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Quality of Domotic Goods

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Abstract: This article is a study focusing on an important area of appliances we inevitably use almost daily and which has a tendency of renewal, diversification and quality improvement – that is the television set. There is a discrepancy between the quality of the products on the market and the one required by customers. When the difference between them is minor, it has a stimulating role for the producer, but when it is considerable, there is a negative effect on the customer. Thus, this paper carries out a comparative analysis of quality on a segment of television sets traded in Romania which represents a main component of enterprise management by means of which decisions on quality strategy according to market variations are made.

Keywords: domotic goods; comparative analysis of goods' quality; non-quality

JEL Classification: D12; D22; L63

1. Introduction

"Quality is measurable" – this is an essential principle of goods' quality. In order to continuously improve quality, we need to know where we stand or what the present level of quality is, and we also need to know where we are heading or what level of quality we aspire to. There is a relevant expression that illustrates the importance of this key concept: "if you do not know where you are heading, then you will probably stop somewhere along the way".

Although the inherent quality of the product/service must be unique for both the producer and customer, there are different ways of measuring and assessing according to the standard we are considering.

If the specifications are "translated" to the quality requirements identified through the marketing studies carried out on customer segments that products are destined to, then there is a tendency to match the two ways of evaluating quality.

There is a discrepancy between the quality of the products on the market and the one required by customers. When the difference between them is slight, it has a stimulating role for the producer, but when it is considerable, there is a negative effect on the customer.

"*An important place inside the system of goods' quality indicators is held by the synthetic indicator of quality, which reflects the input of characteristics, balanced according to their importance and expressed either quantitatively (numeric) or attributively (notional)"* (Burtică & Negrea, 2006).

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The comparative analysis of product quality represents a main component of enterprise management by means of which decisions on quality strategy according to market variations are made.

"However, we need to highlight the fact that a strategic approach to quality should involve the compliance of the objectives regarding quality with the organizational strategy, while the implementation of changing/innovation projects can help organizations attain sustainable success" (Popescu & Mandru, 2016).

2. Domotic Goods. Concept

Domotic goods include the appliances and machines used in homes that are fitted with some modern appliances. They comprise all the electrotechnical, electronical and electrical equipment that a modern home is equipped with, holding an extraordinary tendency of diversification and quality improvement.

Domotics became a new branch of science at the beginning of the 90s and it deals with home modernization (intelligent homes controlled by a central unit).

The term "domotics" derives from the Latin word "domus, domo" (house) and the suffix "tics" characteristic to many other sciences (like mathematics, statistics, etc).

The term "domotics" or home automation represents the technique of continuous modernization of electrotechnical, electronical and electrical equipment in the modern home of each appliance, but also their cumulated control through complex remote controls, programming and automation controlled by a computer. From this point of view, we can consider that the term domotics derives from the words domo+tics (automation), that is an automated home or intelligent house.

In this sense, domotic goods represent all the new appliances (which are getting better and better) suitable for home use and not only and which are currently considered electrotechnical goods and appliances with different uses, as well as electronical appliances (audiophonic, radiophonic and videophonic), with individual controls or remote controls for each appliance, but which, in the near future, will be part of an integrated system, with programmed or automated controls for the entire house, including control and surveillance devices.

Domotic, office, IT and multimedia goods are dynamic from the point of view of their quality and variety. Their manufacturing process can take advantage of the latest technical and scientific discoveries, starting with design, choosing the raw materials, setting technologies, ensuring reliability and the best technical functional characteristics for each product. The electronic industry produces nowadays a large range of goods suitable to the household field, from radios and TV sets to complex equipment needed in various fields.

3. Quality of Domotic Goods. Theoretical Concept

The quality of a product or service defined as "*the ability to satisfy needs that are expressed or understood"* or as a "*degree of achieving*" those, determines naturally the requirement to objectively know this ability, that is the degree of achieving needs by assessing (determining value) or estimating (rating the size) it.

Therefore, there is a very subjective part of the concept of quality which is linked to the consumer's perception and which is influenced by the various features of the product. Assessing quality plays an essential role in the model, not as aim, but in as far as it satisfies the reasons for buying and the assets

associated with it. The way the features of the product is perceived has important consequences on consumers' expectations and, on the contrary, the consumers' required and expected assets have an impact on the most desired aspects of quality and on the way the different characteristics are perceived and assessed. The process which, starting with product assets and expected quality eventually leads to reasons for buying, brings about more and more abstract cognitive categories.

