

## Chapter Seven

### The Pharmaceuticals Cluster, 2000

#### Historical Background

The end of the 1930's witnessed the initiation of the pharmaceutical industry in the Arab world. It started with Egypt followed by Morocco in the 1950's, then Iraq, Syria and Jordan during the 1960's. By the end of the 70's and 80's Sudan, Yemen, Algeria, Tunisia, UAE, Kuwait and Saudi Arabia had already entered the industry. Ever since its establishment, the industry developed and grew in the Arab world. In 1999, the total number of pharmaceutical companies in the Arab world reached 219.

To this end, Jordan is considered the third or fourth Arab country to enter the pharmaceutical industry. The first Jordanian pharmaceutical company was established in 1962, and continued to represent the entire Jordanian pharmaceutical industry till the mid 70's. By 1980 three large Jordanian companies had entered the industry.

The number of entrants to the industry tripled during the 1980's and 1990's as twelve new companies were established, totaling sixteen pharmaceutical companies in the Jordanian industry. Six of the companies are public shareholding companies as opposed to the remaining ten that are privately owned. This increase in pharmaceutical companies entering the market in the past decade was due to the inflow of capital returns from the Gulf, in conjunction with the fact that the pharmaceutical industry was one of the pioneering industries that demonstrated high profitability at the national level during the past decades.

#### Overview

With sixteen companies, the industry remains relatively small compared to world pharmaceutical industries. However, actual investment in the Jordanian pharmaceutical industry exceeds US\$ 400 million, which is satisfactory, when compared to the US\$ 4 billion invested in the Arab pharmaceutical industry. Nevertheless, ever since its establishment, the Jordanian pharmaceutical industry has been of growing importance to Jordan and to the Arab world in general. The contribution of the industry to manufacturing GDP amounted to 7.5%, which was equivalent to 0.01% of the total GDP in 2000.

However, this is significantly lower than international standards as seen in figure (7.1), which compares the Jordanian pharmaceutical share of GDP to that of other selected countries.

70% of the total production for this industry

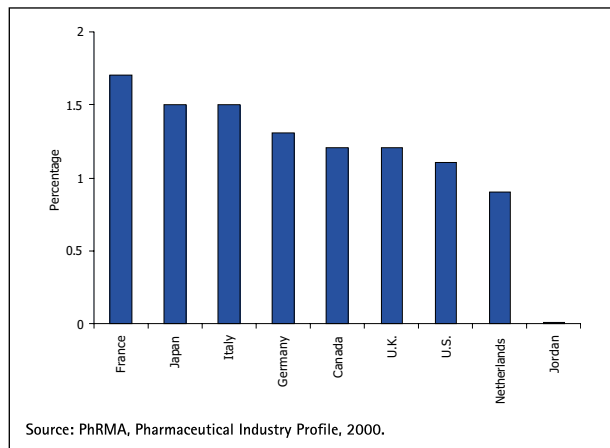
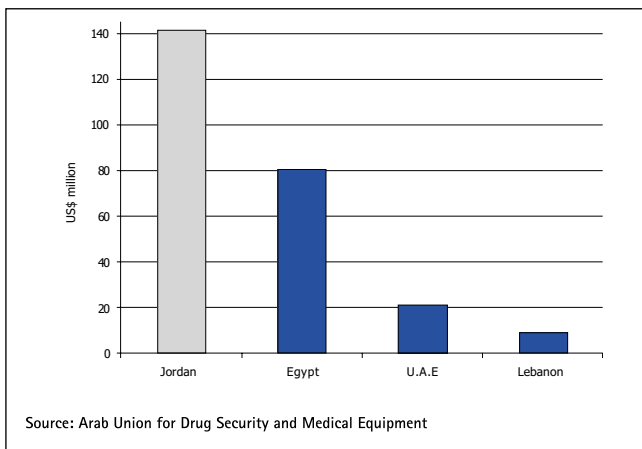


Figure 7.1: Pharmaceuticals' Share of GDP in Selected Countries, 1997

Figure 7.2: Arab Pharmaceuticals Exports 1999



is exported, thereby accounting for 9.6% of total exports, which is worth US\$ 141 million; making it the third largest exporting industry in Jordan after potash and phosphates. Figure (7.2) shows that in 1999, Jordan was a leader among Arab pharmaceuticals exports. However in the international context, the total Arab pharmaceutical exports in 1998 represented 0.25% of the total world exports as opposed to the leading pharmaceutical exporter, Germany that reached 15.4% of the total world exports.

Figure 7.3: Distribution of World Pharmaceuticals Consumption.

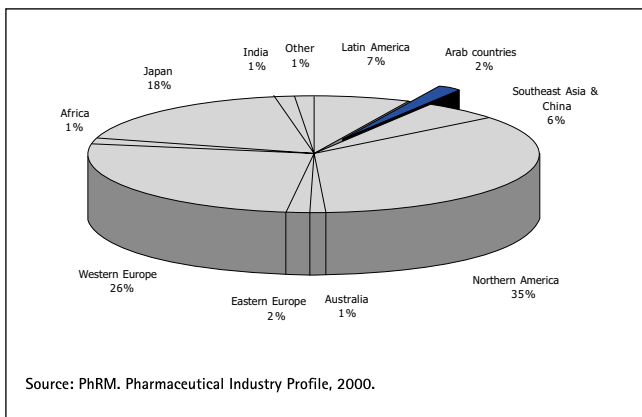


Figure (7.3) illustrates the distribution of world pharmaceuticals consumption, which in 1998 aggregated to US\$ 341 billion. As clearly indicated in the figure, North America, which represents only 5% of the world population, is the largest consumer of pharmaceutical products. Whereas 60% of the world's population amassed in South East Asia, China, India and Africa consume only 8.6% of the global pharmaceuticals. This does not only indicate how advanced and developed the pharmaceutical industry is in North America but also demonstrates the huge demand for such products and the potential posed as large markets.

