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PRODUCT DESIGN IN LATECOMER FIRMS: CASE OF TURKISH MEDICAL DEVICE INDUSTRY

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ABSTRACT
Medical devices is a new and developing market in Turkey. However, it is dominated by import trade products. Although there is an increasing number of Turkish producers, they face certain problems about global competition in the local market. In this study, focuses on the latecomer characteristics of medical devices industry in Turkey an its influence on design of Made in Turkey (MiT) medical devices. For this purpose, firstly the Turkish medical device industry was analyzed through sector reports. Then, an interview study was conducted with 12 medical device retailers to understand general perception on medical devices produced in Turkey regarding the market and design related issues. The results suggest that, although general image of MiT medical devices improves, at the time being the influence of latecomer characteristics on design can be sensed in this industry.

Keywords: design, design management, latecomer

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1 INTRODUCTION

The definition of "latecomer firms" in literature may differ as some definitions put market situation at the center, while others mainly consider technological abilities. But looking at various definitions, it can be said that (1) latecomer firms lack a developed internal market, (2) they are mainly situated in developing countries (thus have difficulty in reaching technology sources), (3) they are not technology frontiers and (4) they are mostly manufacturing companies (Chung, 2011). Most of the studies done about latecomer firms consider Asian countries (Hobday, 1998 ; Kim & Seaong, 2010; Kim, 1998; Hobday & Rush & Bessant, 2004; Ho-Don, 2012).

The main characteristics for latecomer firms (regarding technological development) is, that they mainly start their production with assembly process and as they learn more about technology, they develop process innovation and product design capabilities to be followed by product innovation; thus going through stages of acquisition, assimilation and improvement (Kim, 1998).

The aim of this paper is to look at industrial design issues in latecomer firms in the Turkish medical device market. In this study, medical device retailers were interviewed to define Turkish medical device market characteristics in terms of product design issues such as aesthetical qualities, brand identity and usability of Made in Turkey (MiT) medical devices.

2 TURKISH MEDICAL DEVICES INDUSTRY

The medical devices market is one of the fast developing markets in Turkey. Due to its stable growth, it is forecast that the market value will reach 3.12 billion US dollars by 2015 (TPIPA, 2010). However, 85% of the market depends on import trade which is mainly dominated by far eastern countries due to price advantage (Kocak, 2008). Some of the main countries Turkey imports medical devices from are the United States, Germany, UK, Japan, France, Holland and China (Kocak, 2008).

The Turkish medical device industry can be considered to have latecomer characteristics. A report provided by The Union of Chambers and Commodity Exchanges of Turkey, show that 58% of the medical device producers in Turkey have a history of less than 20 years (TOBB, 2009). According to a report published by Republic of Turkey Prime Ministry Investment Support and Promotion Agency, most of the MiT branded medical devices are low-tech products, while the high-tech systems or materials to be used in these devices are mainly imported (TPIPA, 2010). It is also mentioned that Turkish producers could not adapt themselves to the newer technologies (TOBB, 2009). Some of the medical devices produced in Turkey are, operating tables, dentistry units and equipment, hospital beds, gynaecological tables, orthopaedic prosthesis, patient headwalls, sterilizers, etc (Kocak, 2008; TOBB, 2009).

Since the medical devices market is considered as one of the most important sectors in Turkey, new investments in R&D are supported by the Turkish Government. Recently, the medical devices market is designated as one of the 12 sectors which are supported by "Large-Scale Investment Incentives Scheme" (TOBB, 2009; Eren, 2009). Due to these developments in this sector, the requirement for industrial designers working in this field has also increased.

One of the shortcomings of the sector is that, as suggested by The Union of Chambers and Commodity Exchanges of Turkey (Kocak, 2008), there is a prejudice against MiT branded medical devices in terms of their reliability. However, all the medical devices manufactured in Turkey require a CE mark in order to be sold in the Turkish market. This means that these devices go through the same regulatory procedure as medical devices produced in European Union (EU).

