTS THROUGH PUBLIC PROCUREMENT

**Tina Vukasović<sup>1</sup>, PhD (\*), Anita Sluga<sup>2</sup>, PhD**

<sup>1</sup>*Professor, International School for Social and Business Studies, Mariborska cesta 7, 3000 Celje, Slovenia and University of Primorska, Faculty of Management, Izolska vrata 2, SI-6000 Koper, Slovenia*  
[tina.vukasovic@mfdps.si](mailto:tina.vukasovic@mfdps.si)

<sup>2</sup>*VenoFarmacija d.o.o., Ul. I štajerskega bataljona 7, SI-3000 Celje, Slovenia*  
[anita.saso@gmail.com](mailto:anita.saso@gmail.com)

## ABSTRACT

*The purpose of the paper is to contribute to the knowledge in the field of marketing of medical devices in the public sector. A quantitative research method was used by means of a structured questionnaire. The target population of research is employed in laboratories in health centers and hospitals. We have obtained a sample of 208 respondents employed in these institutions. By conducting statistical analyses, we found that all the studied variables are in a positive correlation with each other and that the “Personal Sales” variable is equally important in the marketing of medical devices to social welfare institutions through public procurement as the “After-Sales Activities” variable. The research is based on the results obtained in a narrow segment of the medical products market, which makes them useful with a high degree of reliability only in this product group. For the purpose of comparability, the results may be used within the field of medical products, and in so doing we have to take into account the specificity of medical products and the medical industry. The newly designed structural model of correlations between the studied elements, represents a new value both in the field of scientific research work as well as in the field of usability in practice. The research is a contribution to the fact that in the process of marketing products through public procurement, the same attention is devoted to the after-sales activities as to the design and development of new products, planning of marketing channels (distribution), marketing communication (promotion) and pricing.*

**KEYWORDS:** public procurement, medical devices, personal sales, after-sales activities, social welfare institutions, marketing mix

## 1 INTRODUCTION

The healthcare sector consists of many industries including pharmaceuticals, biotechnology, equipment manufacturing, distribution, residential care facilities and managed healthcare. In the past few decades, the healthcare field has been grown exponentially because of increasing general awareness and globalization. However, in spite of this, the global healthcare sector is influenced by major hindrance from legislative and regulatory barriers, as well as globalization and expensive costs (Tadesse et al., 2015; Dixit et al., 2019).

The healthcare industry is oriented toward domestic demand and is not affected by a poor economy (Shao and Ji, 2006; Bellazzi and Zupan, 2008). The global trends of aging populations, breakthroughs in biomedical technology and nanotechnology, and the innovation of new drugs, medical treatments and medical devices suggest that the healthcare industry is expected to grow (Shao and Ji, 2006). However, the presence of numerous economic entities, such as pharmaceutical companies, sales agents, medical distributors, and healthcare service providers creates a complex industrial environment (Davis, 2004; Chuang et al., 2013).

The research focuses on the views of the actors involved, who are in our case employed in laboratories, hospitals and health centers. The studied variables were in this type of marketing presented as codependent variables, which influence the preparation of the tender documentation when marketing medical devices (blood collection devices) to social welfare institutions in which the sale is carried out through public procurement. The research problem is based on verifying the correlations between the elements of the 4P marketing mix, after-sales activities and their influence on the preparation of tender documentation in the marketing of medical devices to social welfare institutions. The research question related to the research problem reads as follows: Do after-sales activities have at least as statistically significant influence on the preparation of the public procurement tender documentation when marketing medical devices to social welfare institutions as the elements of the marketing mix (product, price, promotion, distribution)? The marketing mix with the basic elements, as so far stated by many authors, applies to the marketing of the products that do not need to be marketed through public procurement. Different authors have already studied the marketing mix, but nobody has expanded it with the after-sales activity variable, where after-sales activities only begin after signing the contract. The results and findings of the research serve as a guidance to many companies in which they market more complex products of a higher price range, characterized by high quality.

### 1.1 DESCRIPTION OF RELATED RESEARCH CARRIED OUT

When reviewing the published research in accessible databases, we did not find any similar research that would connect the product, price, personal sales as a marketing and communication channel (distribution), and after-sales activities into a whole of influential factors in the marketing of medical devices to social welfare institutions through public procurement. Various authors and experts in this area deal with these factors only individually as some kind of impact on a particular phenomenon; thus, we can note that the conceptual

design of this research is new. The marketing mix management paradigm has dominated marketing thought, research and practice since it was introduced almost 56 years ago. Today, this paradigm is beginning to lose its position. New approaches have been emerging in marketing research. The globalization of business and the evolving recognition of the importance of customer retention and market economies and of customer relationship economics, among other trends, reinforce the change in mainstream marketing. The concept of a marketing mix based on the selected four elements (4P: product, price, market communication or promotion and marketing channel or distribution) is the most well-known and most criticized concept of marketing.