## Analysis

### A. Demand Conditions:

In terms of domestic demand, Jordanian pharmaceutical companies met an average of 45% of the quantities locally demanded for the years 1995-1999, the remainder of which were satisfied through imports. However, only 33% of the value of local demand is met through local products. This is due to the considerably lower prices of local pharmaceutical products relative to the imported ones.<sup>1</sup> Arab pharmaceutical companies on the other hand, cover 46% of the value of local demand in the countries of origin; hence Jordan still lags behind.

Furthermore, since the Jordanian industry covers only 33% of the value of local demand, the value

<sup>1</sup> Per capita drug consumption in Jordan was US\$ 33.5 in 1998.

of pharmaceutical imports has increased from US\$ 85.8 million in 1995 to US\$ 97.7 million in 1999. Nevertheless, a trade balance surplus for Jordanian pharmaceuticals is maintained. However, there is a huge deficit in Jordan's trade balance for pharmaceuticals with EU countries such that the value of Jordanian pharmaceutical imports from the EU reached US\$ 63.4 million in 1999, as opposed to US\$ 0.3 million worth of Jordanian exports to the same countries.

With regard to foreign demand, as has previously been mentioned, almost 70% of the Jordanian pharmaceutical production is exported. The value of pharmaceutical exports increased from US\$ 57.3 million in 1990 to US\$ 141 million in 1999, which is almost triple of what it used to be in 1990. However, despite this growth in the value of exports between 1990 and 1999, less growth was recorded in the years 1991, 1995 and 1998. The reason for the 1991 decrease in growth is related to the political context of the time and the Gulf War, when some importing countries stopped accepting pharmaceutical products originating from Jordan. The decrease in 1995 and 1998 was the result of various other factors, some internal others external, that affected the Jordanian pharmaceutical companies.

In terms of the distribution of Jordanian exports, in 2000, exports to Arab countries amounted to 97% of the total Jordanian pharmaceutical exports and only 3% was directed to the rest of the world. As for the main Arab markets for Jordanian pharmaceutical exports, in 1997, 82% of these exports were directed to three Arab markets; the largest being Iraq (39%) followed by Saudi Arabia (26%) and Algeria (17%). However, exports to these three main markets declined from 82% in 1997 to 69% in 2000. Nevertheless, Iraq (40%) continues to be the largest market for Jordanian pharmaceutical exports succeeded by Saudi Arabia (21%) and Algeria (8%).

As a safeguard against political instability and barriers to trade, and to overcome the instability of these markets, the Jordanian production for Arab countries was relocated through partnerships with strategic endogenous partners. For example, establishing partnerships in Saudi Arabia gives Jordanian companies access to the Gulf. This is due to the fact that pharmaceutical products cannot enter certain Gulf countries such as Kuwait unless the product is registered in Saudi Arabia. Therefore, establishing partnerships with Saudi Arabia becomes a prerequisite for gaining access to other markets in the region. Similarly, Algeria facilitates access to North Africa.

Finally, whilst Jordanian pharmaceutical exports focus mainly on Arab countries, the total consumption only amounted to 1.6% of the world consumption for pharmaceutical products in 1998, whereas advanced countries such as the US, Japan and Europe constitute 78.5% of world consumption. However, though Arab markets enjoy the advantage of geographic proximity and easy entrance, unlike international markets, the Jordanian industry should search for new stable markets to access and simultaneously work on increasing its contribution to total Jordanian exports. The establishment of new pharmaceutical companies in Arab countries is on the rise thereby posing the threat of increased competition; hence the Jordanian industry should work to differentiate its products in these export markets. Otherwise, Jordan risks losing its market share in the presently open Arab markets, on top of its inability to access international markets.

## B. Factor conditions:

The analysis of factor conditions for this cluster focuses on the structure of employment within the pharmaceutical industry. It relies on information gathered in a survey conducted in December 1998. The following, clarifies the structure of employment in this small industry.

To begin with, the years ranging from 1976 to 1998 witnessed a cumulative average growth rate of 12%. The number of employees within the industry rose from approximately 250 employees in 1976, to 3,098 in 1998. Hence the pharmaceutical industry is a major source of employment.

However, after examining the distribution of the 3,098 employees according to specialization (figure 7.4), it was observed that most employees had high school degrees or less (1,404 employees; 45.3%), followed by diploma holders (821 employees; 26.5%), the majority of which held a diploma in pharmacy (13.1%).

