

Reengineering the Furniture Industry in Egypt to Help Improve its Export Capability: A System Dynamics View

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ABSTRACT

The furniture industry around the world is undergoing a period of rapid globalization. With the rapid globalization of the furniture industry and the competitive pressures of imports, a nation had to find a way to stay competitive. The furniture Industry in Egypt experience a lot of weaknesses and constraints that limited the industry growth and hence its export. Most importantly, are the quality, delivery delays and others that are rooted fundamentally into the current structure of the industry.

The objective of the paper is to propose group of policies that might help reengineer the Egyptian furniture industry. As outcomes of the research, the authors have suggested two group of policies based on the scale of the furniture manufacturer using a time framework approach. A system dynamic methodology has been used to conceptualize the dynamics of the furniture industry in Egypt, and hence propose macro solutions to the observed problems by the researchers. So, the research follows a qualitative paradigm that needs quantification in future phases of the research.

Keywords: Furniture Industry, Developing Country, Export, and Reengineering, Human Resource, Research and Development.

INTRODUCTION

Furniture Industry worldwide

The furniture industry around the world is undergoing a period of rapid globalization. It is expected this trend to continue during this decade as larger domestic manufacturers in highly developed countries continue to import furniture and furniture parts in an effort to meet the demand for lower-cost quality products (Dossenbach, 2002). With the rapid globalization of the furniture industry and the competitive pressures of imports, a company had to find a way to stay competitive.

Furniture market in the USA

As figure 1 below shows, the trade deficit for the furniture industry has generally been growing over the past ten years. Fully a third (34%) of all furniture consumed in the

United States today is imported. China has emerged as the leading low cost producer of wood products in the world and is taking market share from US and European manufactures and from other exporting countries around the world. Italy holds firm to the high-end leather upholstery market as well as to other high styled furniture.

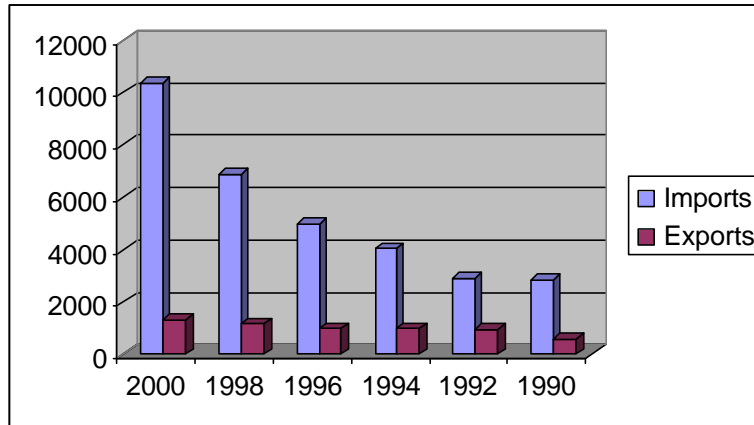


Figure 1: Us Furniture Trade Balance. (Source: Dossenbach, 2002)

Figure 2 below depicts how the import trend is affecting selected sectors within the value added wood products industry. Every category shows a trend that indicates a greater number of US manufacturers, wholesalers, and retailers importing products to lower their cost through the purchase of finished goods, semi finished goods, or parts.

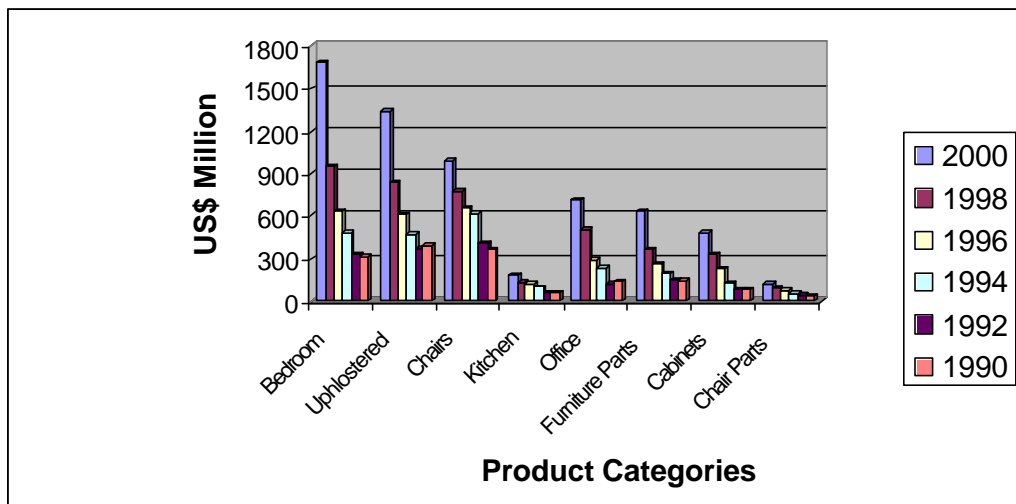


Figure 2: Major US Furniture & Related Categories. (Dossenbach 2002)