The basic concept of the marketing mix had been too simple, especially when implementing marketing activities between businesses (B2B – Business to Business) and in the field of services; this was consequently followed by the development of the concept of a marketing mix by adding different P's.

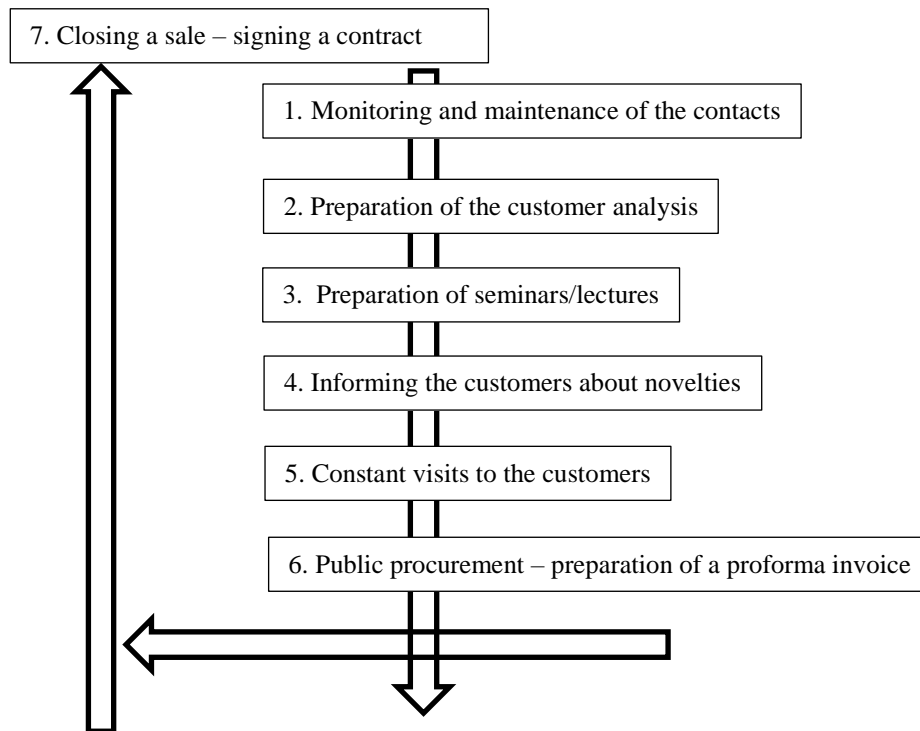
The basic parts of a firm's promotional effort are advertising, sales promotion, personal selling, public relations, direct and digital marketing. Personal selling involves direct personal communications between a consumer and a salesperson, with the latter conveying the product or service benefits to the former. Salespersons are increasingly being perceived as an important contributor to a firm's business success. Personal selling is an important promotion tool in that it can lead to a better relationship between the buyer and the seller (Fam and Merrilees, 1998). Johnston and Marshall (2003) believe that personal selling messages have the potential to be more persuasive than advertising or publicity due to the face-to-face communication with customers. With increasingly fragmented markets, the role of personal selling becomes extremely important (Jaramillo and Marshall, 2004). The role of personal selling will continue to be of overwhelming importance in the case of those companies operating in markets characterized by high volume customized goods and services (Jaramillo and Marshall, 2004). The evolution from basic products to nonstandardized, and in many cases highly technical products and intangible services, has required that selling activities evolve as well. Personal selling in health care is an example of selling nonstandardized, highly technical and intangible services. Promotion of health care has evolved from an emphasis on advertising to a current interest in personal selling (Bowers and Powers, 1991). In addition, increased competition and a demand for cost-cutting measures has prompted many health-care organizations to market their products through a salesforce. Along with public relations and planning research, sales is becoming a significant part of the marketing function of health-care organizations (Bowers and Powers, 1991; Mack and Burns, 1988; Bowers, Powers and Spencer, 1994).

