

# DECISION MAKING ON VARIOUS APPROACHES TO IMPORTANCE-PERFORMANCE ANALYSIS (IPA)

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## ABSTRACT

The purpose of this paper is to compare several approaches to Importance-Performance Analysis (IPA) and show how different criteria can be used for dividing the IPA matrix to decision-making fields. The authors performed the IPA analysis basing on the data collected in customer satisfaction survey in health care sector. The survey was conducted from January to April 2016 in selected dentist's surgeries in cities Żywiec and Bielsko-Biała (southern Poland). Over 200 questionnaires were distributed, 100 of them returned. The study may facilitate the selection of appropriate form of matrix used in customer satisfaction surveys. It may be useful in future studies on adequate approach to IPA analysis. The paper is based on unpublished, own study.

## KEY WORDS

customer research, customer satisfaction, customer satisfaction survey, Importance-Performance Analysis, IPA

## JEL CODES

M300, I110

## 1 INTRODUCTION

### 1.1 Importance-Performance Analysis (IPA)

IPA is a tool that is easily applicable in marketing research. It helps to indicate main factors, attributes of product or service which require an immediate response (improvement). Furthermore the visualization of data can

clearly show areas of concern and facilitate changes.

The IPA analysis was introduced by Martilla and James (1977). Since then IPA has been applied to a diverse range of context including various branches, among them: automotive (Meng and Yun, 2016), food (Tzeng and Chang, 2011), health care (Yavas and Shemwell,

2001; Olbrych and Łopyta, 2011; Gajewska and Piskrzyńska, 2016), tourism (Guadagnolo, 1985; Haahiti and Yavas, 2004), educations (Biesok and Wyród-Wróbel, 2015; Kitcharoen, 2004), banking (Joseph et al., 2005).

The classic form of IPA, proposed by Martilla and James (1977), recognizes satisfaction as the function of two components: the importance of the product or service to the client and the performance of business in providing that service or product.

The means of importance and performance rating are placed on the Cartesian diagram in which one axis represents importance of selected attributes and the other one shows the product's/service's performance in relation to these attributes. This graphic interpretation of the IPA is called an Importance-Performance matrix or grid. The matrix is divided into four quadrants ( $2 \times 2$ ). Each quadrant suggests a different marketing strategy, recommendation for the attribute. Fig. 1 illustrates the classic IPA matrix.

The four quadrants in IPA are characterized as (Martilla and James, 1977; Silva and Fernandes, 2011):

- A. Keep up with the good work – high importance, high performance: attributes placed here indicate opportunities for achieving or maintaining competitive advantage and are major strengths.
- B. Concentrate here – high importance, low performance: these attributes require immediate attention for improvement and are major weaknesses.
- C. Low priority – low importance, low performance: these attributes are minor weaknesses and do not require additional effort.
- D. Possible overkill – low importance, high performance: these attributes indicate that business resources committed to them would be overkill and should be deployed elsewhere.

The organization should focus their attention on those attributes for which importance is

high and performance is low. If the organization is able to improve on these attributes they represent the largest potential gains (Eskildsen and Kristensen, 2006).

## 1.2 Alternative Approaches to the Analysis

Despite of simplicity IPA analysis several different approaches to inferring priorities and measuring importance have emerged in the literature (e.g. Oh, 2001; Bacon, 2003; Fuchs and Weiermair, 2003; Abalo et al., 2007; Biesok and Wyród-Wróbel, 2015). Usually modifications rest on different division of the matrix. For example Abalo et al. (2007) proposed such solution: the main matrix was divided by diagonal line (45-degree line, also called iso-line) into two equal parts (the new area occupies the whole of the zone below the priority line). The quarter below the diagonal line is an area that requires special attention. In relation to the criteria contained in this part of the graph improvement actions should be introduced (Fig. 2a). The interpretation of the areas above the diagonal line is the same as in the original Martilla and James (1977) diagram.

For comparison, Biesok and Wyród-Wróbel (2015) used other convention. The data for the analyses were gathered in survey on satisfaction of students of management at the University of Bielsko-Biala. In conclusion of the study, the authors proposed applying 6 decision fields (Fig. 2b):

- Field A1 – keep up the good work.
- Field A2 – warning: good work, but worsening of these factors implicates immediate improvement because it can affect on customer satisfaction in a large extent.
- Field C1 – factors of low priority with which you do not have to deal.
- Field C2 – factors that can be improved in some time horizon.
- Fields B and D have the same meaning as in classical IPA matrix.