In the furniture industry it is important to remember that quality is not represented by the amount of work but rather the workmanship employed. So, the customer satisfaction based on the following criteria:

- A quality product that will give no problem.
- The products to be priced fairly and represent a value (a reason to buy)
- Functionality (not only a piece of art)
- Good looking (finish appears perfect)

The furniture Industry in Egypt: Historical background

Egypt has a long history in furniture industry for thousands of years. Manufacturers had been affected by a multiple of cultures that formulated the industry (catholic, Islamic, French, and Britain). During the first decades of last century, many foreign minorities have come to live in Egypt, that attracted some Italian and French furniture companies to establish the manufacturing projects in Egypt, mainly in Cairo. By 1952, importing furniture to Egypt terminated because of the increased production and the army's revolution, however the export activities started by the end of the 50s and during the 60s and mid of 70s targeting the past Soviet Union and the eastern block. During late 70s, the Egyptian furniture started to show up in the western markets. By 80s, Egypt focused on exporting furniture to gulf countries, which realized an increasing income level and high demand for the furniture products. On other side, furniture industry of Egypt gained a serious bad image worldwide in the 90's, due to different reasons, including quality and delivery delays.

The ministry of trade in Egypt had referred to a decline in GNP of furniture industry from 2 billion (93/94) to 1.1 billion Egyptian pounds in 96/97. The united nations industrial development organization (UNIDO) referred to decreased value added in the furniture industry from US\$ 35,644 in 1985 to US\$ 28,156 in 1996, that resulted in a negative growth rate of value added reached (0.7%).

Dumyat city is considered to be the center of furniture industry in Egypt, it's contribution in GNP of furniture is about 60% (Elmihiy, 2002). According to official statistics (COMDAS), Dumyat city has 25% of the entities working in the field of furniture industry.

The Egyptian Furniture Industry Analysis

A sort of analysis for the furniture industry in Egypt has been done based on an analytical tool like the SWOT Analysis (dossenbach)

Strengths

- There is a large cluster of many workshops in Dumyat that have the basic skills needed to manufacture hand carvings furniture
- There is abundance of highly skilled carvers and those who can produce inlay and marquetry.
- Level of workers wages is internationally competitive.
- In Dumyat workers are quick to acquire skills of the woodworking business
- The know how in producing French reproduction furniture.

Weaknesses

- There is a denial by many stakeholders that there are any problems or constrains.
- The furniture Industry is very fragmented
- There is a resistance to change by many that feel they know best and want to do things the way their grandfathers did.
- The raw materials and supplies used by the industry are inferior compared with standards.
- The productivity levels of both the plants and the labor are far below the benchmarks in developing countries.

- There is neither production scheduling nor control to guarantee on time deliveries to all customers and many promises are broken.
- There is a lack of attention to the human resources management mainly to motivate the labor and improve their living conditions.
- The management training and skills to run an exporting company are not widely found (one man show style) (centralized authority) (no managerial positions in the companies hierarchy) (no marketing managers, production managers, purchases managers).
- Most of the equipment and methods used for manufacturing furniture in Dumyat are old and outdated and incapable of producing a consistently high quality product in a time limit.
- Import tariffs and taxes on raw materials.

Opportunities

- Most of the global manufactures in the industrialized countries are performing cost effective production through reorganization of its supply chains.
- Countries around the world are struggling to provide their population with ever-increasing standard of living. So, Egyptian companies can fulfill the requirements of import customers if they are committed to do what is necessary. The worldwide indicators are pointing out that in the USA market around 34% of all furniture are imported mainly from Canada, China and Italy. So, Egypt has the opportunities to position itself with the top imports to USA.
- There are promising indicators for semi-finished classic handmade furniture worldwide.

Threats

- One of the critical threats that Egypt is obviously facing is the GATT agreement application in 2005. On its application, the 40% taxes on imported furniture will be eliminated which will affect negatively the local sales of furniture.
- The very aggressive global competition in particular, from the very active China in this field (Dossenbach 2002).
- Dossenbach has also indicated in his study that, the very small amount of exports that have been shipped from Egypt during the past four years were lacking in quality and customer support from the factory to the degree that repeat business (orders) is all but non - existent. (Due to dissatisfied customers).