The result of quality assessment is often expressed by specific indicators of statistical mathematical methods. These indicators either integrate a group of characteristics (measurable or notional, technical functional, economical, aesthetical) or a product's entire system of features. "*Some indicators that measure the quality of products are presented hereafter"* (Mandru et al, 2009).

3.1. Methods of Assessing Product Quality by Synthetic Indicators

3.1.1. Method of Scoring Values of Characteristics

This method involves giving a conventionally-set maximum score to values of characteristics considered optimal from the point of view of customers' requirements. "*Real values of analyzed product features, experimentally determined, can be at the level of the ones which are considered to be the best and, in this case, the maximum number of points can be granted, or there can be differences (variations) in regard to the optimal level and the score will be congruently decreased. Relating the score of the real level of each characteristic (Xr, Yr, Zr ...) to the maximum score allotted to the optimal level of the same characteristics (XN, YN, ZN ...) we can obtain the indicators of those features."* (Iloiu, 2013)

$$Ix = \frac{Xr}{Xn} \qquad Iy = \frac{Yr}{Yn} \qquad Iz = \frac{Zr}{Zn}$$

The indicators of the features that improve quality by decreasing their value are calculated by reversing the ratio (Iz). Each characteristic is then scored according to its relevance, so that the sum of the points given be 100. The sum of the features' indicators, balanced with the score given according to relevance constitutes a synthetic indicator of quality (Iq):

$Iq = Ix \cdot px + Iz \cdot py + Iz \cdot pz$

This method is suitable especially for the assessment of quality based on attributive characteristics evaluated by points. The advantage of this method is situating into various quality categories according to the synthetic indicator value, but its disadvantage is introducing some subjective elements when granting points for the real level of the analyzed product characteristics; that is the reason why it is recommended to use an average score obtained as an arithmetic average of the points granted by several subjects.

3.2.2. The Method of Scoring According to Reference Standard Quality

It is applied by following the same methodology, but by comparison against products considered to be the reference standard. Characteristics indicators are established in relation to the values of characteristics of the standard product, and the total score granted according to the relevance of characteristics can be 100. The score for a parameter of the analyzed product (Pa) will be:

$$Pa = \frac{Va}{Vi} \times Pi \text{ or } Pa = \frac{Vi}{Va} \times Pi$$

where:

Va – value of the analyzed product parameter;

Vi – value of the standard product parameter;

Pi – score of the standard product parameter;

The quality indicator (Ic) of the analyzed product compared to the standard one is calculated with the ratio:

$$Ic = \frac{\sum Pa}{\sum Pt} = \frac{\sum Pa}{100}$$

3.2.3. The Method of Quality Parameters Absolute Value

This method allows the determination of a synthetic indicator of quality which expresses an integrative system of parameters. The synthetic indicator is determined in relation to regulatory values (stipulated by standards or other regulatory documents) in order to determine conformity with other values which can be those of goods produced by prestigious companies in the field of the analyzed products, considered to be *standard values*.

The applied methodology allows quality analysis of products, processes and services which have quantifiable and unquantifiable parameters.

4. The Case Study: Quality Analysis of LED Television Sets

Study purposes:

The following study includes an analysis of five products based on the latest technology created with one aim: *to make your life more pleasant*. Technologies which are really advanced are easy to use since they are especially designed for nowadays needs.

LED television sets can offer a special visual experience at an accesible price. They have the advantage of a longer lifespan and of a very big width. In this case study the following aspects have been analyzed:

- Analyzing merchandise variety (5 LED TV models);
- Carrying out the study regarding the quality of analyzed products;
- Comparative analysis of evaluated products.

Study hypothesis:

Starting from the above mentioned objectives, the following hypothesis has been formulated: "*If we analyze and compare 5 LED TV models of the same type, we can determine price-quality ratio, that is the most reasonable model for the final consumer".*

Taking into account the variety of LED TV types available on the market, we have selected a few well-known brands for the comparative analysis, such as: Sony, Philips, Panasonic, Samsung, LG.

Each of the manufacturing companies put up models with technical functional and economical parameters which vary a lot on the Romanian market. In order to carry out a study of LED TV quality study we have chosen types with similar quality parameters. One of the first selection criteria was the width (43/108 inch/cm), the second one being resolution, the highest one for this width.

Within the study, ranging parameters represents a defining reference since it allows selecting characteristics which are in direct and indirect ratio to quality.

