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The Smart Products Value Chain

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Abstract *The commercial niches cover national and international levels and should guide to responding the special human needs. For a value chain integration, a huge effort is dedicated to aware the idea or the concept in front of those who could be interested in. The separation of each type of activity follows the result of each segment and it leads to design the landscape of the revenue for every part. Sometimes the results are not in terms of money, they can be even entry barriers. This paper presents a case study as an example of integration for the first Romanian smart fabric SIDMAT 3 in an international value chain. The purpose of this research is to design the value chain for this smart-product. The cost calculation was helpful to catch the added-value during the production process. By collecting data directly from the company, the value chain was configured and the company position could be identified. To get a complete view of SIDMAT 3 market, we fulfilled information using the five forces Porter's model. This analysis reveals that the position of SIDMAT 3 is strong now, but the geo-political context and the raw-materials supply could affect the success of this business. New discoveries could lead to new a competitor that is why the company concentrates all the efforts to develop the research activity. The position of SIDMAT 3 into the value chain could be affected by the raw materials (the most part is brought from abroad). Another weak point is the dependence on strategic customers, but generally this is a feature for a niche product. The integration of the SIDMAT 3 in the value chain is an example difficult to be followed, because it was a result of a chance to be in the right place and meeting the right people since it supposes a very difficult collaboration activity to be managed. Finally, the technology is the key that reconfigure the international market. When the advantage seems invincible, this is for a short time, since new discoveries can threat the company's position into the value chain*

Key words Value chain, competitiveness, smart products, Porter's model

JEL Codes: L67, L69, M11, O32, O33

1. Introduction

Effective solutions incorporate ideas in physical new and modern products that apply discoveries by identifying specific niches. The commercial ones cover national and international levels and should guide to responding the special human needs. For a value chain integration, a huge effort is dedicated to aware the idea or the concept in front of those who could be interested in. The globalization pushed the production dispersion to the efficiency of the processes and obtains the best-selling conditions. Nowadays more information is required to sustain the coordination of a value chain and it becomes the key to gain income from a dynamic perspective. The separation of each type of activity could follow the result of each segment and it leads to design the landscape of the revenue for every part. Sometimes the results are not in terms of money, they can be even entry barriers. In this paper we present a case study as an example of integration for the first Romanian smart fabric (SIDMAT 3) in an international value chain. The purpose of this paper is to build the value chain for SIDMAT 3 and to configure its market. To obtain this, we collected information from the in-depth interviews and documents supplied by the company and it represents an important international reference for the specialized literature that claims few practical examples.

SIDMAT 3 is a smart product used for military and low-temperature industries that was tested in France twice, first at -50^0 C and later at -80^0C. The result was a success and the company obtained a certificate that proves its unicity. Nowadays it is used in different applications where low temperature protection is needed and it is the most representative product for SIDERMA Company, which helped it to become an international leader leaving behind famous brands from Western Europe. This product uses almost 80% from the production process of the entire factory and it is required in Europe and Russia, and the international context plays a very important role. In this case the integration in a commercial value chain depends on reputation, trust and it requires a challenge to find new ways of development.

2. Literature review

First a smart concept presentation is required for a better understanding of the subject.

Generally, the smart products have been created to cover the need for new materials or technologies as consequence of raw material or energy crisis (Berger, 2013). Everything becomes sophisticated in chemical composition (Berger, 2013) and smart products are born by integrating sensors to improve perceptions, monitoring, interface connection, in other words

strategies for remote control (Schwartz, 2009). Every new step to existing products improvement finds new ways to generate new technologies. For aiming the purpose of this study, there are two directions that concentrates the analysis: the Porter's theory regarding the five forces that defines an industrial landscape and configures the borders for the products market; then, the theories regarding the value chain concept are required to explain products business integration. All these will be applied in the case of the smart product presented in this paper. This step was helpful to emphasis the first Romanian smart product in textile field and brings the contribution to fulfill the specialized literature regarding this concept.