PROBLEM STATEMENT

In year 1991 the export volume of furniture products reached US\$ 47 million, while in year 1998 the figure fall to about US\$ 14 million. The furniture industry in DUMYAT faces many challenges in order to become a successful exporter. It has been observed that the current structure of furniture industry in Egypt is the main burden for export growth rate.

OBJECTIVE OF THE PAPER

The objective of the paper is to propose a fully new structure for the furniture industry in Egypt based on the framework of the reengineering process using the system dynamics approach to create policy decisions that could help Egypt on the long term to foster its export capabilities.

SYSTEM DYNAMIC MODEL FOR THE FURNITURE INDUSTRY IN EGYPT

A comprehensive system dynamic model for the furniture industry in Egypt has been developed. The model includes the main pillars for the industry based on the value chain approach. Using the value chain model, the authors were able to pinpoint the potential problems and hence the location, where the value-added can be realized.

Primary activities

- Inbound logistics (supply chain for the raw material)
- Operations management (production schedules)

Support activities

- Marketing strategies
- Human resources management
- Research and development

Causal loop that reflects the interaction among the critical factors/variables for each activity is shown in figure 3 and a larger scale in Appendix A.

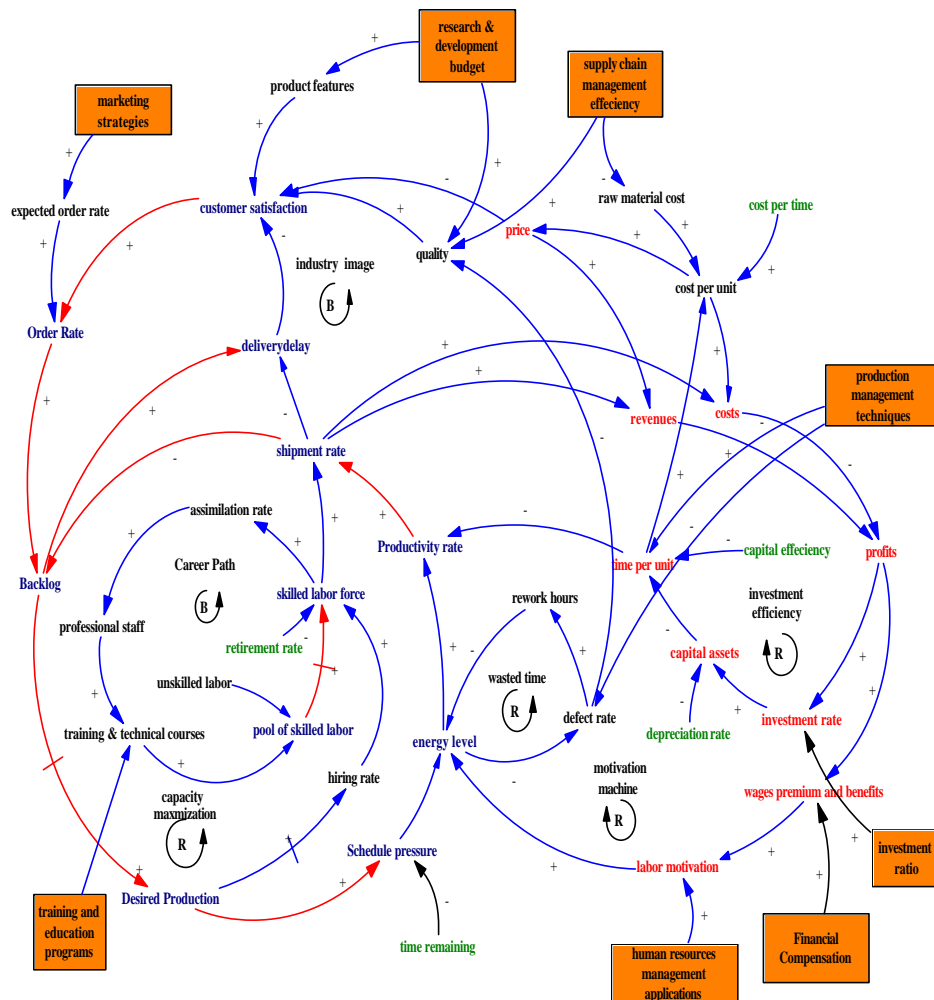


Figure 3: The causal loop of the furniture industry in Egypt (medium & large scale)

The causal loop shows 6 major loops, (4 positive reinforcing, and 2 negative balancing). Those loops will describe the origin of the industry problems and its proposed solutions.