1. Parameters directly proportional to quality:

   LED TV size. (marked C 1)..... **C 1**

   LED TV brightness. (marked C 2) ..... **C 2**

   LED TV dynamic contrast. (marked C 3) ..... **C 3**

   LED TV viewing angle. (marked C 4) ..... **C 4**

   Maximum resolution the LED TV can display. (marked C 5)..... **C 5**

2. Parameters indirectly proportional to quality:

   LED TV intensity of sound output. (marked C 6)..... **C 6**

   Energy consumption while functioning. (marked C 7) ..... **C 7**

   Energy consumption in standby. (marked C 8)..... **C 8**

   Product weight (including stand). (marked C 9)..... **C 9**

For this analysis we have chosen five important LED producers. Among the hundreds of products they sell, we have chosen one product that belongs to the same segment, with similar qualities. These are the five models:

1. LG 43LH630V – Standard product;
2. Philips 43PUH6101/88;
3. Panasonic TX-40EX700E;
4. Samsung UE43M5602A;
5. Sony 43XD8088B.

	Parameters directly proportional to quality					Parameters indirectly proportional to quality				
Products / Parameter	C1	C2	C3	C4	C5	C6	C7	C8	C9	Preț
LG 43LH630V	109	1500	30000	178	2073600 pixels	20	35	0,5	9,45	2399
Philips 43PUH6101/88	108	500	7500	178	8294400 pixels	16	68	0,3	9,70	2499
Panasonic TX-40EX700E	108	1300	10000	178	8294400 pixels	20	63	0,5	12,50	2799
Samsung UE43M5602A	108	1500	100000	175	2073600 pixels	20	95	0,3	10,50	3249
Sony 43XD8088B	109	650	3000	160	8294400 pixels	10	95	0,5	13,30	3400

Chart 1. Ranking parameters

Source: Processed by author

4.1. Classical Comparative Analysis Method

The classical method involves drawing charts for each quality parameter under analysis and analyzing these charts to rank products, taking into account their quality.

Width:

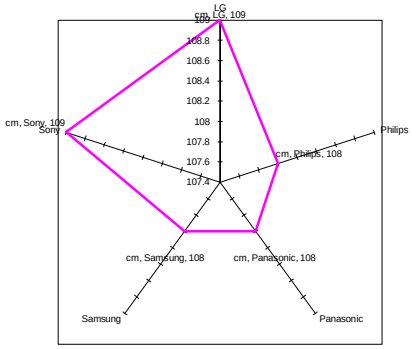

Chart 2. LEDs width

Source: Created by author

According to the chart above, all products have approximately the same width, with a difference of only 1 cm between LG and Sony LEDs, which leads to the following ranking:

1st place - LG and Sony;

2nd place - Philips, Panasonic, Samsung.

Brightness:

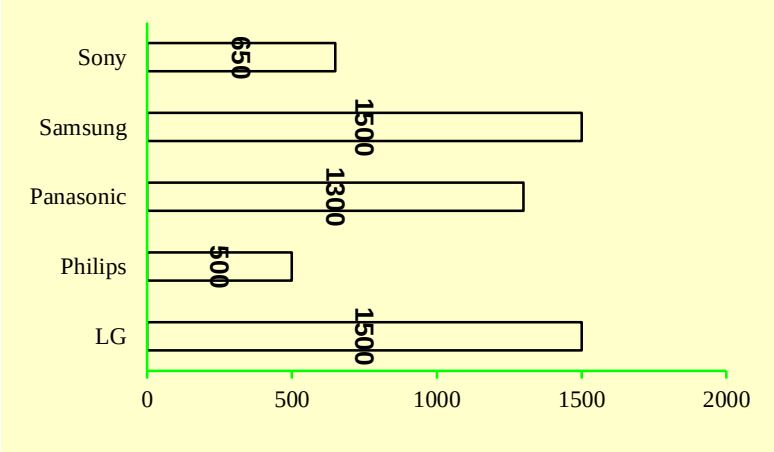

Chart 3. Brightness

Source: Created by author

Analyzing the chart above we can set up the following ranking:

1st place – LG and Samsung;

2nd place – Panasonic;

3rd place – Sony;

4th place – Philips.

Image contrast:

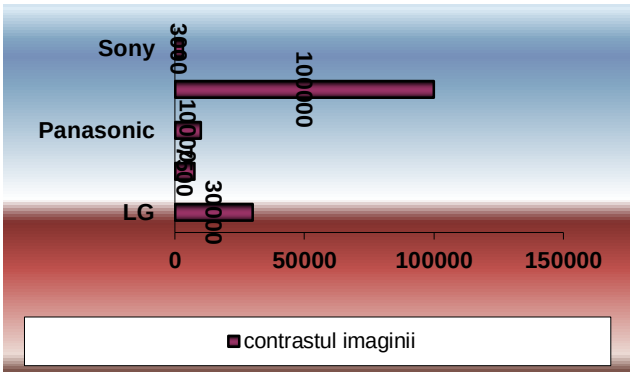

Chart 4. Dynamic contrast

Source: Created by author

After analyzing Chart 3, we can set up the following ranking:

1st place – Samsung;

2nd place – LG;

3rd place – Panasonic;

4th place – Philips;

5th place – Sony.