Below we describe the process of personal sales in the marketing of medical devices to social care institutions in the context of public procurement through the elements of the marketing mix and after-sales activities. The elements examined (product, price, personal sales in the context of distribution and sales promotion as marketing and communication channels and after-sales activities) are interlinked and influence the preparation of tender documents for the procurement of medical devices. The product plays an important role at the beginning of the personal sales process, which begins with the preparation of the approach to the potential

customer. In the product launch phase, we should not forget to disclose brand information, especially if it is well established and recognizable in the market. Brand information is also important in the preparation of seminars and presentations, as well as in informing customers about new developments and finally in the preparation of a contract or agreement. In the preparation of the quotation with the technical requirements. The price is an important element of influence in the marketing of products by public procurement, as the Act on Public Procurement ZJN-3 (2015, Art. 84) defines the price as decisive for the selection of the offer, provided that all previously required criteria from the tender documents are met. However, they change or vary. determine with all other elements of the marketing mix. Advertising and distribution are the two elements of the marketing mix that influence the outcome of the selection of the bidder by the public procurement procedure in all the individual phases of the personal sales process. These two phases include all the decisive steps that the buyer decides on, with which he gets a picture of the product and the company and through which the invoice in the tender documents is created. After-sales activities - cover those parts of the phases that begin with monitoring and maintaining contacts, preparing customer analyzes, preparing seminars, informing customers and continuous visits to customers, preparing an invoice and finally signing a contract. At the end of this round, the after-sales activities resume the monitoring and maintenance of contacts and continue in the same order as before, regardless of whether we have a product supply contract or not.

Hereinafter, we focus on one particular element, namely after-sales activities also called after sales services, which are supposed to be key in the purchasing behavior of consumers, who can purchase medical devices exclusively through public procurement, as required by the Public Procurement Act. Such marketing is different from the marketing where it is not necessary to market products through public procurement, in particular it differs in the part that follows the signing of the framework agreement or contract. After the signing of the cooperation agreement between the supplier and the contracting authority, the obligation of the supplier to the customer is not terminated, instead by signing the mutual agreement, this obligation only starts in the aftermath of after-sales activities (monitoring and maintenance of contacts, preparation of seminars, informing about novelties).

After-sales activities are the activities that companies use to draw attention to themselves when they have already concluded contracts with the buyers. The mentioned method of market communication is typical of the sale through public procurement, where contracts can be concluded for one to up to four years. In the meantime, companies have to continue with their active cooperation with the buyers through the after-sales activities, and in this way, they constantly draw their buyers' attention to their products as well as to innovations. After-sales activities are important in the marketing of medical devices through public procurement and consist of several successive phases (Figure 1).



**Figure 1: The process of after-sales activities in the marketing of medical devices through public procurement**

Monitoring and maintenance of contacts is the first phase, by which we offer the buyer an unconditional guarantee in terms of effective resolving of complaints and constant search for solutions for the buyer. When visiting the buyers, it is necessary to obtain as much information as possible about the products used, competition, satisfaction, price, and their expectations (Phase 2). Occasionally, we need to prepare lectures or seminars on the novelties in which we get buyers closer to our products, present their advantages and potential innovations, and at the same time draw their attention to ourselves (Phases 3, 4 and 5). If we have been successful and have convinced the buyers of the quality and advantages of our products as well as services, we have also managed to instill in them the need for these products. At the next publication of the tender documentation and the budget, the buyers will set the criteria according to their needs and wishes (Phase 6). Submission of the bid will only be possible if we are the type of provider who meets the requirements of the budget and the requirements of the tender documentation. Then follows the last phase (Phase 7), which is the completion of the sale or signature of the contract, which depends on all the previous phases. After signing or not signing the contract, all the aforementioned phases (1-6) are still indispensable, because if companies are not present on the market (personal sales), the competition gets ahead of them and convinces the buyer of the quality and advantages of their products. Some phases of after-sales activities (monitoring and maintaining contacts, informing customers about news, customer visits) can only be successfully carried out through personal marketing.

Public procurement refers to “the acquisition of goods and services by government or public sector organizations” (Uyarra and Flanagan, 2010) and is one of the key economic activities of government (Thai, 2001). In spite of its long history and significant scale, public procurement has only relatively recently been the subject of considerable academic research (Trionfetti, 2000; Brulhart and Trionfetti, 2004; Brammer and Walker, 2011). Public procurement is subject to special rules in order to secure that goods and services are acquired at competitive prices. Transparency is needed. EU directive 2004/18/EC of the European Parliament and the Council of March 31, 2004 concerning the coordination of procedures for the award of public works’ contracts, public supply contracts, and public service contracts (The Public Procurement Directive) regulates this need with a high emphasis on transparent, competitive procedures. The objective is fair and open competition. Obtaining the best prices also establishes a substantial part of companies’ purchasing in the private sector (Arlbjørn and Freytag, 2012).