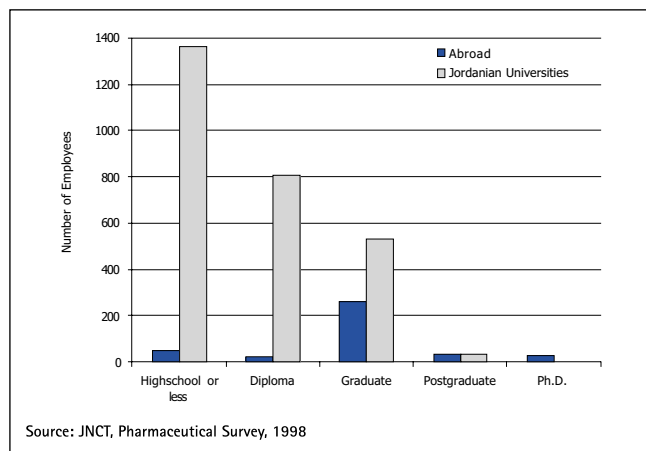
Next were bachelor degree holders (789 employees; 25.5%), again most of them with a specialization in pharmacy (12.3%) and economics or administration (3.4%). Masters degree holders came up to 60 employees representing 1.9% mostly specialized in economics or administration (0.6%), and finally Ph.D. holders (24 employees; 0.8%), the majority holding a Ph.D. in pharmacy (0.5%).

As for the distribution of employees according to place of graduation, the findings illustrated in figure (7.4) reveal that almost all high school degree and diploma holders graduated from Jordan, while more than one third of bachelor degree holders and two thirds of postgraduate degree holders graduated from abroad. All Ph.D. holders on the other hand, graduated from abroad.

However, the wages of the 3,098 employees are set according to their qualifications. To be specific, the employees who are high school graduates or less, earn an average of JD 120 per month, which is higher than GDP per capita for the year 1997. Diploma holders, earn an average of JD 185 per month whereas those with graduate degrees make an average of JD 387 per month. As for employees with postgraduate degrees, their monthly wages go up to JD 802, whereas Ph.D. holders earn JD 1,794 per month. The average monthly wage per employee is JD 373.5, turning the pharmaceutical industry into the highest paid industry in Jordan.

Figure (7.5) shows the 1998 distribution of employees in different departments of the pharmaceutical industry according to their academic qualifications for comparison purposes with figure (7.6), which illustrates the breakdown of 125 employees according to their academic background in a typical generic company in the USA.

Figure 7.4: Distribution of Employees According to Place of Graduation



When examining figure (7.6), a huge difference in workforce distribution and breakdown can be noted. For example, the Quality and Control Department is given more weight in the American Company than the whole industry in Jordan. Devoting a significantly bigger percentage of employees to the department, as well as more qualified employees with at least a graduate degree, primarily accounts for this.

Based on the findings of the survey, the qualifications that are lacking, and are therefore needed in the Jordanian pharmaceutical industry, are Masters degrees in analytical chemistry and microbiology, and Ph.D. degrees in biotechnology, drug organic synthesis, drug metabolism, drug law, organic synthesis, and chemical analysis.

The assessment of the employment structure in the industry makes clear the need to compile a profile of the teaching staff at pharmaceutical faculties. This is essential since academia provides vital resources for the industry in terms of research and progress resulting from the collaboration between universities and the pharmaceutical companies. There are only eight Jordanian universities offering pharmacy or pharmaceutical related studies. These are Applied Science University, Al-Isra, Philadelphia, Amman Private University, Al-Petra, Zaytooneh University, Jordan University, and Science and Technology University. Only the latter two universities are public.

However, in 1998, 62% of the professors at pharmaceutical faculties in Jordanian universities were non-Jordanian. The Higher Council for Science and Technology (HCST) conducted a survey to create profiles containing relevant data and detailed information on professors. The type of information gathered includes, name, nationality, academic qualifications, university of graduation, time percentage of activities (basic and applied research), number of years spent in R&D (internally and externally), number of patents in the professor's name, finally, the number of books and reports registered in the professor's name. Universities should utilize such information to construct web sites that would facilitate industrialists' search for expertise, and thereby help industries meet their needs. In addition, such an initiative would strengthen the relationship between the industry and academia, reinforcing the cooperation between the two sectors, a key element to development, growth and progress. In the absence of such an initiative, invaluable resources such as academia are being underutilized and wasted.

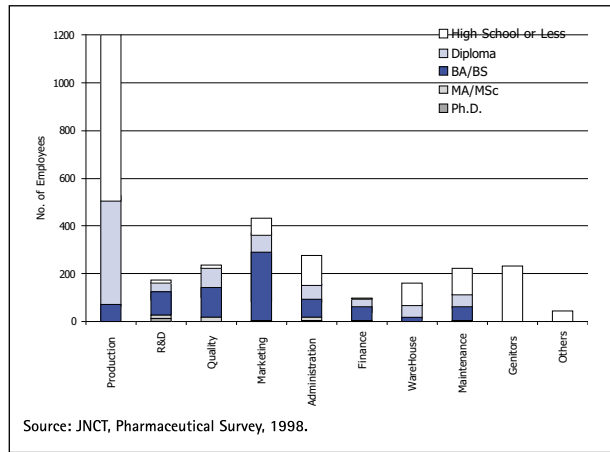


Figure 7.5: Distribution of Employees in Different Departments in the Pharmaceutical Industry According to Academic Qualifications