The Porter's theory (Ghemawat, 2010) helps in creating a complete picture for an industry, by framing market entrances, competitors, substitutes (horizontally), then suppliers and customers (vertically). Every coordinate offers a holistic perspective of market information. The main reason for using this theory is that it offers a realistic view that is why we consider it to be adopted for the products analysis. Concerning the value chain theory, it is worth to mention some authors focusing on the object of this paper. In this way we start with Kaplinski and Morris (2000) who explained that configuring the value chain is essential in identifying the competitive advantages. Another study (Morris, 2002) shows that value chain relieves the way in which the company is connected to the market. In the same time, it is very important to catch the most important processes, for getting an idea of what brings value during the entire activity.

Elg *et al.* (2011) say that market leaders can reconfigure the value chain by adding or eliminating suppliers. More than this, when companies expand, they can change the position on the chain and other leaders can take the lead. This offers a carefully watch if there are key suppliers. Continuing the last idea, Morris (2002) shows that in every value chain there are key-points where the companies assume main responsibilities. In this case, the activity is not coordinated by a single company; each nodal point is responsible for connecting actors from different sectors, regions, or countries. This is the way to organize a creative value chain.

Subedy (2013) says that a creative value chain is in fact a coalition of those powerful and determined. Inside the chain there is a continuous competition translated through capturing a big profit proportion. Boons *et al.* (2012) state that until now the theory or the practice are not well developed to identify sustainable production or consumer processes. Even if the innovation process concentrates knowledge, there are not always win-win situations between production and selling. The innovation is always connected to economic performance.

Since this research regards the smart products, some theories about integrating new technologies into the value chain are required. For this reason, Jolly (2012) was an appropriate choice, when he talks about technology selection that it concerns financial aspects or product life. In the same time, the customer attraction for a patent helps the last decision of a company. Finally, the competitive advantages are depending on the attractive technology that brings the product to the market and keep far away the competitors. Generally, the competitors are tended to copy and not to create, so good results come from high barriers and intellectual rights protection. Moorthly (2012) shows the connection between knowledge and company performances. Even so, the decision to invest in a certain technology is difficult to be taken because every time there is alternatives. Concluding, performance comes from investments in an adequate product, in technology and the position into the value chain.

3. Methodology of research

The purpose of this research is to design the value chain for the smart-product named SIDMAT 3 produced by a Romanian company. We made a cost calculation that has helped us to catch the added-value during the production process. By collecting data from the company, we could build the value chain and identify the company position. To get a complete view of SIDMAT 3 market, we fulfilled information regarding suppliers, competitors, customers, entering barriers and substitutes following the five forces Porter's model. Before understanding the production process, which raw materials are needed for SIDMAT 3, the history of product could be necessary.

During '90s the economic situation of the Siderma Company met difficult conditions and these put pressure on the creative activity. SIDMAT 3 was born in this way, but at the beginning it was different than nowadays.

At a fair based in Turkey, the company met its future partner from Kazakhstan who owned a very modern technology but was not able to produce. This was the moment when SIDMAT 3 was recreated for that customer without having any idea that this could be a smart product. SIDMAT 3 was offered to other customers, as a sample to a shoes factory from Azerbaijan. One owner of this factory made a test in a very cold room where the temperature was -40^{0}C. At a certain moment ethyl alcohol was added on the shoes, an extremely dangerous test (simulating conditions of -65^{0}C) everything was filmed and posted on Youtube.

Few weeks later after this film was posted, important customers appeared, after trying to use a fabric from a competitor, but that fabric changed at very low temperatures. The SIDMAT 3 could meet the needs of this customer because of its

technology. The technology of SIDMAT 3 consists in: there are three layers, each produced separately, and all together united by interweaving or sewing. The first layer is a polyamides nonwoven product consolidated under pressure at high temperatures and it can be painted in different colours. The second layer is made of 80% wool by a mechanical interweaving. The mixture of wool and polyesters gives the final colour. The last layer is made of aluminized polyethylene, the only part not produced by Siderma, imported from abroad.

