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Using the advantages of the KANO model in the process of designing a modern summer house

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Abstract: The aim of the study was to define and assign to an appropriate group the attributes that the client is looking for and requires when deciding to buy a summer house. This aim was achieved through the use of the KANO model, which helps to define and divide the attributes of a given product into four groups: must-have attributes, one-dimensional attributes, delighters and mistakes. The KANO model was used in a construction company in the process of designing a modern summer house. A questionnaire was carried out, the aim of which was to select a representative group and to investigate what attributes customers who decide to build a summer house are looking for. The result of the survey was the identification of 4 groups of attributes and obtaining information that could support the design of a modern summer house. The results showed that customers are looking for a summer house project, which has, among others attributes, solutions that can enable the house to be used as a year-round house.

Keywords: summer house, customer requirements, KANO model, questionnaire

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Introduction

Each company, in the process of designing new products and services, looks for ways to understand the needs and requirements of customers. Often the language used by customers is confusing and unclear for designers and constructors. The client may know exactly what he wants and expects, but find it difficult to convey what they want in technical language. The company is interested in information about the perception of a product by a potential customer, what features of the product

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are necessary and desired by the customer, which are irrelevant to them, which irritate them and what features they do not need. Therefore, it becomes necessary to define the concept of quality for the customer, with an emphasis on “perceived quality” and “technical quality”. Perceived quality differs significantly from technical quality as it depends on factors such as competition, advertising and customer expectations.

A summer house is real estate that is being built for temporary or occasional residence. Owning a summer house is associated with many advantages (including the ability to rest at any time without prior reservation), which is why the construction or purchase of such houses is currently very popular. The COVID pandemic has contributed to some extent to the popularity of such houses. During the lockdown period, people living mainly in blocks of flats must have painfully felt the inability to go out into the fresh air and the lack of their own piece of backyard, so therefore the decision to buy a plot or a summer house.

The subject of the study is a BRDA-type summer house. The building has a characteristic A-shaped body with a steeply sloping, two-section roof that functions as walls. The building is easy and relatively cheap to build, which is why it enjoys unflagging popularity. Currently, its appearance is modernized by large glazing or terraces.

The aim of the study is to define the attributes that the client requires when purchasing a summer house project and assigning them to the appropriate group specified in the assumptions of the KANO model in a construction company offering summer houses. The work is to assess whether the KANO model will help in indicating the attributes that customers require and expect from the summer houses built in the analyzed company.

1. The theoretical basis for the KANO model

The Kano model was developed by the Japanese quality management theorist Noriaki Kano in the 1980s (Al Rabaie, 2021; Brajer-Marczak, 2015; Ingaldi, 2016; Ingaldi et al., 2018; Kuo, 2004; Luor et al., 2015; Meng, 2018; Tan et al., 1999). According to the model, product attributes can be divided into 4 groups (Takehara, 2016; Wolniak & Skotnicka 2008):

- Must-have attributes – these are attributes that do not affect the level of customer satisfaction, the customer considers them obvious and when asked about a given product, they do not even mention such attributes. However, if the product does not have such an attribute, the customer is dissatisfied.
- One-dimensional attributes – such attributes are searched for by the customer, they are easy to define, because the customer is aware of their existence and if the product has such an attribute, the customer will be satisfied.
- Delighters – if the customer has such attributes in a given product, he will be very happy because he did not expect them, also due to the lack of awareness of the existence of delighters or, in the absence of them, it will not reduce customer satisfaction.

- Mistakes – when creating a product with such an attribute, the manufacturer thinks that it will be well received by the customer, but it turns out that it is irrelevant, redundant or has no impact on the level of customer satisfaction.

In the Kano model, it is necessary to conduct a customer survey through a properly constructed questionnaire. This questionnaire specifies the type of attribute and examines customer reactions to two variants (Gupta & Shri, 2018; Rashid, 2010; Wiśniewska, 2009):

- positive – if the product has a given attribute and functions properly,
- negative – if the product does not have a given attribute or does not function properly or only satisfactorily.