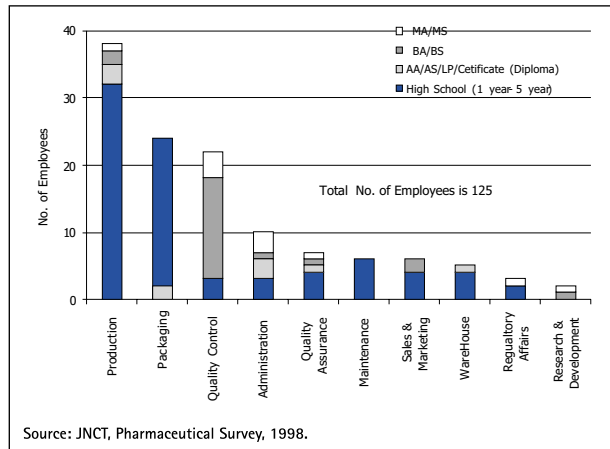
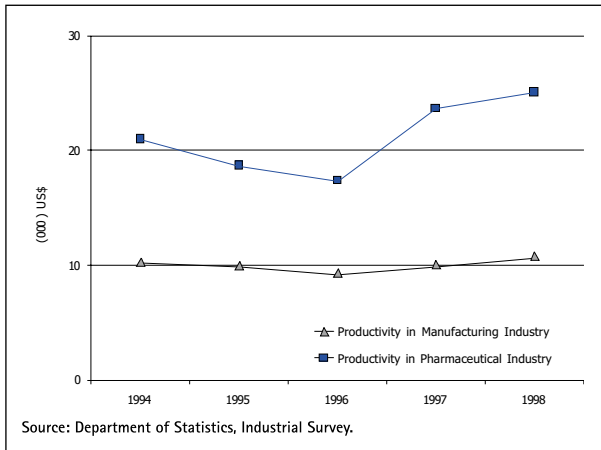


Figure 7.6: Breakdown of Employees According to their Academic Background in a Typical Generic Company in the US

Figure 7.7: Productivity in Manufacturing Industry vs. Pharmaceutical Industry

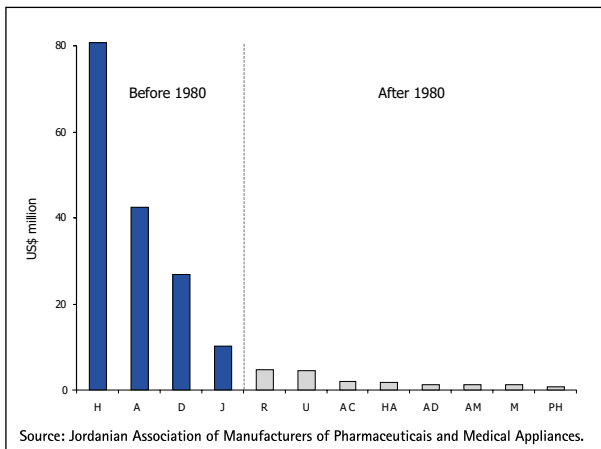


To summarize, although 45.3% of employees hold high-school degrees, the distribution of employment in the pharmaceutical industry is considered to only be satisfactory. Average wages of employees holding high school degrees or less was higher in 1998 than the GDP per capita for the year 1997. Yet only 38% of professors related to this industry are Jordanian citizens, clearly indicating that the educational system is not yet market driven, to match university outputs with market requirements. Labor productivity in the pharmaceutical industry is relatively higher than that of the manufacturing industry as shown in figure (7.7).

### C. Strategy, Structure and Rivalry:

As previously mentioned, the pharmaceutical industry consists of 16 companies, four of which were established before 1980 and the remainder thereafter. The companies established after 1980 cover only 10% of the local production and 6% of exports in 1999. On the other hand, those established prior to 1980, cover 90% of the local production as well as 94% of exports, obviously dominating the industry. The sector domination of the four pre-1980 companies is further illustrated in figure (7.8) indicating 1999 sales.

Figure 7.8: Total Sales by Company, 1999



However, it is worth mentioning that the companies established after 1980 excelled over

pre-1980 companies in terms of compliance with Current Good Manufacturing Practice (CGMP), inclusive of the complete separation of penicillin production ingredients from other drugs. Consequently, the cost of modernizing the pre-1980 pharmaceutical companies in order to restructure their production lines is equivalent to US\$ 30 million.

Nonetheless as a result of high profit margins and high local demand, most Jordanian pharmaceutical companies focus on the same product categories, mostly reproductions of in-patents. Twelve of the sixteen companies divide up the production of certain groups of pharmaceutical products such as anti-ulcerants, antibiotics systemic, anti-rheumatic system and non-narcotic analgesics. Two of the twelve companies, however, also specialize in the production of intermediate products; one produces empty hard gelatin capsules and the other cephalosporin antibiotic, although a third company is specializing completely in the production of cephalosporin antibiotic. As for the remaining three companies, each specializes in either ophthalmologic,

dermatological products (topical preparations), or insulin that is still under construction.

The focus of pharmaceutical companies on the production of pharmaceutical products from the same therapeutic categories rather than diversifying, developing, and exploring new products to reduce imports (see figure 7.9) inevitably leads to product overlapping, high domestic competition (see figure 7.10) and excess production capacity. As a result, companies are forced to compete on the basis of prices fixed by the technical committee at the MoH. These are set depending on the price level of imported pharmaceutical products, whereby the policy practiced dictates lesser prices for local products compared to the same products originating from foreign companies. Local pharmaceutical products are usually cheaper by 25%-35% than imported ones.