## 2 MATERIALS AND METHOD

### 2.1 CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

The main aim of the research is to develop a comprehensive model for identifying the correlations between the elements of the marketing mix, after-sales activities and their impact on the preparation of tender documentation for public procurement in the marketing of medical devices. To achieve the desired goal, we have set hypotheses, which we refer to below.

**H1: After-sales activities have at least such a statistically significant impact on the preparation of the public procurement tender documentation in marketing medical devices to social welfare institutions as the selected elements of the marketing mix (product, price, promotion, distribution).**

Hypothesis 1 stems from the idea that in the marketing of medical devices through public procurement, the after-sales activities (contact with customers) are very important. “After-sales services” are often (Lele and Karmarkar, 1983) referred to as “product support activities”, meaning all activities that support the product-centric transaction. They are also found in the literature as “customer support” elements, meaning all activities that ensure that a product is available to consumers “over its useful lifespan for trouble-free use” (Loomba, 1998). Furthermore, the term “after-sales services” has been approached in the literature under two broad perspectives. When referring to service providing companies, after-sales services are being treated as one among several supplementary service elements provided by them (Oliva and Kallenberg, 2003). On the other hand, when referring to tangible goods, they are mostly seen as operative activities of some or all members of the distribution chain (Gaiardelli et al., 2007; Rigopoulou et al., 2008).

**H2: Good product characteristics statistically significantly influence the preparation of public procurement tender documentation when marketing medical devices to social welfare institutions.**

The basic tool of the marketing mix is the product. It represents a tangible market offering that includes quality, design, functions, branding and product packaging (Kotler and Armstrong, 2018). The product is an important source of brand equity. Through it, consumers interact with the brand, with which the company communicates through the brand (Keller, 2013, pp. 178-182). Offering a product that fully meets the needs and desires of consumers is a prerequisite for successful marketing. In the research case, we will be interested in the opinion of the respondents as to what makes a good product. By “product properties” we mean the characteristics that directly relate to the product: laboratory testing, references, professional studies, brand recognition, safe product (innovation), importance of the country of origin, product conformity with standards, personal contact of the representative, and good product presentation.

### **H3: Personal sales statistically significantly influence the preparation of public procurement tender documentation when marketing medical devices to social welfare institutions.**

Hypothesis 3 is based on the idea that personal sales are crucial in the preparation of public procurement tender documentation when marketing medical devices. The choice of marketing channels and the way of communication with complex products that are the subject of this research paper are crucial for the success of each brand and company in general. Shimp and Craig Andrews (2013) states that marketing communication is the sum of all the elements of a brand's marketing mix, which facilitates exchange by targeting the brand at a group of users, positioning the brand against differences to competing brands and communicating the meaning of the brand and its main differences, the target groups. Vukasović (2020) combines the terms communication and marketing and states that marketing communication is a mutual information process between the company and the users. In summary, there is no more effective communication with the customer than direct communication through the marketing channel - personal sales, Fill (2009, p. 624) emphasizes that direct marketing is a strategy for creating and maintaining personal and direct communication with consumers.

Based on this, we decided to consider personal sales in the set of distribution and promotion variables as a marketing and communication channel. We are of the opinion that personal sales is a component which, through the marketing mix elements of “Marketing Channel (distribution)” and “Marketing Communication (promotion)” influences the outcome of the selection of the provider during the marketing of products through public procurement.

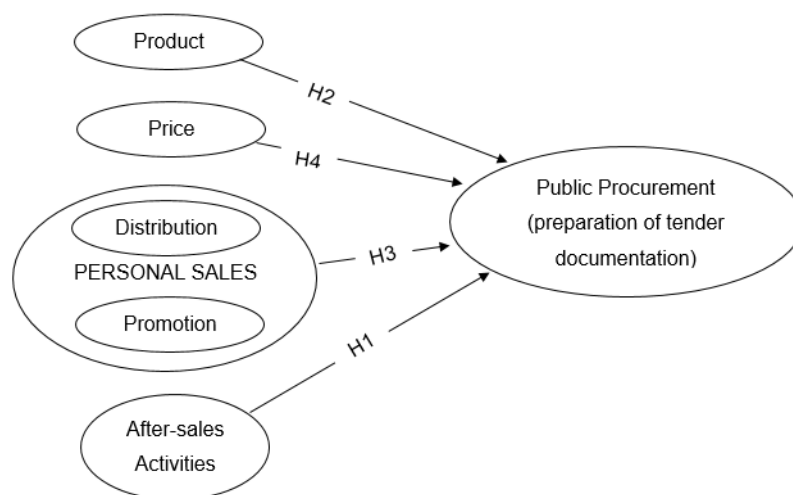
### **H4: The price of the product indicates its quality, innovativeness, origin, brand recognition and statistically significantly influences the preparation of tender documentation for public procurement in the marketing of medical devices to social welfare institutions.**