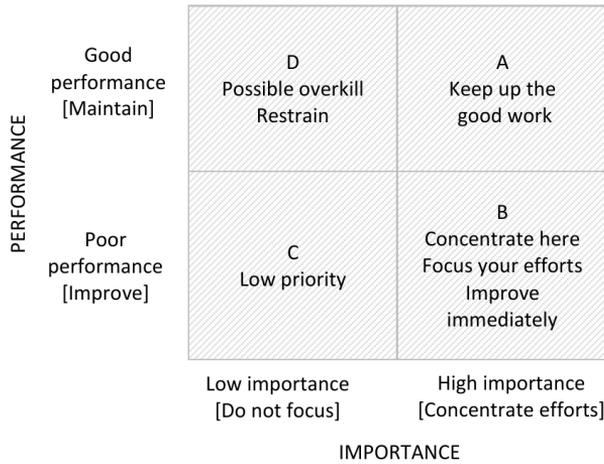


Fig. 1: The IPA matrix – adapted from Martilla and James (1977).

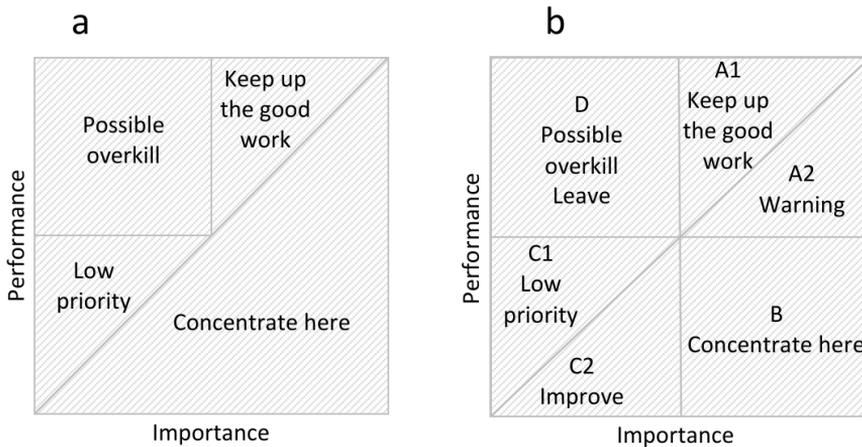


Fig. 2: Modifications of the IPA matrix – (a) Abalo et al. (2007); (b) Biesok and Wyród-Wróbel (2015), adapted from Martilla and James (1977), Bacon (2003).

## 2 METHODOLOGY AND DATA

### 2.1 Research Instrument

Various approaches to IPA analysis was tested using data gathered in the survey on customer satisfaction of dental surgeries in Żywiec and Bielsko-Biała (Silesian Voivodship, Poland). The survey was performed from January to April 2016.

The questionnaire for this study included four main sections. The first section included questions connected with dental service and among them the question about overall satisfaction

of the dental service. The second section of the questionnaire contained 15 dental service attributes which were identified basing on a focus group discussions.

In the survey, the respondent was asked to evaluate importance and the performance of these attributes. For evaluating the attributes 5-point scale was used, ranging from 1 – not important at all, very bad (performance) to 5 – very important, very good performance.

The other sections of the questionnaire included questions about loyalty, expectations and recommendations.

## 2.2 The Sampling Method

Data was collected using a paper questionnaire that was available in selected dental surgeries. Patients could take a part in the survey voluntarily, filling the questionnaire. There were no age or other limitations for participation in the study. Over 200 questionnaires were distributed and 100 valid questionnaires were received, so the response rate reached nearly 50%.

## 2.3 Data Analysis

The data was analysed in two variants:

- classical – the IPA matrix was constructed using mean performance and importance rating taken from the survey,
- in the second variant the importance measures was estimated using linear regression.

The second variant is part of a broader problem: how to perform the analysis without data about the importance of the attributes, for example in case of using survey data in which respondents were not asked about the importance of quality attributes. In the literature you can find various proposals of the solution of the problem: with using multiple regression coefficients (e.g. Matzler and Sauerwein, 2002) or linear correlation coefficients (e.g. Biesok and Wyród-Wróbel, 2015).