LED viewing angle:

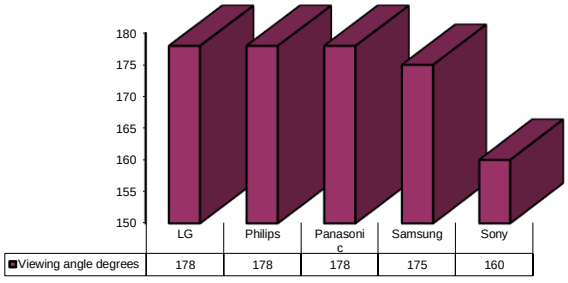

Chart 5. Viewing angle

Source: Created by author

Comparing the data in the chart above, we get the following ranking:

1st place – LG, Philips, Panasonic;

2nd place – Samsung;

3rd place – Sony.

Maximum resolution displayed:

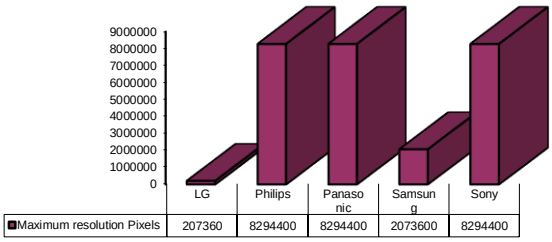

Chart 6. Maximum resolution

Source: Created by author

According to the data in chart 5, the ranking is as follows:

1st place – Philips, Panasonic, Samsung;

2nd place - LG, Sony.

LED TV intensity of sound output:

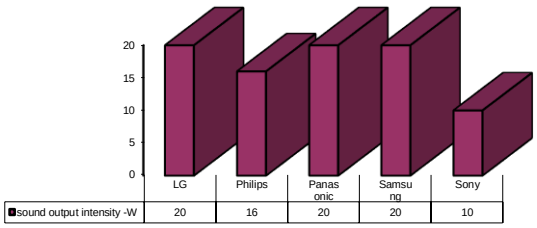

Chart 7. Sound output intensity

Source: Created by author

Judging by the analysis of chart 6, we get the following ranking:

1st place – LG, Panasonic, Samsung;

2nd place – Philips;

3rd place – Sony.

Energy consumption while functioning:

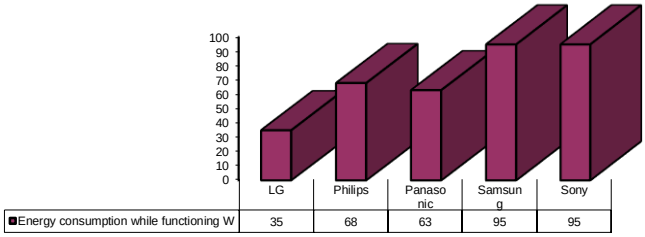

Chart 8. Energy consumption while functioning

Source: Created by author

The analysis of the data in chart 7 leads to the following ranking:

1st place – LG;

2nd place – Panasonic;

3rd place – Philips;

4th place – Samsung, Sony.

Energy consumption in standby:

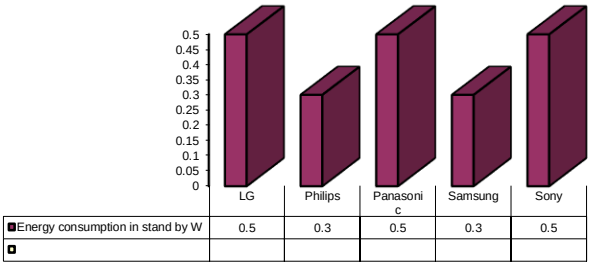

Chart 9. Energy consumption in standby

Source: Created by author

The analysis of the above chart leads to the following ranking:

1st place – Philips, Samsung;

2nd place – LG, Panasonic, Sony.