Figure (7.10) demonstrates an increase in the incidence of local companies competing on the same product categories. For example, there is strong competition on the sub-category (Broad Spect Penicill Oral), which covers 23%, 20%, and, 16% of the sales of the three largest Jordanian pharmaceutical companies. In terms of retail, local sales primarily mean sales conducted through pharmacies and pharmaceutical warehouses, and as such sales through tenders are not included.

The intensity of competition between local pharmaceutical companies on one hand, and foreign and Arab companies on the other, is very strong. This is due to the fact that foreign companies maintain several advantages over Arab producers such as; trade and brand name, long presence in the market, and focus on the development and production of new products. Foreign companies allocate between 12% and 21% of the annual net sales to R&D. The major leading pharmaceutical companies in the world conduct research in five areas including the critical and complex synthesis compound, toxicology and clinical studies. It is in these areas that most drug development occurs. World pharmaceutical companies also corner advanced technologies in this field, in the form of technological ownership, patents and protectionism regulations. The availability of pharmaceutical inputs, as well as materials and packaging materials are an additional advantage enjoyed by foreign companies, explaining the supremacy of such companies in the world market of pharmaceutical products and the control these companies exercise over prices and profitability.

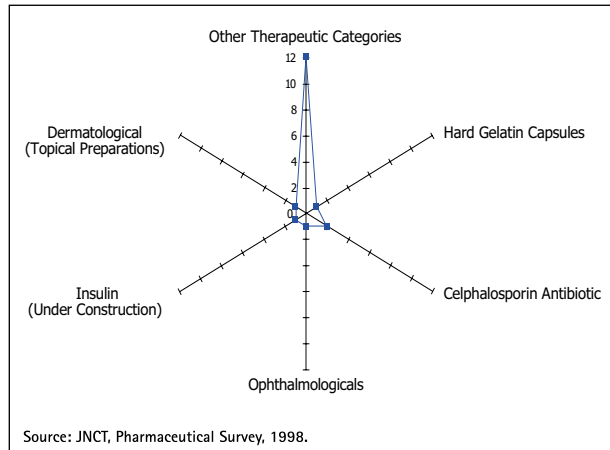


Figure 7.9: Product Concentration

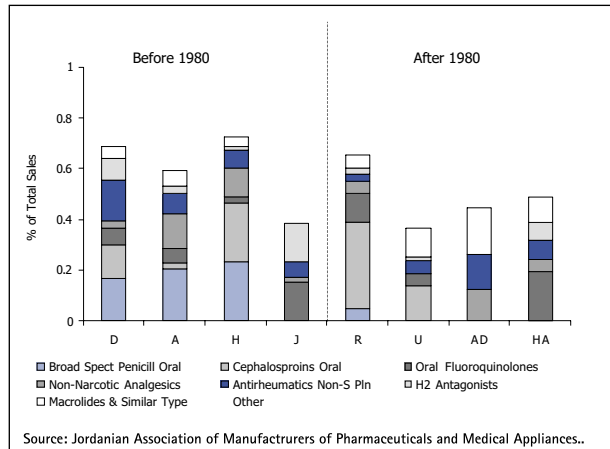


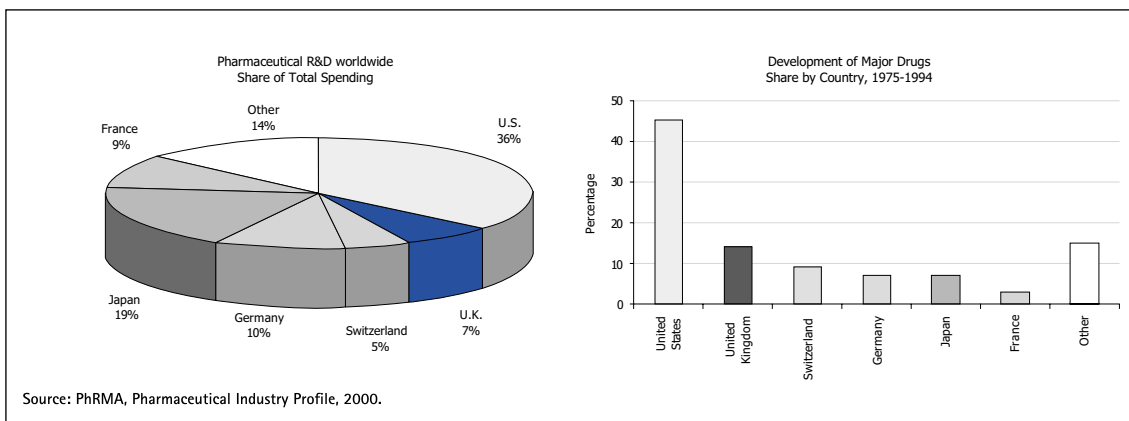
Figure 7.10: Company Product Concentration and Rivalry

On the other hand, most of the research conducted in the Jordanian pharmaceutical sector focuses on developing new formulas for already patented drugs. The Jordanian pharmaceutical companies give attention to only two areas; formulation and stability studies, and bio-equivalence studies, which absorb an average of less than 0.1% of the allocations from net sales.