Looking close to the furniture industry in Egypt (in particular Dumyat City), the researchers are pointing out and based on the above causal loop, that the main reasons for the problem under study lies under the fact that most of the industry is small family businesses, inherited through many generations. The owner himself or one of his sons usually performs managerial practices without educational background. However, most of them neither have the capabilities to manage or the talent to run the business in efficient manner. The majority of those depend heavily on gained and inherited life experience which could find some success in the past, but according to the dynamic changes in the global aspects of trade and competition, that will be a very old fashion.

SYSTEM DYNAMIC MODEL AND PROPOSED POLICIES

Based on the above analysis and supported by the studies performed by Doessenbach, 2002 and Elmehy 2002, a reengineering process is proposed through applying some policies suggested below that can be based on the size of the existing manufacturers. The policies have been sub-divided into two groups. The first group was designed for the medium and large-scale manufacturers, that already exporting based on enhancing the managerial hierarchy of the manufacturing units. The second group designed in specific for the small-scaled workshops, a 4 phase Reengineering process policy.

The main problems facing medium scale manufacturing while proceeding some export activities are Delivery delay, low quality, and low productivity.

The proposed policies are illustrated in each loop in a colored box and its dynamic effects shows how each policy can help dealing with the industry problems, while at the end of this part, the proposed policies are listed in details according to a time horizon.

The reinforcing positive feedback loops include the following:

Loop R1: Capacity Maximization

That loop figures the reasons of delivery delay problem. In case of increased order rate this will develop a backlog, which will increase the desired production. Obviously this will place a continuous pressure on the production schedule and then the labors will work overtime which later on decreases the labor energy and hence productivity rate will fall to reinforce the problem of delivery delay. Figure 4; explain the dynamics of the R1 loop.

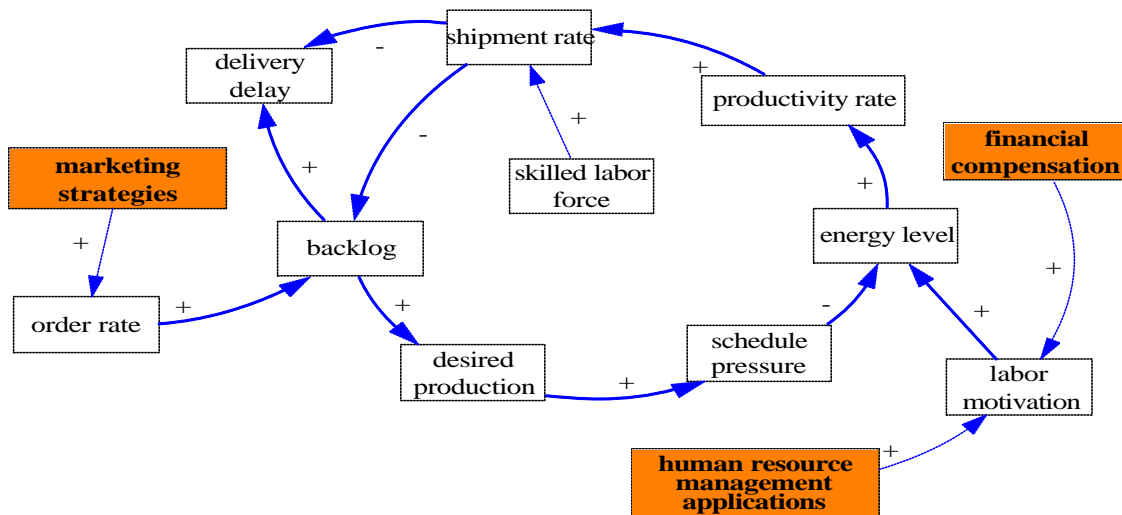


Figure 4: R1 capacity maximization loop

In short run, a financial packages is to be offered to labor in order to esteem their efforts and fuel the energy level during over times and pressured schedules.

Some marketing efforts should be done to stimulate orders that generate revenues. In the long run, a complete human resource program should be applied to take care of developing social life of labor, which will affect positively the productivity.

Loop R2: Wasting Time

This loop describes how the exhausting labors could negatively affect the quality and the productivity rate by increasing the defect rate. Figure 4 illustrates the reinforcin g R2 loop.