The characteristics of this product are that the wool maintains the foot temperature, the aluminium layer rejects the cold air and humidity that enter inside the leather shoe and the temperature remains constant. These three layers are united by sewing and not by chemicals because in this way the foot can „breath". After analysing the production process, we can define SIDMAT 3 as a smart product since:

- it confers abrasive resistance at very low temperature (minus 90 degrees Celsius – the lowest known on the Earth);

-the technology is a mix between classical production methods and modern ones; the productivity is higher than in the case of woven products and this has a low-cost effect;

- this product can be improved with new technologies – nano-chemical substances for bringing particularities as fire protection, antistatic, odorizing and many others.

To produce SIDMAT 3 the following raw materials are required: poliamides, copoliamidic fybers, colours, added agents, wool, polyester, aluminized polyethylene. The suppliers are from Italy, Russia, Germany, Bulgaria, and Romania. To produce 1 m of SIDMAT 3 we collected the following prices and consumes for domestic raw materials (Table 1) and for imported raw-materials (Table 2):

Table 1. Domestic raw-materials cost

Materials	Unit measure	Price (euro)	Value (euro)
PES fybers	0.0660	1.15	0.0759
PVC	0.02	0.305	0.0061
Packing film	0.02	1.07	0.0214
Adhesive band	0.004	0.0088	0.00004
TOTAL 1	-	-	0.1034

Table 2. Imported raw-materials cost

Materials	Unit measure	Price (euro)	Value (euro)
Accessories	0.1392	0.11	0.015312
Duron NV 12	0.00240	3.09	0.00742
Aluminized polyethylene	0.0600	3.00	0.18000
Rucogal PAP	0.0018	1.6	0.00288
Wool	0.264	7.5	1.98000
White Radici fybers	0.1818	3.25	0.59085
EMS fybers	0.04	4.3	0.17200
Acetic acid	0.0004	0.86	0.00034
TOTAL 2	-	-	2.991702

Besides the raw materials, the production process supposes other variable costs that we take in consideration for the final price calculation (Table 3):

Table 3. Other costs of SIDMAT 3

Others	Consume	Unit Price (euro)	Value (euro)
Energy	0.4784	0.12	0.057408
Heating	0.0307	0.36	0.06
Amortization	1	0.06	0.06
Thermo process	1	0.000468	0.000468
Optional process	1	0.8	0.8
Total 3 (without optional process)	-	-	0.128928
Total 4 (with optional process)	-	-	0.928928

4. Results of the research

The total cost for SIDMAT 3 without optional process is:

Total 1+Total 2+Total 3= 0.1034+2.991702+0.128928=3.22404 euro/m

The total cost for SIDMAT 3 with optional process is:

Total 1+Total 2+Total 4 = 0.1034+2.991702+0.928928= 4.02403 euro/m

The company sells SIDMAT 3 (without optional process) for 5.93 euro/m

Transport: approx. 5% from the selling price= 0.30 euro

The company sells SIDMAT 3 (with optional process) for 7.53 euro/m

Transport in this case: 0.38 euro

This means that the added value for SIDMAT 3 without optional process is 2.406 euro/m and for SIDMAT 3 with optional process is 3.126 euro/m.

Nano-particle treatment: 0.2 euro

We know that the final product that incorporates SIDMAT 3 is sold with 150 euro.

The customers' portfolio is connected to payment conditions. Customers from Russian Federation usually demand high quantities, but offer best payment conditions (usually, they pay in advance in comparison with others who require small quantities and ask for long terms of payment).

Based on all this information, we can design the value chain for SIDMAT 3 (Figure 1):

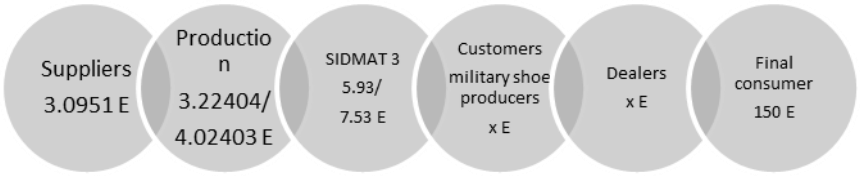

Figure 1. SIDMAT 3 Value Chain

After this long introduction of SIDMAT 3 a market analysis is welcome to emphasize how the company succeeds to create competitive advantages and integrating this product into international value chain. The Porter model will be helpful again in constructing the whole commercial image of the product (Figure 2).