In this case we used another approach. The measures of the attributes importance was

estimated using single linear regression. We assumed that overall satisfaction rating (SAT) expressed by respondents in the survey is linear and related to every studied attribute. The relation among them can be shown as a such linear equation:

$$\text{SAT} = I_i P_i + b_i, \quad (1)$$

where: SAT – overall satisfaction rating expressed by respondents,  $P_i$  – performance rating of  $i = 1 - 15$  attributes expressed by respondents,  $I_i$  – linear regression coefficient,  $b_i$  – linear regression intercept.

Then we calculated linear regression coefficients  $I_1 - I_{15}$  between overall satisfaction rating (SAT) and ratings of every attribute performance. These coefficients were used for analysis as measures of importance of the attributes.

In both variants the matrix was divided into four decision fields in the “centre of gravity” of the importance and performance rating and cut in half with priority-line (iso-line). Then the attributes were classified into decision fields, using following approaches:

- simple – based only on priority line (iso-line),
- classical 4-field,
- 6-field, proposed by Biesok and Wyród-Wróbel (2015).

At the end we compared the results of the analysis and showed both the similarities and differences and different approaches witch influenced conditions for decision making, based on the IPA analysis.

## 3 RESULTS

In the first variant of the study, we performed IPA analysis in a classical way. Lines dividing the matrix were lead in the relative middle (“centre of gravity” of the attributes) with additional 45-degree iso-line. The classical IPA matrix is shown on the Fig. 3.

Tab. 1 shows the results of IPA analysis in the first variant. All three decision criteria are consistent only in one case: attribute A5 and

suggest focusing attention on the prices in the office.

The approach based on priority line (iso-line) causes the biggest differences in the assessment of attributes. It gives only dichotomous response (concentrate or leave) and its recommendations stand out from other approaches.

In the case of analysed survey, the classical division of the IPA matrix gives to

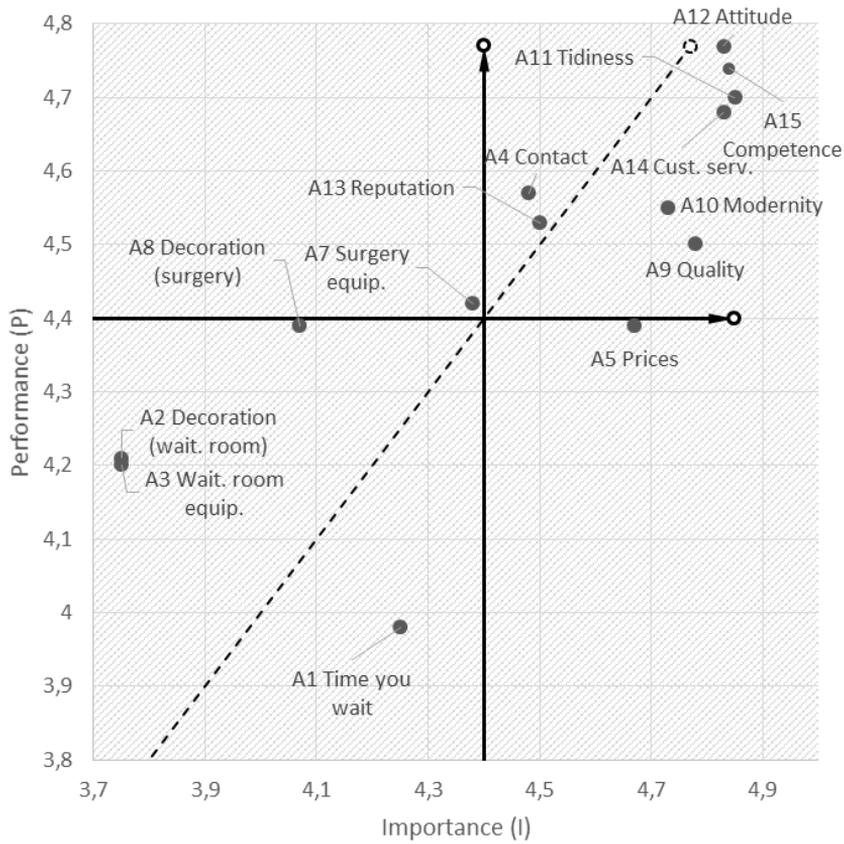


Fig. 3: Classical IPA matrix. Attribute A6 (Acceptability of credit cards) is over the range because of its low importance.