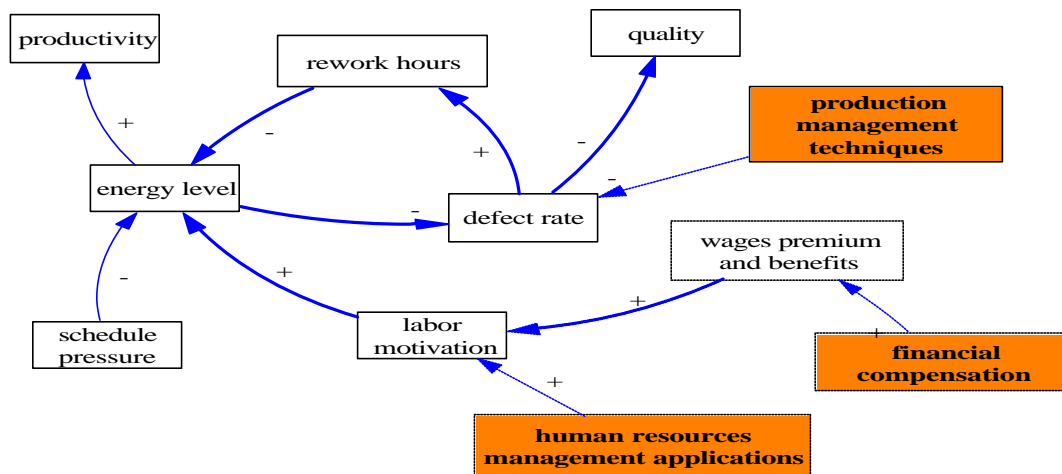


Figure 5: R2 wasting time loop

In short term, a simple form of production management techniques could be applied to control the quality and find out defected parts in early stages so the rework process is easier.

Also financial compensation can play its main role in motivating labor.

Loop R3: Motivation Machine

This loop focuses on how labor motivation could be a success factor in the industry through leverage the labor energy level, which could contribute in solving the delivery delay and quality problems. Doing so, more revenues and profits can be generated to compensate profit/wage premium distributed on the long-term.

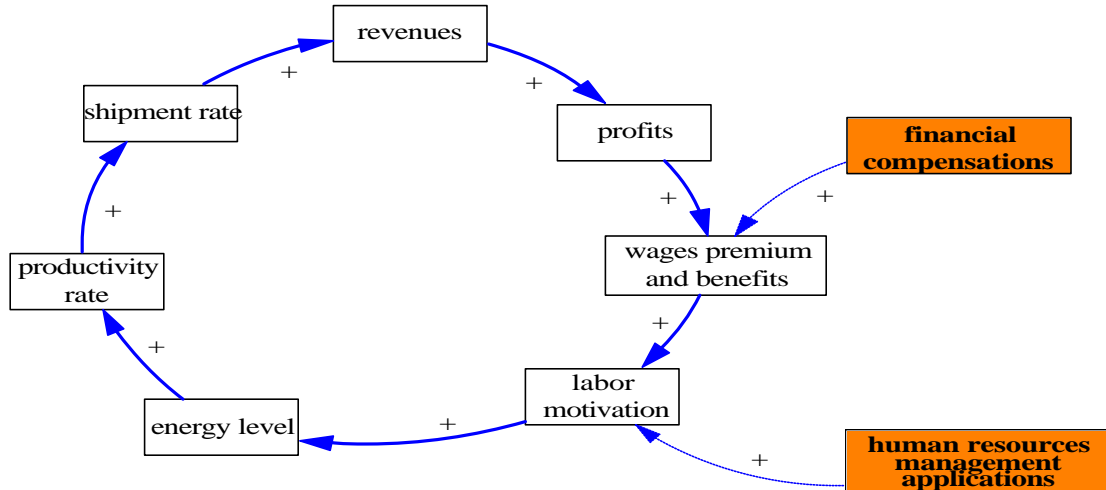


Figure 6: R3 motivation machine loop

This loop is the corner stone in solving the main problem of the furniture industry since that industry is a traditional one based on labor and hand made production techniques.

Loop R4: Investment Efficiency

This loop shows how important, investing in capital assets/machines will decreasing the time needed to produce one unit, which in turn increases the productivity rate and reduce cost per unit.