Consumers often judge the quality of products based on the basic information that is related to the product. Some of this information is internal, other external, such as price, reputation, trademark, origin, or advertising message. Internal as well as external information, or both together, provide the basis for perceiving the properties of the product. If a component of the product is tangible and standardized, it is not difficult to create specifications, measure the compliance of activities with these specifications, and assess the quality of activities based on how successful the company has been in following the specifications. Companies have to

constantly monitor the wishes of their consumers in order to ensure the compliance of specifications with their needs.

Price is the most important factor in choosing the right supplier, in marketing medical devices to social care institutions through public procurement, as required by the Public Procurement Act ZJN-3 (2015, Art. 84), which prescribes the criteria for the award of a public contract. The first paragraph states that the contracting authority shall award the contract on the basis of the most economically advantageous offer.

By reviewing academic and scientific literature, we have designed a conceptual model of correlations, which is shown in Figure 2.



**Figure 2: Display of the conceptual model**

The following are defined as independent variables in the conceptual model: “Product”, “Price”, “Promotion”, “Distribution”, “After-sales Activities”, while “Public Procurement (preparation of tender documentation)” is the dependent variable. Each of the variables is measured by several different assertions in the questionnaire. Each of the variables will be measured with different statements, manifest variables or indicators which will be included in the survey questionnaire.

## 2.2 SAMPLE AND PROCEDURE

The target population of our research is employed in laboratories in health centers (61 institutions) and hospitals (31 institutions) in Slovenia and totals 92 observed units. Altogether we received 217 completed questionnaires, while 9 questionnaires were excluded from the survey because they were not entirely filled out or were incomplete. We have obtained a sample (N = 208) of 208 respondents employed in these institutions. We used non-probability and purposive sampling. Given the public institution in which respondents are employed, we note that the majority (62.5%) of the respondents are employed in health center laboratories, whereby 4 people are employed as supervisors, 36 people as heads of laboratories and 90



people as other employees. The remaining respondents (37.5%) are employed in laboratories in hospitals, namely 15 people as heads of laboratories and 63 people as other employees.

### 2.3 RESEARCH METHODOLOGY

We used a quantitative research method. The primary data was collected by means of a structured questionnaire. We contacted the heads of laboratories via telephone and asked them to assist in the submission of surveys to their colleagues. We subsequently sent surveys to them by post. Upon completion, the respondents returned the completed surveys to the address provided in the accompanying survey letter. The questionnaire was designed based on the purpose and objectives of the research and the basic assertions. The principle of the selection of items that were included in the questionnaire was based on the theoretical perspectives found in literature (Kotler and Armstrong, 2018; Vukasović, 2020). These measuring instruments were adapted for our own research case. When forming the assertions, we used a five-level Likert scale from 1 to 5, where for the selected assertion a rating of 1 means: "I do not agree at all", where for the assertion a rating of 5 means: "I agree completely".

For each element of the marketing mix, after-sales activities and public procurement, we formed a set of statements that were tested in a quantitative research. The questions are grouped into different content sections, which allows the analysis of each narrower range and model variable.

In order to test the fundamental thesis and the hypotheses of the study, we analyzed the data by the corresponding uni-, bi- and multivariate data processing methods in the SPSS statistical package. Linear relationships between the selected variables were determined by the correlation coefficient and linear regression analysis. The conceptual model, model connections and hypotheses were tested by correlation and regression analysis.