Weight of the product:

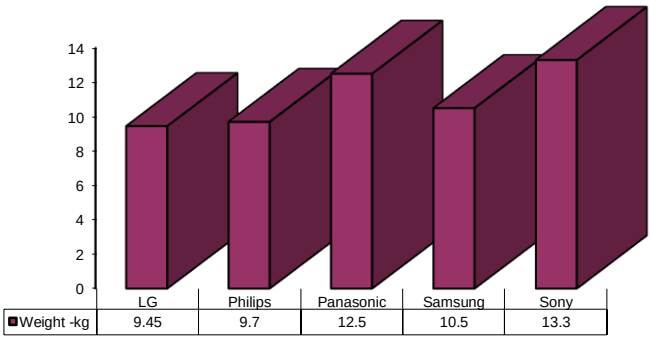

Chart 10. TV set weight

Source: Created by author

The following ranking is obtained after the analysis of chart 9:

1st place – LG;

2nd place – Philips;

3rd place – Samsung;

4th place – Panasonic;

5th place – Sony.

Product price:

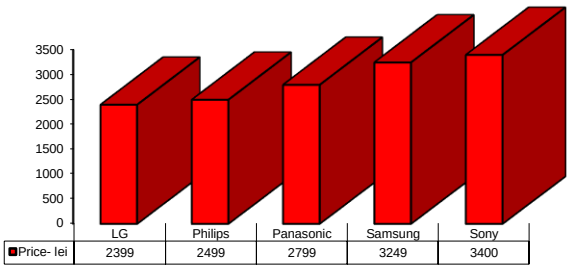

Chart 11. Product price

Source: Created by author

After we analyze chart 10, we get the following ranking:

1st place – LG;

2nd place – Philips;

3rd place – Panasonic;

4th place – Samsung;

5th place – Sony.

Analyzing the charts above and alloting 10 points for each product situated on the 1st place, 8 points for those situated on the 2nd place, 6 points for those on the 3rd place, 4 points for the products on the 4th place and 2 points for those on the 5th place, we obtain the following ranking:

LG: 10+10+8+10+8+10+10+8+10+10 = 94 points

Philips: 8+4+4+10+10+8+6+10+8+8 = 70 points

Panasonic: 8+8+6+10+10+10+8+8+4+6 = 70 points

Samsung: 8+10+10+8+10+10+4+10+6+4 = 80 points

Sony: 10+6+2+6+8+6+4+8+2+2 = 54 points

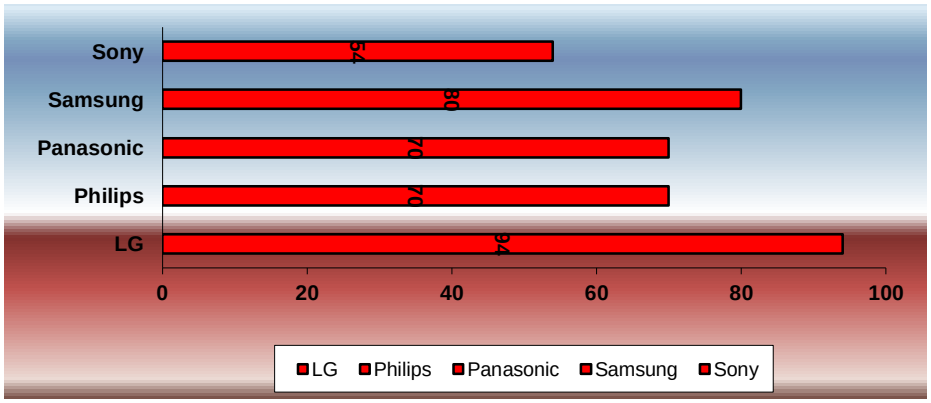

Chart 12. Summarizing chart

Source: Created by author

According to the parameters analyzed so far, the best product is LG 43LH630V.

The ranking, according to the classical method, is as follows:

1st place – LG;

2nd place – Samsung;

3rd place – Philips, Panasonic;

4th place – Sony.

5. Method Limitations

Applying this method is recommended especially for quality assessment according to the points allotted to attributive characteristics.

"*For many specialists and researches the method of value analysis may seem pointless. But the elements which are manifesting in turbulent economics denounce that it is necessary to "revaluate" the method of value analysis. The principal objectives which are at the base of the "revaluating" impose the intensification and the substantial renovating and amplify of its aptitude from different systems and ever a new conception about the method of approach"* (Aldea, 2005).

This method has the advantage of falling into different quality sections according to the value of the synthetic indicator, but it has the disadvantage of introducing some subjective elements when allotting points for the real level of the analyzed products' parameters; that is why it is recommended to use an average score calculated as an arithmetic average of the score granted by several subjects.

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