SWOT analyses done for the medical devices industry in Turkey also shows latecomer characteristics (TOBB, 2009; Kocak, 2008). Some of its strengths are listed as follows;

- Increasing product quality
- Improving quality perception
- A qualified and eligible workforce with relatively lower wages
- And some of the weaknesses;
- Weak university-industry collaborations; hence insufficient R&D activities
- Production on limited scale with limited fields; therefore dependence on import for semi-finished goods and raw materials
- High rate of medical device import in the market
- Even though the industry is listed in high technology group, there is a lack of high-technology

oriented newly established producers
- A lack of workforce that is qualified in this field

3 PRODUCT DESIGN ISSUES IN MIT MEDICAL DEVICES

Medical devices can be stated as a reasonably new field of work for industrial designers in Turkey. However, to date, their position and contributions have not been clearly understood in this field. On March 14th 2012, a meeting was organised by the Industrial Designers Society of Turkey (ETMK) regarding the design of medical devices in Turkey. In the meeting, the designers and producers met and discussed the issues relevant to the sector. According to the meeting report, there is a communication problem between designers and manufacturers. However it was also emphasised that more designers are required and should be encouraged to contribute in this sector.

Due to the fact that MiT branded medical devices require assuring the level of quality expected to fulfil the harmonised regulatory requirements of the EC, it was hypothesised that the prejudice against MiT branded medical devices might be arising from design related shortcomings. This was thought to be linked with the latecomer characteristics of reasonably underdeveloped market. This can also be assumed from the high amount of import trade in the market. To understand this issue, an interview study was carried out with 12 medical device retailers located in Istanbul. The purpose was to investigate if there is a link between industrial design related shortcomings and latecomer characteristics of MiT medical devices.

4 STUDY METHOD

Medical device retailers are selected as the sample group of this study, because:

- They are in communication with both manufacturers and end-users
- They sell both import trade and MiT branded medical devices
- They sell a diverse range of medical devices
- End-users frequently get in communication with their retailers if they are not satisfied with the device they bought.

In total 12 medical device retailers took part in the study. During the sampling, an effort was made to include a variety of medical device retailers selling different types of medical devices, including products for professional users and lay users. The product range included: hearing aids, orthesis and prosthesis, general hospital fixtures and equipment, dentistry equipments, basic laboratory equipment, assistive devices / rehabilitation products. Therefore purposive sampling was used as the sampling method (Robson, 2011).

Interviews are a particularly good and flexible method when the intention of the researcher is to gain in depth understanding of the subject area (Robson, 2011). Semi-structured interviews are used as the main study method. The objectives were to:

- Understand the current image of MiT branded medical devices regarding their designs.
- Make a comparison of MiT branded medical devices with import trade products in terms of their design aspects.

When preparing the interview questions, the aim was to keep the interview session to less than 30 minutes. In order to facilitate answering and decrease the time taken in certain questions, five-point Likert scale questions were also used (some of the interviewees neutrality for these questions were also considered; therefore a neutral response was designated as ‘3’). On the other hand, the participants were encouraged to give verbal expressions regarding the reasons behind their answers. In total, 7 questions were prepared. All the interviews were conducted at the retailers own store. During the interviews the note-taking technique was utilised.

5 RESULTS

The results are presented in accordance with the three main objectives of the research.

2.1 The Current Image of MiT Branded Medical Devices

Firstly, the participants were asked to rate the current ‘general image’ and the ‘reliability perception’ of MiT branded medical devices by using two likert scale questions (five-point:‘1’ very bad; ‘5’ very good). The results over ‘3’ were accepted as positive responses. The mean values are presented in Figure 1.

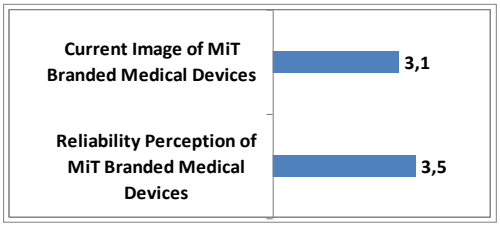

Figure 1. General image and reliability perception of MiT branded medical devices

As can be seen from the figure, the current image of MiT branded medical devices has a score just above 3; however the 'reliability perception' received a better score of 3.5. The participants were asked about the reasons for their answers as well. The positive and negative comments were coded and grouped under two categories. The main reasons are presented in Figure 2.