### 2.4 RESULTS

The reliability of the measuring instrument was tested using the Cronbach Alpha test. We checked whether the presented indicators were a quality measuring instrument for the mentioned latent variables. The reliability of the measurement was labelled as exemplary if the coefficient  $\alpha \geq 0.80$ . If the coefficient at the interval was  $0.70 \leq \alpha < 0.80$ , the reliability was labelled very good, and moderate if it was at an interval of  $0.60 \leq \alpha < 0.70$ . If the Alpha coefficient was less than 0.60, it was barely acceptable. The results of the research, indicate that the measuring instrument is very reliable, since Cronbach Alpha is greater than 0.8. Finally, the reliability of individual variables was also tested. The Cronbach Alpha coefficient of reliability of variables is 0.74, which in accordance with the outlined criteria for measurement signifies very good reliability of measurement.

As part of the survey data analysis, and in relation to the H1 hypothesis, we first checked what impact after-sales activities have on the preparation of the public procurement tender documentation in the marketing of medical devices to social welfare institutions compared with the elements of the marketing mix.

**Table 1: Pearson's correlation coefficient between the elements of the marketing mix, after-sales activities and the public procurement variable**

		Public procurement
Product	Pearson's correlation coefficient	,145*
	Statistical significance (Sig.) (two-tailed)	,037
	N	208
Price	Pearson's correlation coefficient	,203**
	Statistical significance (Sig.) (two-tailed)	,003
	N	208
Distribution	Pearson's correlation coefficient	,085
	Statistical significance (Sig.) (two-tailed)	,221
	N	208
Promotion	Pearson's correlation coefficient	,090
	Statistical significance (Sig.) (two-tailed)	,194
	N	208
After-Sales Activities	Pearson's correlation coefficient	,069
	Statistical significance (Sig.) (two-tailed)	,324
	N	208
**. Correlation is significant at the 0.01 level (two-tailed)		
*. Correlation is significant at the 0.05 level (two-tailed)		

As can be seen from Table 1, all the studied elements are with regard to the "Public procurement" in positive correlation with each other. Hypothesis 1, is confirmed. In the marketing of medical devices through public procurement, after-sales activities (contacts with buyers) are very important, since the after-sales activities (monitoring and maintenance of contacts, preparation of seminars, informing about novelties) only begin after signing the contract.

In the continuation of the study, we checked (H2) whether good product characteristics statistically significantly influence the preparation of public procurement tender documentation when marketing medical devices to social welfare institutions. Using the Pearson's correlation coefficient, we verified the mutual correlation between the "Product" marketing mix set and the "Public Procurement (preparation of tender documentation)" variable (Table 2).

**Table 2: Pearson's correlation coefficient between the "Product" marketing mix set and the "Public Procurement (preparation of tender documentation)"**

		Public Procurement
Product	Pearson's correlation coefficient	,145*
	(Sig.)(2- two-tailed)	,037
	N	208
*. The correlation is significant at 0.05 (2-stransko)		

It is evident (Table 2) that the studied sets of marketing mix are in a positive mutual correlation. A weak correlation ( $r = 0.145$ ) is observed between "Product", an element of the marketing mix, and the "Public procurement (preparation of tender documentation)" variable.

With the analysis of variance (ANOVA), we later examined the impact of "Product", the studied element of the marketing mix, on the "Public Procurement (preparation of tender documentation)" variable. The results of the analysis of variance indicate that the value of Sig. (two-tailed) is less than 0.05 (Sig.,  $\leq 0.05$ ) only for two assertions. We can conclude that for the assertions: "Products should be of an identifiable brand", and "When choosing products, their origin is important", there are statistically significant differences on the studied variable, i.e. "Public Procurement (preparation of tender documentation)." There are no statistically significant differences between the other studied variables. According to the presented results of the statistical analyses, we note that only some product characteristics statistically significantly influence the preparation of public procurement tender documentation when marketing medical devices to social welfare institutions. On the basis of the statistical calculations, Hypothesis 2, is rejected.

The personal sale is the element which influences the outcome of the selection of a bidder in the marketing of products under public procurement procedures at all different stages through the two elements of the marketing mix: "Market Channel (Distribution) and "Marketing Communication (promotion)". These two phases include all the decisive steps that the buyer decides to take in order to get a picture of a product and a company.

We were interested in whether personal sales as a marketing and communication channel statistically significantly influence the preparation of public procurement tender documentation when marketing medical devices to social welfare institutions (H3). In the "Personal Sales" set, we included the marketing mix elements of "Market Channel (Distribution)" and "Marketing Communication (Promotion)".

The impact of personal sales on the preparation of public procurement tender documentation when marketing medical devices to social welfare institutions was tested by means of a regression analysis, correlation and analysis of variance (ANOVA).