Tab. 1: Classical IPA analysis results and decisions about attributes

Attribute	I	P	Priority line criterion	4-field criterion	6-field criterion
A1 Time you wait for appointment	4.25	3.98	Concentrate	Low prio.	Improve
A2 Interior decoration of the waiting room	3.75	4.21	Leave	Low prio.	Low prio.
A3 Waiting room equipment	3.75	4.20	Leave	Low prio.	Low prio.
A4 Contact with a patient	4.48	4.57	Leave	Keep up	Keep up
A5 Prices of treatments	4.67	4.39	Concentrate	Concentrate	Concentrate
A6 Acceptability of credit cards	3.23	3.39	Leave	Low prio.	Low prio.
A7 Doctor’s surgery equipment	4.38	4.42	Leave	Leave	Leave
A8 Interior decoration of the doctor’s surgery	4.07	4.39	Leave	Low prio.	Low prio.
A9 Quality of treatments	4.78	4.50	Concentrate	Keep up	Warning
A10 Modernity of tools and treatments	4.73	4.55	Concentrate	Keep up	Warning
A11 Tidiness	4.85	4.70	Concentrate	Keep up	Warning
A12 The attitude to the patient	4.83	4.77	Concentrate	Keep up	Warning
A13 The reputation of the office	4.50	4.53	Leave	Keep up	Keep up
A14 Customer service quality	4.83	4.68	Concentrate	Keep up	Warning
A15 The competence of the staff	4.84	4.74	Concentrate	Keep up	Warning

many attributes recommendation “keep up”, so therefore it may seem that respondents are satisfied with them. Here 6-field approach is more accurate because most of these attributes have the recommendation “warning”, which means that despite the good reception by the respondents, we should pay attention to them, because their worsening can have a significant impact on the perception of the service and customer satisfaction.

In the second variant of the study, IPA analysis was performed with a regression-derived importance values. Fig. 4 and Tab. 2 show the results of IPA analysis with obtained regression coefficients (I-r) in function of importance measure. Additionally their statistical significance at level 0.05 is marked with an asterisk (\*). The lines dividing the matrix were lead in the same way, as in the preceding variant.

This variant used different importance values, so the matrix structure was rebuilt. Although it does not differ considerably from the classic IPA matrix. We can notice a greater compatibility between 4-field and 6-field approaches. The attributes A2, A7, A10, A8, A13 have the same recommendations, regardless of the used criterion. The disadvantage of this result, limiting the possibility of proper conclusions, is that not all that received the regression coefficients are statistically significant (statistically different from zero).

As already stated, in presented case, the matrix obtained by estimating the importance measures does not differ much from the classical matrix IPA. Tab. 3 shows the results of these analyses and recommendations obtained in both variants with 6-field criterion used.

## 4 DISCUSSION AND CONCLUSIONS

In classic way, importance of attributes in the IPA analysis is rated consciously by the respondents. In contrast, importance measures estimated with the statistical methods can be considered as an importance expressed indirectly. Matzler and Sauerwein (2002) call those two importance measures as the explicit and implicit importance.

The importance of the attributes rated by the respondents is different from the statistically derived ones. It can be assumed that the importance of attributes will correlate with overall assessment of satisfaction (very important attributes should have a strong impact on overall satisfaction score). However, it is not like this attribute having significant statistical influence on overall satisfaction may not always be rated by the respondent as the most important.

Our short study also showed, that a change in approach to IPA analysis, implies taking various decisions. All of these approaches are equal and literature or studies do not indicate any of them as a model. Oh (2001) says explicitly that one of the IPA limitations is the lack of framework

for this method. Therefore various approaches to IPA may provide contradictory results.

The main limitation of our study is the selection of the sample. The sample was rather small and its random nature may cause that the sample is unrepresentative. The second limitation of the study may also be a branch where we performed our survey. Dental surgeries are expected to be a specific type of services and our results cannot be directly generalized to other commercial services. The third limitation is that not all received regression coefficients are statistically significant, which limits the possibility of proper conclusion in the second variant of our study.

Future research should test and compare various variants of the analysis, especially in other branches. Researchers should also look for other, more effective methods of importance measurement. This will facilitate future research (the respondent would not have to assess twice the same list of attributes) and will give an opportunity to provide the IPA analyses using data, where respondents did not rate the importance of attributes.