Moreover, an increasingly larger number of Arab pharmaceutical companies, whose local markets are target markets for Jordanian companies, produce similar products. Consequently, Jordanian pharmaceutical companies find it progressively more difficult to export to such markets.

Hence, Jordanian pharmaceutical companies are confronted with a major issue concerning strategy, first and foremost, the insufficient investment in R&D limits the development of new products. In addition, due to the faulty R&D segment in the Jordanian pharmaceutical industry, similar products are being produced and marketed in the Arab markets, harshening the competition and lessening sales. To emphasize the importance of R&D further, figure (7.11) illustrates how countries with high R&D spending greatly contribute to the development of major drugs and substantially increase sales volume. The USA's share of 36% from the worldwide total spending on pharmaceutical R&D contributes to the development of 45% of major drugs available in the international markets.

Figure 7.11: R&amp;D Spending and Drug Development



#### D. Related and Supporting Industries:

The following cluster map (figure 7.12) highlights the various links between the pharmaceutical industry and supporting industries. From the cluster map, it is evident that production in the Jordanian pharmaceutical industry is largely based on imported equipment, raw materials comprised of a sizable portion of both active and inactive ingredients, in addition to packaging. To be specific, 90% of such materials are imported. The dependency on such a large percentage of imported key components exposes the industry to price variations occurring in the world markets, and negatively affect the costs involved. Consequently, the competitiveness of the industry is weakened in both internal and external markets.

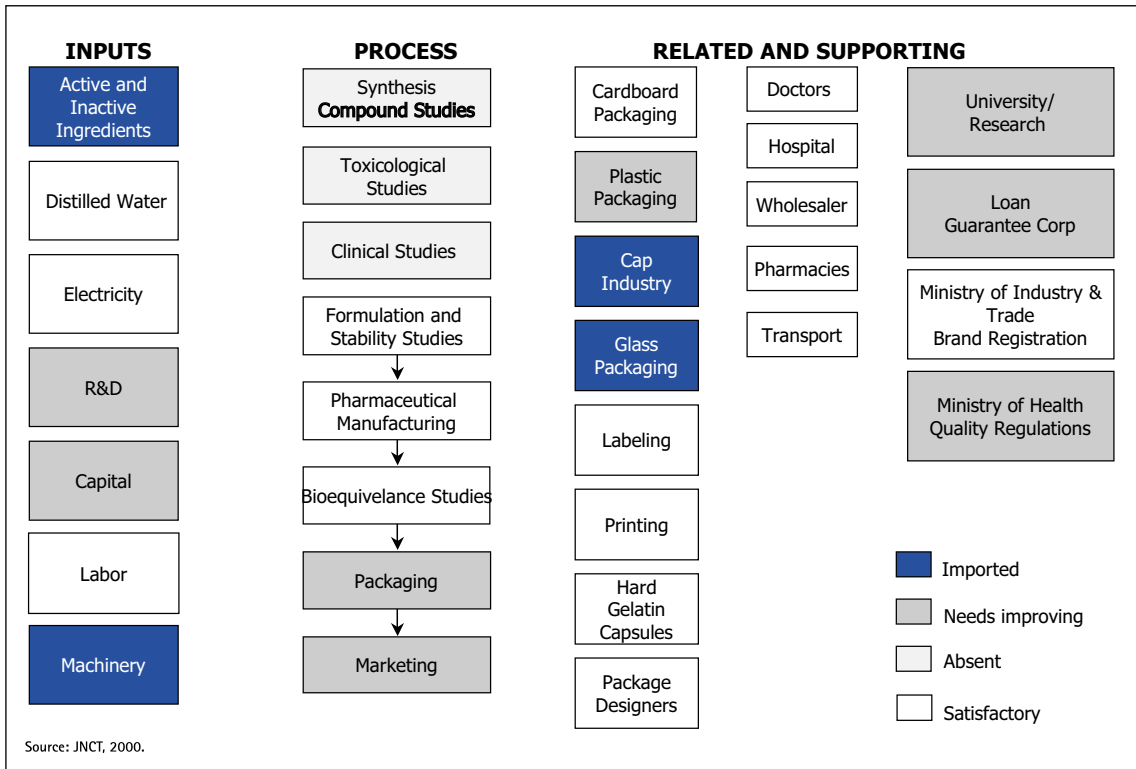


Figure 7.12: Pharmaceuticals Cluster Map

Furthermore, the cooperation and coordination between pharmaceutical companies and pharmacy faculties in Jordan, amounting to eight faculties, is weak and virtually non-institutionalized. In effect, the relationships between academia and the industry are confined to contracts concluded between the two on a personal and individual basis.

The cluster map clearly indicates that fundamental research such as synthesis compound studies and toxicological and clinical studies are absent. In fact what the industry is actually doing is to formulate and produce already existing pharmaceutical products through new processes rather than inventing new products.

In short, many components in the cluster map, whether in terms of inputs or related and supporting industries, are weak and in need of amelioration and development. These main components include R&D, which is based on the examination of various production processes for products already available on the market, packaging, and marketing, which are not implemented in a studied scientific manner. Lastly, the cluster witnesses an increase in the number of local centers responsible for conducting bio-equivalence studies. There are four bio-equivalence centers in Jordan to date.