Below we show the correlation analysis and the results obtained for the "Personal Sales" variable with regard to the "Public Procurement" variable (Table 3).

**Table 3: Pearson's correlation coefficient between the variable "Personal Sales" and variable "Public Procurement"**

		Public Procurement
Personal Sales	Pearson's correlation coefficient	,092
	(Sig.)(2- two-tailed)	,186
	N	208
*. The correlation is significant at 0.05		

Based on the results of the correlation analysis, we can conclude that the “Personal Sales” and “Public Procurement” variables are in a weak mutual correlation ( $r = 0.92$ ). From the results it is evident that Sig value (two-tailed) is less than 0.05 ( $\text{Sig.} \leq 0.05$ ), and thus we can conclude that between the studied variables, there are significant differences. Based on statistical calculations, Hypothesis 3, is confirmed.

In the survey, we also checked whether the independent variable, the price of the product indicates its quality, innovativeness, origin, brand recognition and statistically significantly influences the preparation of tender documentation for public procurement in the marketing of medical devices to social welfare institutions (H4). Consumers are often judged on product quality on the basis of basic product-related information. The information can be internal or external. External information that can influence the quality opinion on a product can be, for example, price, reputation, brand, origin, advertising message.

It is evident that only the independent variable “The brand justifies a high price” has a statistically significant influence on the dependent variable of “Public Procurement”, as the value of the test at the studied assertion is  $\text{Sig.} = 0.04$  and is less than  $\text{Sig.} \leq 0,05$ . Since we were also interested in the correlation between the variable "Public Procurement (preparation of tender documentation) “ and the marketing mix element of “Price”, we used the Pearson coefficient of correlation to check mutual correlations. The variable of “Public Procurement (preparation of tender documentation)” and the marketing mix element of “Price” are in a positive correlation with each other. The results show a weak correlation between them ( $r = 0.203$ ).

Hereinafter we refer to the performed analysis of the correlation between the individual assertions of the “Public Procurement” variable and the assertions of the marketing mix element of “Price”. The strongest yet still a weak correlation ( $r = 0.291$ ) is seen between the assertion “In accordance with the law, by which only the cheapest bidder counts, but under the conditions of connections and acquaintance (VIP), based on the eligibility criteria that are predetermined” and the assertion “the origin of a product justifies its high price”. The strongest negative correlation is noted between the assertion “In accordance with the law, by which only the cheapest bidder counts, but under the conditions stated in the pro-forma invoice, based on preliminary product testing.” and the assertion “the origin of a product justifies its high price” ( $r = -0.135$ ). Of all the 24 measured correlations between the assertions of the variable “Public

Procurement” and the assertions of the marketing mix element of “Price”, there were six negative correlations, while all the other correlations are according to Padua (2008) on the scale of linear correlation level at  $0 < |r| < 0.3$ , which is a weak correlation. Based on statistical calculations, Hypothesis 4 is partly confirmed.

Using the Pearson's correlation coefficient, we found that all the elements of the marketing mix, the “After-Sales Activities” variable and the “Public Procurement (preparation of tender documentation)” variable are in mutual correlation. We concluded that “Personal Sales”, which combines the marketing mix elements of “Marketing Channel (distribution)” and “Marketing Communication (promotion)”, is in the strongest correlation, which confirms our hypothesis that this is the most effective form of marketing of medical devices to social welfare institutions through public procurement. By the strength of mutual correlation, it is followed by the marketing mix element of “Market Channel (Distribution)” and the “After-Sales Activity” variable as well as the marketing mix element of “Market Communication (Promotion)” and the “After-Sales Activity” variable. Based on the strength of the correlation, we can note that after-sales activities are almost as important as personal sales in the marketing of medical devices to social welfare institutions through public procurement.

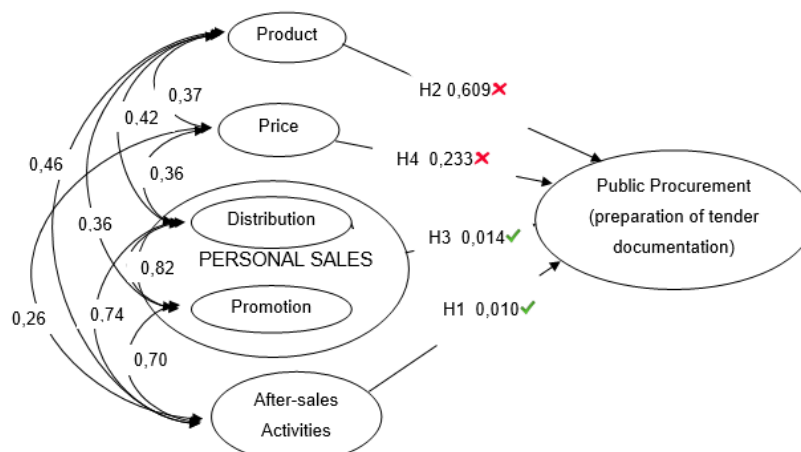
Below, in Table 4, we show the variance (ANOVA) calculations.