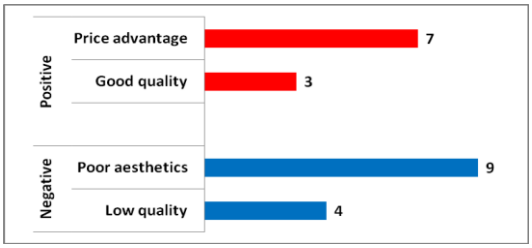

Figure 2. Number of participants reporting positive and negative aspects of MiT branded medical devices (N=12)

The most advantageous feature of MiT branded medical devices is the price aspect. This was mentioned by seven interviewees. On the other hand, most of the interviewees argued that in terms of how they look, MiT branded medical devices are generally poor, even though end-users value aesthetics. They mentioned that more importance should be given to the devices' aesthetics.

One interesting result identified a conflict between the negative and positive comments in terms of the quality of MiT branded medical devices. In this paper, quality is referred to the feeling given by the material used, robustness and smoothness of the design. It was found that the conflict was based on the quality perspective of the interviewees; when the interviewees compared MiT branded medical devices with poor quality import trade products, they argued that MiT branded medical devices are of good quality, or vice versa. The perception of quality is expressed through place of production by some of the retailers. It was claimed by some of the interviewees that products that are produced in Europe perceived to be better in quality, when compared to MiT products. However, MiT products seem to have a better quality when compared to products that are produced in some of the Asian countries.

Results generally suggest that although MiT branded medical devices are perceived to have a degree of quality, improvements are still necessary. Two participants also expressed that the quality image has been changed positively over the last five years, which also supports this idea. This may provide hints about the influence of the EU regulations in medical devices market in Turkey.

2.2 Comparison of MiT Branded Medical Devices with Import Trade Medical Devices

The interviewees were asked to indicate their opinions about why MiT branded medical devices are preferred or not preferred above import trade medical device. The results are presented in Figure 3.

The results suggest that MiT branded medical devices are mainly preferred because they are cheaper and provide a better technical service since the manufacturers are located in Turkey. Interestingly, two interviewees also expressed that some end-users prefer MiT branded medical devices just because they are made in Turkey.

On the other hand, the aesthetics of the devices and the quality feeling they give were the most mentioned shortcomings of MiT branded medical devices, which support our hypothesis. Three interviewees also mentioned that end-users often think that these devices are more defect-prone. This consideration may originate from the inadequate quality feeling as well.

Some interviewees expressed that brand loyalty is an important factor in the healthcare sector which significantly influences end-users' purchase decision. Due to the fact that many Turkish brands are

new to the market, they are less preferred just because end-users simply prefer the brands they trust and know. Also two of the attendees mentioned that some other imported products are more multi-functional, which makes them desirable for consumers.

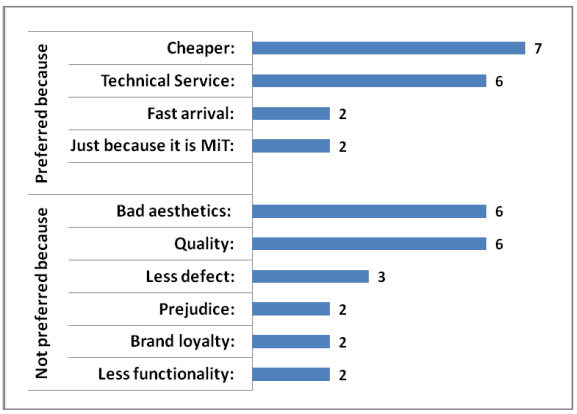

Figure 3: Number of participants stating why MiT branded medical devices are preferred or not preferred (N=12)

5 DISCUSSION AND CONCLUSION

In recent years, medical devices have become an important market segment in Turkey. However the market is mainly dominated by import trade products. It is also argued that there is a prejudice against MiT branded medical devices (Kocak, 2008). Due to the fact that all MiT branded medical devices go through the same regulatory procedure with the EU, these devices need to prove they have the level of quality expected before going in the market. Therefore it was considered that design and usability related shortcomings may have an effect on this prejudice, because as suggested by Wiklund & Wilcox (2005), the marketplace demands medical devices that not only satisfy functional requirements but also user needs and preferences.

In order to understand the general image of MiT branded medical devices in the market and their usability aspect, an interview study was conducted with 12 medical device retailers located in Istanbul. The main findings are summarised below:

- MiT branded medical device producers tend to use price as an advantage in the market. However the overall image of MiT branded medical devices requires more improvement.
- More attention should be paid to the aesthetics of MiT branded medical devices. In addition the quality feeling should be increased by giving more consideration to their overall design.