For each variant, the client can choose from statements such as: “like it”, “expect it”, “don’t care”, “live with” and “dislike”. The questionnaire result is a combination of two answers, each answer can take five values, which gives a total of 25 variants of their combination. Table 1 presents the determination of the type of attribute in the Kano model (Wolniak & Skotnicka, 2008).

Table 1. Determination of the type of attribute in the Kano model (Wolniak & Skotnicka, 2008)

		Negative				
		1. like it	2. expect it	3. don't care	4. live with	5. dislike
Positive	like it	Q	A	A	A	O
	expect it	R	I	I	I	M
	don't care	R	I	I	I	M
	live with	R	I	I	I	M
	dislike	R	R	R	R	Q

Where: A – excitement attributes (delighters), O – one-dimensional attributes, M – must-have attributes, I – customer does not show preferences for a given attribute, R – the customer does not want the attribute, Q – contradiction, the client wants the attribute was and was not there

When all the features have been categorized, preliminary design work begins on a new product that will meet certain requirements (Szeliga-Kowalczyk & Łabaza, 2016; Madzik, 2018).

The Kano model is dynamic, due to the changing needs of customers. Moreover, the nature of a given attribute is not adopted permanently (Ulewicz, 2016).

2. Methodology and analysis of results

The analysis of the client’s attributes and their impact on the perceived quality of the product was carried out in a company that produces wooden houses, summer houses and garages. Analyzing the requirements and needs of customers and the changing market trends, the company decided to design an improved BRDA

summer house. In order to better understand the clients' needs, a short questionnaire was conducted (Jagusiak-Kocik, 2020), in which the clients were asked to indicate the most important attributes, for them, which a summer house should have. The questionnaire was sent to the company's regular customers and to randomly selected people (200 e-mails were sent). Apart from the question about the attributes of the summer house, the respondents were asked to fill in a short personal information survey. The result of the online questionnaire was the creation of a representative group of 40 people. In order to create a representative group, the responses from the e-mails were compiled into 4 groups and 10 questionnaires were selected from each of these groups. The representative group was dominated by women aged 30 to 40, with a higher education background. After the questionnaire, the 11 most frequently repeated attributes of a summer house indicated by the respondents were also identified.

Table 2. Sample of the Kano questionnaire concerning the BRDA type summer house (*own research*)

1. Should a BRDA-type summer house have the possibility of being built on stilts or slabs? a) like it b) expect it c) don't care d) live with e) dislike	1. If the BRDA-type summer house does not have a possibility of being built on stilts or slabs? a) like it b) expect it c) don't care d) live with e) dislike
2. Should a BRDA-type summer house have glazing on both floors? a) like it b) expect it c) don't care d) live with e) dislike	2. If the BRDA-type summer house does not have glazing on both floors? a) like it b) expect it c) don't care d) live with e) dislike
...	...
10. Should a BRDA-type summer house have PVC windows? a) like it b) expect it c) don't care d) live with e) dislike	10. If the BRDA-type summer house does not have PVC windows? a) like it b) expect it c) don't care d) live with e) dislike
11. Should a BRDA-type summer house have storage space? a) like it b) expect it c) don't care d) live with e) dislike	11. If the BRDA-type summer house does not have storage space? a) like it b) expect it c) don't care d) live with e) dislike

These attributes are shown below:

1. possibility of building houses on stilts or slabs,
2. glazing on both floors,
3. a large terrace,
4. fireplace,
5. open kitchen,
6. energy efficiency,
7. concrete floors,
8. insulation of the floor,
9. insulated steel door,
10. PVC windows,
11. storage space.

After identifying the most important attributes according to the respondents, a questionnaire was conducted with the use of the Kano model. A sample of such a questionnaire is presented in Table 2.