**Table 4: Analysis of variance (ANOVA) of the elements of the marketing mix and the "After-sales activities" variable in relation to "Public procurement (preparation of tender documentation)"**

	Correlation		Impact
Product	→	Public procurement (preparation of tender documentation)	0,609✗
Price	→	Public procurement (preparation of tender documentation)	0,233✗
Distribution	→	Public procurement (preparation of tender documentation)	0,011✓
Promotion	→	Public procurement (preparation of tender documentation)	0,033✓
After-sales activities	→	Public procurement (preparation of tender documentation)	0,010✓

We found that between the marketing mix elements of “Price” and “Product” there is no statistically significant difference for the “Public Procurement (preparation of tender documentation)” variable. For this reason, we cannot generalize the previously obtained data on the correlation of the marketing mix elements of “Price” and “Product” to the entire population. In addition, we note that all the studied variables are mutually positively correlated and that the “Personal Sales” variable, which combines the marketing mix elements of “Marketing Channel (distribution)” and “Marketing Communication (promotion)” is equally important in the marketing of medical devices to social welfare institutions as the “after-sales activities” variable.

Based on the basic research thesis and hypotheses that have been verified, we developed a structural model of correlations between the studied elements, as shown in Figure 3.



**Figure 3: Structural model of correlations between the studied elements of the marketing mix, the "After-sales activities" variable in relation to "Public procurement (preparation of tender documentation)"**

### 3 CONCLUSION

The research focuses on the views of the involved actors who are in our case employed in laboratories, hospitals and health centers. The studied variables were in this type of marketing shown as mutually dependent variables that affect the preparation of tender documentation in the marketing of medical devices (devices for blood sampling) to social welfare institutions, where sales are made through public procurement. By conducting statistical analyses, we found that all the studied variables are in a positive correlation with each other and that the “Personal Sales” variable, which combines the marketing mix elements of “Market Communication (promotion)” and “Market Channel (distribution)”, is equally important in the marketing of medical devices to social welfare institutions through public procurement as the “After-Sales Activities” variable. Based on the results, we produced a structural model of correlations between the studied elements. The model represents an added value not only in the field of scientific and research work, but also in the field of usability in practice. Using the statistical analysis, we proved that the proposed additional element of the marketing mix, "After-sales activities", is very important in this type of marketing and equivalent to the marketing mix elements of marketing communication (promotion) and marketing channel (distribution) in this type of marketing and that personal sales is that form of a marketing channel and marketing communication that combines both elements into one and is most effective in the marketing of medical devices to social welfare institutions through public procurement. The research is a contribution to the fact that in the process of marketing products through public procurement, the same attention is devoted to the after-sales activities as to the design and development of new products, planning of marketing channels (distribution), marketing communication (promotion) and pricing.

The research results presented in the paper can be a trigger for further research. The newly designed model can be used in practice. In the study, we limited ourselves to studying the

correlations of the selected elements of the product marketing mix. We selected a simplified concept of 4P. In the future, it would be useful to include other elements of the product marketing mix, which are mentioned by authors in the different concepts of the marketing mix. In this way, we would explore the correlations between the expanded marketing mix and other studied variables and find out if there are generally valid rules of correlations in the marketing of products through public procurement, as defined by the Public Procurement Act. Generalization for the purpose of directly understanding and solving problems in the medical products market is not realistic. The research is based on the results obtained in a narrow segment of the medical products market, which makes them useful with a high degree of reliability only in this product group. For the purpose of comparability, the results may be used within the field of medical products, and in so doing we have to take into account the specificity of medical products and the medical industry. Companies that market these products exclusively to social welfare institutions can market them only through public procurement defined by the Public Procurement Act. The paper presents the importance of each variable, in the eyes of the buyer in the marketing of products through public procurement. The conducted research also serves as a model that enables more successful sales for the companies offering medical devices, and thus a better competitive position on the market.

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