From this study, it may be inferred that the Turkish medical devices sector has a latecomer character. Interviewees mention that MiT products are mostly simpler products, they lack multi-functionality, Turkish producers tend to import certain high-tech parts of the products, they lack design quality and producers are frequently price oriented. All of these issues hint that Turkish medical device producers are still in the phase of price oriented process innovation and they haven't yet mastered the technology and design of the products they produce.

Findings from this study show some of the main obstacles latecomer firms face in product design. It can be understood from the results that, the main reasons for users to prefer MiT medical devices are advantages of locality and their price. As mentioned in most of the articles, latecomer firms mostly gain experience in local markets before aiming for global markets. Studies also mention that brand awareness is a problem for latecomer firms during this stage (Hobday, 1998). These characteristics of latecomers can be seen in the reasons for why users may not prefer MiT medical devices. Retailers mention that users think MiT medical devices are poor in terms of design related issues. They also mention that there is prejudice against MiT medical devices and a brand loyalty for imported brands.

Another result worth discussing is the fact that MiT medical devices are considered to have poor quality when compared to first-mover companies' products; however they are perceived to have a better quality when compared to some other latecomer firms' imported products. These latecomer firms are mostly located in Eastern Asia, which shows that EU regulations may have an important role in this perception. It may be considered that EU regulations enforcements results with a know-how transfer, which gives an advantage to Turkish producers as they can benefit from first-mover producers

experiences through these regulations. Two of the interviewees also mentioned that products designs were improved in the last 5-6 years; which may indicate that regulations also could affect design awareness.

This research only presents the current situation of MiT branded medical devices from a limited perspective. As this is an ongoing study, this paper presents only the initial results which were derived from medical device retailers. As a further study, interviews will be conducted with medical device producers. So, the main aim of this paper was to have a general idea about the medical devices sector in Turkey to see if there was any latecomer effect on product design in this sector. Therefore only a limited number of retailers are interviewed and there was not a sub-sector discrimination in the analysis. Since this study shows that there may be a latecomer effect in product design in this industry, more detailed studies will be made to understand the results that may be occurring from latecomer effect in product design.

REFERENCES

Chung, A. T. 2011. *Role and Dynamics of Latecomers in Global Technology Competition.* KIT Scientific Publishing, Karlsruhe.

Eren, I. 2009. Public Support and Incentives for Industry in Turkey. In: UCTEA Chamber of Mechanical Engineers (ed.*) Proceedings of the Third National Medical Devices Production Industry Conference and Exhibition*, Guven Offset, Samsun, 27-31

Hobday, M. 1998. Latecomer Catch-Up Strategies in Electronics: Samsung of Korea and Acer of Taiwan, *Asian Pasific Business Review,*4-2, 48-83

Hobday, M., Rush, H., Bessant, J. 2004. Approaching the Innovation Frontier In Korea: The Transition Phase to Leadership. *Research Policy*, 33:10, 1433–1457

Ho-Don, Y. 2012. Entrepreneurship, Competitive Strategies, and Transforming Firms from OEM to OBM in Taiwan. *Journal of Asia-Pacific Business*, 13:1, 16-36

Kim, L.1998 Technology Policies and Strategies for Developing Countries: Lessons from the Korean Experience. *Technology Analysis and Strategic Management*, 10 (3) (1998), pp. 311–323

Kim, W., Seong, J. 2010. Catching-up and Post Catching-up strategies of Latecomer Firms: Evidence From Sansung Semicondustor. *Asian Journal of Technology Innovation*, 18:2,115-142

Kocak, A. 2008. The Report of Medical Devices Sector, *The Union of Chambers and Commodity Exchanges of Turkey*, Ankara

Robson, C. 2002. *Real World Research: A Resource for Social Scientists and Practitioner*, Blackwell Publishing

TPIPA, 2010. *The Report of Healthcare Sector in Turkey*, Republic of Turkey Prime Ministry Investment Support and Promotion Agency

TOBB. 2009. Medical Sector in Turkey, *The Union of Chambers and Commodity Exchanges of Turkey*, Yorum Press, Ankara

Wiklund, M, & Wilcox, S. 2005. *Designing Usability into Medical Products*. CRC Press, Florida