Another element of the analysis was the comparison of results from the KANO questionnaire with the division of the customer's reaction to the positive and negative variant of the analyzed product. The summary is presented in Table 3.

Table 3. Summary of the results of some of the studies on the Kano questionnaire concerning the BRDA type summer house (*own research*)

Attributes	Respondents												
	1		2		3		...	38		39		40	
	P	N	P	N	P	N	...	P	N	P	N	P	N
1. possibility of building houses on stilts or slabs	b	e	b	e	e	b	...	c	c	e	b	e	b
2. glazing on both floors	a	e	a	e	b	e	...	b	e	a	e	a	e
3. a large terrace	b	e	b	e	b	e	...	b	e	a	e	a	e
...
9. insulated steel door	c	c	b	e	a	d	...	c	c	a	d	c	c
10. PVC windows	c	c	a	d	a	d	...	c	c	a	d	c	c
11. storage space	b	e	b	e	b	e	...	c	c	a	d	c	c

Where: P – positive, N – negative

The last part of the analysis in the KANO model is to determine the group to which a given attribute belongs, based on Table 1. Some of the results are presented in Table 4.

Table 4. Identification of the group to which the given attribute of the BRDA-type summer house belongs (*own research*)

Attributes	Respondents						
	1	2	3	...	38	39	40
1. possibility of building houses on stilts or slabs	M	M	R	...	I	R	R
2. glazing on both floors	O	O	M	...	M	O	O
3. a large terrace	M	M	M	...	M	O	O
...
9. insulated steel door	I	M	A	...	I	A	I
10. PVC windows	I	A	A	...	I	A	I
11. storage space	M	M	M	...	I	A	I

Conclusion

The BRDA-type summer house is still very popular in Poland. It is a favoured choice of project due to its simplicity in construction and the possibility of upgrading into year-round house.

The work presents an analysis of the attributes of a designed, improved summer house. Based on the respondents' answers, 11 of the most important attributes of such a house were identified. A questionnaire was carried out using the Kano model and the following conclusions were drawn:

- The vast majority of respondents considered the following attributes as must-have attributes of a summer house: a large terrace, an open kitchen and space for storage. These are the attributes that appear in most of the standard summer houses built and thus the respondents indicated them as obvious attributes, while in the absence of such attributes, the respondent would be dissatisfied (the questionnaire indicated the answer "dislike").
- One-dimensional attributes according to the respondents are attributes related to glazing on both floors, concrete floors and insulation of the floor as well as insulated steel doors, PVC windows and energy efficiency. The summer houses are built in a modern style, with large glazing, sometimes covering both floors. This ensures a large supply of daylight to the house and also increases the aesthetics and attractiveness of the house. Large glazing is one of the elements of a fashionable Scandinavian style, just like another one-dimensional attribute – concrete floors. The remaining attributes are related to the possibility of using a summer house as a year-round house, therefore the respondents are looking for solutions that would allow them to spend free time at the house, even in winter. Designers, while planning the design of such a house, can think about insulating the floor, as well as the use of insulated steel doors and PVC windows instead of traditional wooden windows. Energy efficiency has also

been indicated as a one-dimensional attribute. Customers in a summer house are also looking for solutions that will reduce heat loss. Designers of such a house, taking into account the needs of customers, may decide to use certain elements in the design of such a house that are used in passive houses, e.g. large windows on the sunny side, three-layer walls or electric roller shutters (Jagusiak-Kocik, 2021). These solutions will also contribute to the possibility of using the holiday home as a year-round house.

- According to the respondents, a fireplace is a delighter. Manufacturers sometimes decide to build a house with a modern fireplace in the living room, but in most projects the fireplace is not included and therefore respondents treat this attribute as a delighter, something they did not expect and if this attribute exists – they are very happy.
- In the surveyed group, the attribute related to the possibility of building houses on stilts or slabs turned out to be a mistake – the vast majority of respondents (30 out of 40 people) indicated it as irrelevant, redundant and having no impact on their level of satisfaction.

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