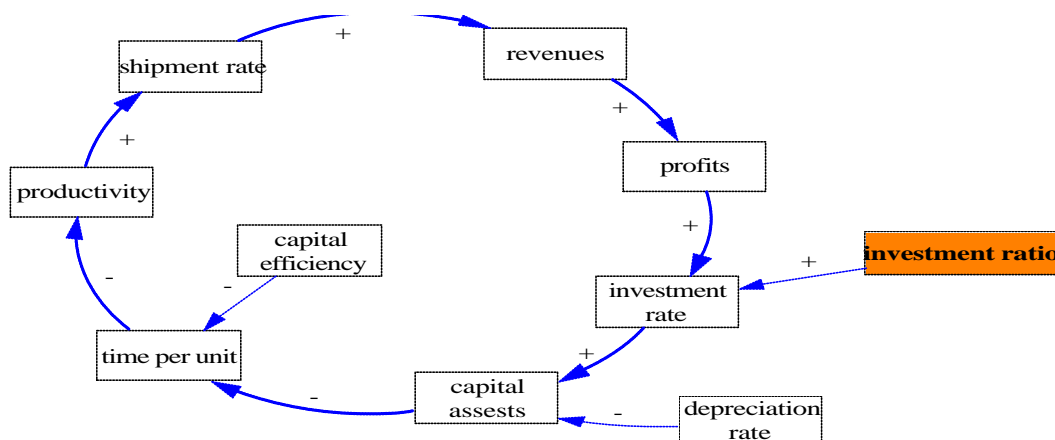


Figure 7: R4 investment efficiency

In the medium term, a portion of the revenues could be invested in purchasing capital assets and machinery, these assets participate in leveraging the productivity by saving time devoted for each piece.

The Balancing negative feedback loops

B1: Industry Image

To build the industry image, it is obvious that customer satisfaction plays a very critical role. So, the loop shows how to manage the variables/factors that affect the customer satisfaction (quality, delivery delay, prices and product features).

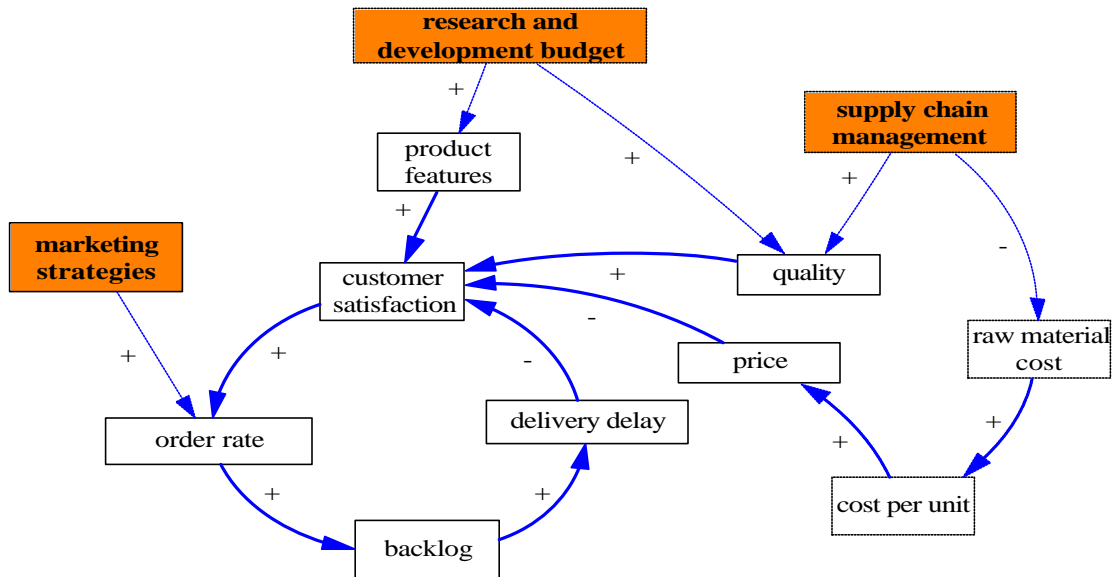


Figure 8: B1 furniture industry image loop

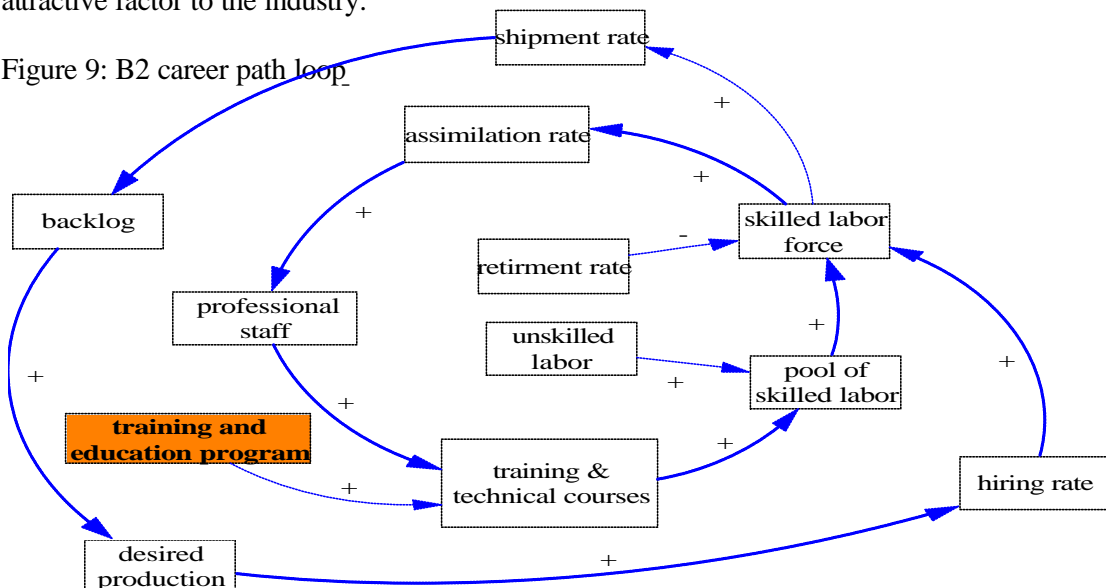
In the medium term, supply chain management could decrease the cost per unit through large volume purchases of raw material