Figure 2. The SIDMAT 3 overview

Entrances: There is a relative high barrier for those interested in entering on this market due to the patented technology, but new discoveries or geopolitical situation could afford anytime the access for similar products. That is why Siderma avoids advertising to not inspire the competitors.

Competitors: Even if SIDMAT 3 is difficult to compete with, similar products are supplied by GoreTex (USA), Tessile Toschi (Italy) and Lenzi Technology (Germany).

Substitutes: The partner from Azerbaijan made a test with a GoreTex fabric, but it could not keep its proprieties at extremely low temperature.

Suppliers: They are selected depending on raw materials. Usually they are from Italy, Russia, Germany, Romania, Bulgaria.

Customers: They are from ex-Russian countries, but some of them are from Romania and Italy.

6. Conclusions

SIDMAT 3 has a cost value about 3.0951 euro and is included in a pair of military shoes sold with 150 euro. In this value chain the company producing SIDMAT 3 can control only the part regarding the selection of suppliers can impose a selling price, and it has a privilege of a strong partnership. As the company states, the competitors offer the similar products 40-50% more expensive.

Even if the position is strong now, the geo-political context could affect the success of this business. Also, new discoveries could lead to new competitors that are why the company concentrates all the efforts to develop the research activity.

SIDMAT 3 has the following competitive advantages:

- it is a unique patent;
- the company enjoys strategical partnership
- it is a result of a technological partnership improved inside the own laboratory
- the competitive price
- cheap labour

Shortly, the Matrix SWOT for SIDMAT 3 could be the following (Figure 3):

STRENGH	**WEAKNESSES**
Patent Partnership Research Cheap labour	Imported raw materials Payment conditions
OPPORTUNITIES	**THREATS**
New discoveries New markets New suppliers	Geo-political situation New competitors

Figure 3. Matrix-SWOT for SIDMAT 3

The position of SIDMAT 3 into the value chain could be affected by the raw materials (the most part is brought from abroad). Another weak point is the dependence of strategic customers, but generally this is a feature for a niche product.

The integration of the SIDMAT 3 in the value chain is an example difficult to be followed, because it was a result of a chance to be in the right place and meeting the right people since it supposes a very difficult collaboration activity to be managed.

As a conclusion, the technology is the key that reconfigure the international market. When the advantage seems invincible, this is for a short time, since new discoveries can threat the company's position into the value chain

References

Berger, E. A. (2013). "The Advanced techniques for making welded joints of dissimilar polymeric materials", Doctoral Thesis, Timisoara Technical University Publishing.
Schwartz M. (2009). "Smart materials", CRC Press Taylor &Francis Group, USA.
Ghemawat, P. (2010). Strategy and the Business Landscape, Pearson, New Jersey.
Kaplinski R., Morris, M. (2000). A Handbook for Value Chain Research, IDRC.
Morris, M. (2002). "Capturing Value: - A Value Chain Approach to National Export Strategy Development, the Usefulness of Value Chain Analysis as a Policy Intervention Tool For Developing Countries", Executive Forum on National Export Strategies, Managing Competitive Advantage: The Values of National Strategy.
Elg, U., Deligonul, S., Ghauri, P., Danis, W., Tarnosvskaya, V. (2011). Market-driving strategy implementation through global supplier relationships. Industrial Marketing Management 41, p. 919-928.
Subedi, D. (2013). Explaining supply chain as an ~opportunistic coalition~ Competitiveness Review: An international Business Journal, Vol 23, No. 1, p. 41-54.
Boons, F., Montalvo, C., Quist, J., Wagner, M. (2012). Sustainable innovation, business models and economic performance: an overview, Journal of Cleaner Production xxx, p. 1-8.
Jolly, D. (2012). Development of two-dimensional scale for evaluating technologies in high-tech companies: An empirical examination. Journal of Engineering and Technology Management 29, p. 307-329
Moorthy, S. (2012). Varying effects of enhanced and new corporate technological knowledge in responding to technological change, Competitiveness Review: An International Business Journal, Vol. 22, No. 3, p. 235-250.