## E. Government:

One role the government plays in this cluster concerns price control on local sales. The Jordanian government sets price ceilings on both domestic and imported products, whereby, as previously mentioned, local prices are generally 25–35% below those of the original imported products. Jordan's export markets on the other hand, mainly the Gulf, set prices according to price levels in the Jordanian market. Therefore, local price controls subsidize export prices. Furthermore, price reviews of locally produced medicine are infrequent whereas import prices are reviewed periodically to adjust for exchange rate fluctuations. This rigid price control system in Jordan is also imposed in other Arab countries such as Egypt, Bahrain, Lebanon, Oman, and Kuwait.

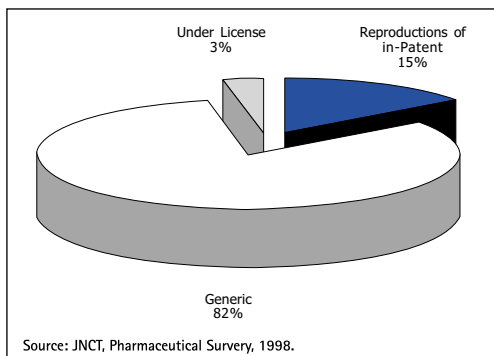
Naturally, international pharmaceutical companies view this price control system as a constraint since it restricts fair and just competition. However, the elimination of price control would negatively affect the performance of local companies since foreign competition in the Jordanian market would increase and become more intense. Therefore, reaching an effective compromise with the government, rather than eliminating the price control system altogether, is favored in the long run.

On a larger scale, the adoption of trade policies grounded on gradual openness to the global economy, and the disintegration of custom fees and protection policies of local production, coincides with the current trend of globalization and free trade. In accordance with this trend, various agreements have been concluded, the most significant of which are EURO–JOR Association Agreement, Arab Free Trade Area (AFTA), and the accession to the WTO.

The accession to the WTO has been a huge step for Jordan, particularly in terms of Intellectual Property Rights (IPRs)<sup>2</sup> protection. It required adjusting certain legislative laws to meet international standards in areas concerning patents and data exclusivity. These are all covered in the Trade Related Intellectual Property Rights (TRIPs) agreement. Progress in Intellectual Property Protection is measured according to five criteria. In the case of Jordan, all provisions; pharmaceutical product protection, twenty-year patent term and compulsory licensing limited apply, except for pipeline protection, which is not stated in the agreement. However one provision known as patent term extension is included in the agreement with various exceptions.

Previously, Jordanian patent law only protected production processes. After signing the TRIPs agreement however, Jordanian legislation changed to protect the production process and final product. Most companies produce both generic and patented medicines without license agreements from the foreign patent holders. Hence, international patent law affects the reproduction of in-patent drugs, which constitutes 15% of the total sales of the local industry, based on a study conducted in 1998. (See figure 7.13) Those

Figure 7.13: Effects of Patents Law under TRIPs on the Local Industry



<sup>2</sup> The Intellectual Property Rights (IPRs) Agreement comprises of a legislative package which introduced amendments to the Trademarks Law, Copyright and Patent Law, Industrial Design and Models Law, Geographical Indications Law, Plant Varieties Law, Protection of Layout-Designs for Integrated Circuits and Protection of Undisclosed Information (trade secrets) and Unfair Competition Law.

affected most are companies established after 1990, which rely primarily on patented products; the percentage of patented products sold in the local market versus total sales is greater than that of the old companies. Consequently, in the future, this percentage is expected to diminish further whilst giving companies added incentives to invest in R&D.

Further, data exclusivity relates mainly to the proprietary registration data, which relies on extensive pre-clinical and clinical trials that companies or right holders are required to submit in order to gain marketing approval to protect them against "unfair commercial use". To elaborate, manufacturers or copier drug companies other than the right holders must rely on their own test data to be submitted to the regulatory authorities for marketing approval. Jordan is now on the list of countries, which comply with data exclusivity alongside the USA and European countries. In fact, Jordan is no longer among watch countries that are considered TRIPs offenders. The main TRIPs offenders are illustrated in figure (7.14).

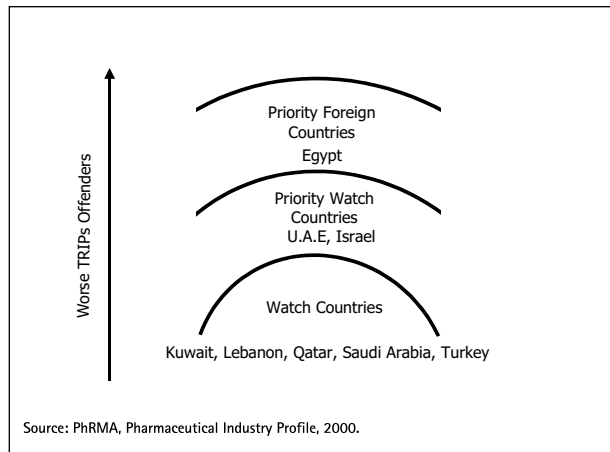


Figure 7.14: Current Situation under TRIPs Protection

In brief, unsurprisingly, the industry feared the issue of compliance with international standards of intellectual property rights due to the negative effect of certain provisions. However, abiding by the WTO regulations and applying the TRIPs agreement offers significant potential benefits. It allows access to new markets, increases the chances of the industry in attracting strategic partners, and creates incentives to upgrade quality and standards.