In the long run, research and development is a must to innovate new designs and add more features and improve quality to increase customer satisfaction.

B2: Career Path

This loop illustrates a medium-term policy with delay, to expand production capacity by hiring skilled labor. Generation of professional staff capable of handling training and education courses will increase the pool of skilled labor. This loop also acts as an attractive factor to the industry.

Figure 9: B2 career path loop



In the long term, training courses might be held to generate skilled labor to be involved in the production process in the future. This policy will help to eliminate the shortage problem of skilled labor and give chance for further and further of capacity expansion.

Proposed Policies in Details for Large and Medium Size Manufacturers

Short-Term Policies

Production management techniques

The researchers do suggest introducing the world-class production management techniques that will help to solve the backlog problem, delivery delay, and the increased defect rate, through job design and production. This will decrease time per unit and cost, which generate more profit to finance the medium and long term plans.

Financial Package/Compensation

In this study it is recommended to apply incentive methods to motivate labors. This will leverage energy level and productivity rate as well to meet the requested orders and overcome backlog problem. This policy will help a furniture company; on the short run, to produce efficiently and within time constraints on the conditions of the commitment, skill, and quality of its labor force. Labor whose compensation is tied to profit sharing or the company stock often work harder and longer than those on straight salaries.

It would be then obvious, that the more profitable the company, the higher the wages and benefits it can pay, the greater the career opportunities and job security for the labor.

Another way to motivate the labors is the goal setting that causes labor to compare their present performance with that required achieving the goal. In contrary, labors with undefined goals are prone to work slowly, perform poorly, and exhibit a lack of interest.

Marketing strategies

On the level of marketing strategies the authors are suggesting the following policies as a part of the short-term policy:

- Investing a huge figure in promoting unfinished hand made furniture to specific potential countries (ITALY, USA).
- Participate in the international exhibitions for furniture
- Establish sales offices to support customers and maintain a feedback information system for customer requirements and complains.
- That will stimulate the order rate, which generate more revenues and increase the growth rate of exports.

Although the short-term policies will solve the problems (actually its symptoms), it would have been of importance to design the policy in the medium as well as the long term that the long-term solution is the main and major concern of the Egyptian government and the private sector.

Medium-Term Policies

Supply chain management efficiency

So, the researchers suggesting introduce the supply chain management concept that will help control the purchasing process of raw material in terms of quality and cost.

Investment rate

The study has pointed out that the current technological status is poor, so increase the capital assets by acquiring new machinery to maintain standard quality and reducing time per unit to increase productivity and overcome any possible delivery delay as order rate increases. One of the very important and critical factors that affect this industry is the painting process, so acquiring painting machinery to modernize the whole production process will add value to exported furniture.

Long-Term Policies

Human resources management

It's one of the key issues of concern since the furniture industry in Egypt is labor intensive and the skilled labor is the only competitive advantage the industry owes in the hand made furniture category. HR management could help developing both the work and living conditions of labor, which increase labor commitment and loyalty and motivate labor.

Research and development

To maintain the expected market share in the forthcoming, the Research and Development activities should be realized. This should include technology transfer, use the state of the art manufacturing facilities, and teach management and supervisory skills. To establish design centers, that encourage inventing new design and features and to enhance the quality.

Training and education program

In order to build a pool of skilled labor and protect the traditional industry to vanish over time, training courses should be organized and supervised by the assimilated professional staff.

The problem for the small-scale manufacturer stem from the fragmented structure and inability to handle any export activities

As mentioned above, one of the weaknesses in the furniture industry in Egypt that it is fragmented (see figure 10), so the main methodology of the reengineering process is to group hundreds of small workshops under the umbrella of small number of large scale manufacturing plants.