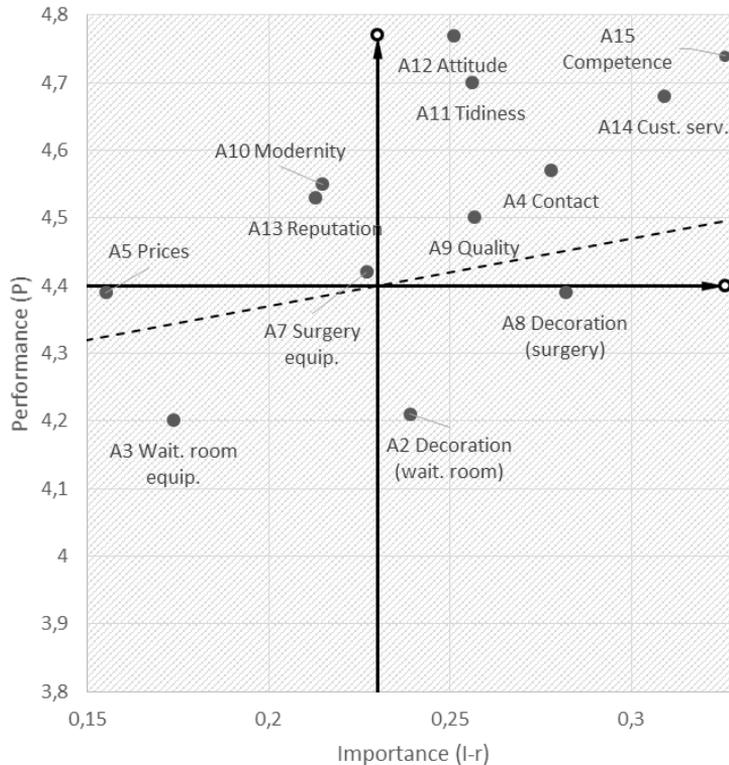


Fig. 4: IPA matrix with a regression-derived importance values. Attribute A6 (Acceptability of credit cards) is over the range because of its low importance.

Tab. 2: IPA analysis with a regression-derived importance measure and decisions about attributes

Attribute		I-r	P	Priority line criterion	4-field criterion	6-field criterion
A1	Time you wait for appointment	0.140	3.98	Concentrate	Low prio.	Improve
A2	Interior decoration of the waiting room	0.239*	4.21	Concentrate	Concentrate	Concentrate
A3	Waiting room equipment	0.174*	4.20	Concentrate	Low prio.	Improve
A4	Contact with a patient	0.278*	4.57	Leave	Keep up	Keep up
A5	Prices of treatments	0.155	4.39	Leave	Low prio.	Low prio.
A6	Acceptability of credit cards	0.055	3.39	Concentrate	Low prio.	Improve
A7	Doctor's surgery equipment	0.227*	4.42	Leave	Leave	Leave
A8	Interior decoration of the doctor's surgery	0.282	4.39	Concentrate	Concentrate	Concentrate
A9	Quality of treatments	0.257*	4.50	Leave	Keep up	Keep up
A10	Modernity of tools and treatments	0.215*	4.55	Leave	Leave	Leave
A11	Tidiness	0.256*	4.70	Leave	Keep up	Keep up
A12	The attitude to the patient	0.251	4.77	Leave	Keep up	Keep up
A13	The reputation of the office	0.213*	4.53	Leave	Leave	Leave
A14	Customer service quality	0.309*	4.68	Leave	Keep up	Keep up
A15	The competence of the staff	0.326*	4.74	Leave	Keep up	Keep up

Note: Statistically significant at level 0.05 (\*) or non-significant.

Tab. 3: Results and recommendations of IPA analysis in classic variant (I) and with importance measures estimated using linear regression (I-r)

Attribute	I	I-r	Recommendation
A1 Time you wait for appointment	Improve	Improve	The same
A2 Interior decoration of the waiting room	Low prio.	Concentrate	Different
A3 Waiting room equipment	Low prio.	Improve	Similar
A4 Contact with a patient	Keep up	Keep up	Similar
A5 Prices of treatments	Concentrate	Low prio.	Similar
A6 Acceptability of credit cards	Low prio	Improve	Similar
A7 Doctor's surgery equipment	Leave	Leave	The same
A8 Interior decoration of the doctor's surgery	Low prio.	Concentrate	Similar
A9 Quality of treatments	Warning	Keep up	Similar
A10 Modernity of tools and treatments	Warning	Leave	Different
A11 Tidiness	Warning	Keep up	Similar
A12 The attitude to the patient	Warning	Keep up	Similar
A13 The reputation of the office	Keep up	Leave	Different
A14 Customer service quality	Warning	Keep up	Similar
A15 The competence of the staff	Warning	Keep up	Similar

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