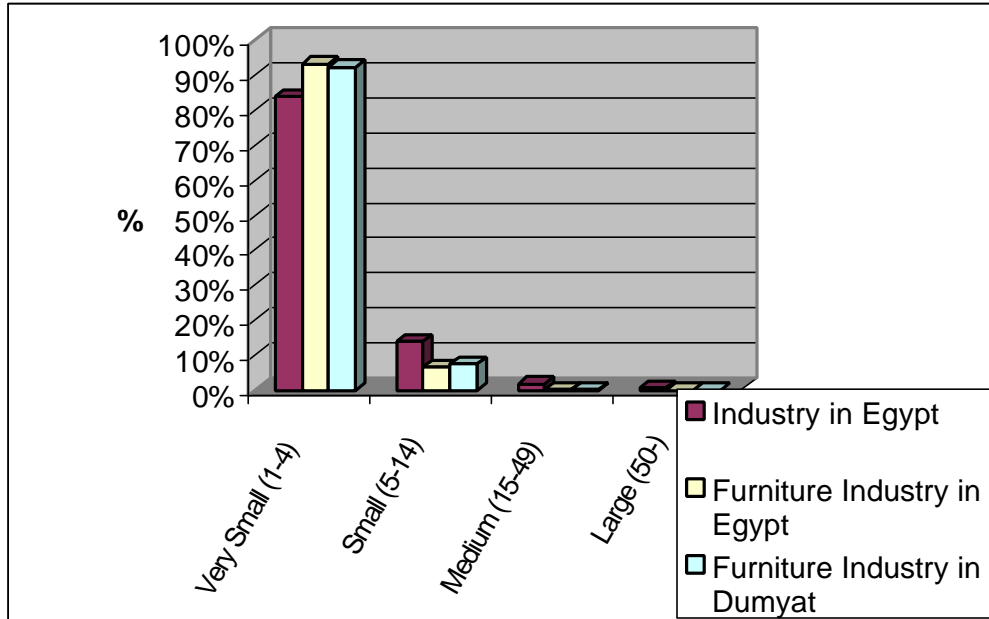


Figure 10: Industry Segmentation. (Elmihy 2002)

The proposed policy is a 4 phase Reengineering process, suggested as follows:

1 phase: Form Modern Manufacturing Plants for Different Product Categories

The researchers believe the reengineering process is to start as every 20 to 30 small workshops form a manufacturing plant. Every group of workshops will participate by a percentage according to his financial ability in the initial investment costs. Each plant is specializing in one specific product category to achieve the economies of scale principles (e.g. a plant for cabinets, one for tables, other for chairs and so on). Each plant equipped with new machinery; such as lumber drying, lumber and plywood cutting, and finishing.

That would enable small independent workshops to produce furniture using such modern technology. These workshops would share equipment to reduce the capital requirements.

Workshops in each plant will earn revenue according to their output every month, and plant profits is distributed on workshops every 6 months according to the share in the initial investment and bonuses is given to workshops of higher production rates.

The researchers suggest the production of that phase to be directed to the local market as an experimental period.

Phase 2: Build an Export and Marketing department

Each plant has to build a department that handle the sales and marketing of the products of that plant world wide, and promoting exports in all international furniture exhibition and even rent showrooms in some countries. Export sales will generate revenues to cover the 3rd phase.

Phase 3: Create Technical department

Each plant should form a technical and production department to manage the operations in the manufacturing plant, transfer the latest design, and support engineering aids,. Also it would carry out research and development, use the state of the art manufacturing facilities, supply chain and inventory management, and run a world-class furniture manufacturing operations.

Phase 4: Create Human Resources Management Department

The main objective of this department is to develop the living conditions and work conditions of the workers in each plant, and deliver social services. Also it can handle medical insurance system to workers, entertainment programs, retirement procedures, assimilation standards, compensation package, retention, reward system, banking time off system.

Also this department would provide training and technical courses to the workers in the plant as well as to the workers outside the industry in order to build a pool of skilled workers.

CONCLUSION

The furniture industry in Dumyat and in Egypt faces many challenges in order to be successful exporter, however the stakeholders have an opportunity to meet all these challenges. Dumyat has the resources to become a global player, the authors believe that Egypt could be so if all stakeholders collaborate more and support the proposed policies to make them real.

Short-term, to Long-term policies have been proposed using the System Dynamics Approach for the medium- as well as for the large-sized manufacturers. On the other side, the 4 phase proposed reengineering policy for the small workshops will enlarge their scale by the grouping shape and then the same policies if needed could be applied.

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