## Future Strategy Options

Available data shows that 42% of the top fifty pharmaceutical companies are found in Europe whereas 36% are in the USA and the remaining 22% in Japan. The availability of state-of-the-art-technology, flexible work force, stable political environment and a strong economy have made the USA a thriving ground for pharmaceutical companies.

Jordanian pharmaceutical companies should benefit from what the leading companies in the world are doing. There are three main strategies that leading companies follow to secure the prerequisites considered critical success factors for increasing competitiveness, and these are; global expansion, portfolio optimization and value creation. Their implementation would assist Jordanian pharmaceutical companies stay in business, establish partnerships with foreign firms and identify mutual benefits with regards to expertise.

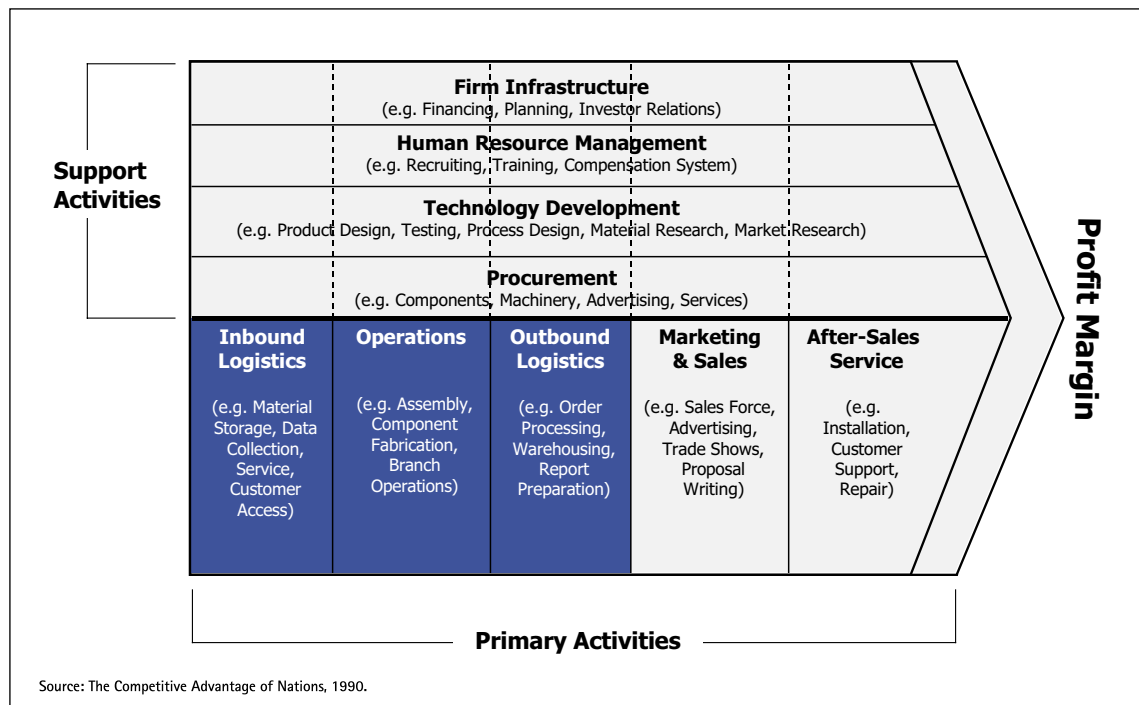
In global expansion, after identifying emerging markets, whether through joint ventures, strategic alliances or mergers and acquisitions, leading companies settle on strategies that depend primarily on the actual conditions of the selected market. For example, the strategy found most adequate and used by western European and former Soviet Union markets, is joint ventures. This is due to the fact, that joint ventures offer a huge market

where raw materials are available and production costs are low. This benefit works in conjunction with yet another fact, namely that consumer and market information gathered so far shows that Russian consumers prefer local pharmaceutical products to foreign ones. Hence foreign companies cannot penetrate such huge markets on their own without entering joint venture projects with local companies. Other incentives to undergo joint venture projects include technology transfer, tapping into distribution channels, and gaining a better understanding of consumer demands and knowledge concerning the surrounding legal environment.

Whereas the most suitable strategy for the South and Central American market, also considered a promising market due to the exemption of customs, the removal of trade barriers between Canada, Mexico and USA, and the introduction of IPRs under the North America Free Trade Agreement (NAFTA), is strategic alliances. However, mergers and acquisitions between the largest world pharmaceutical companies have considerably increased between 1985 and 1999, the reasons being the desire to lower production costs, through an effort to create economies of scale in both areas, marketing and R&D, and the increasing number of drugs with expired patents.

Portfolio optimization comprises developing new drugs while managing already existing products and focusing on ways to extend their life cycles. Portfolio optimization also involves buying into Health Services Areas, which focus on organizing the work of the R&D and marketing departments in order to prepare for future challenges and maintain investments.

The final critical success factor otherwise known as value creation is clarified in figure (7.15).



The invention and production of new drugs is no longer the sole determinant of profits. To create a more value-oriented chain, companies should focus on improving their efficiencies in both primary and support activities. This is particularly necessary as the consumer becomes more sophisticated.

Jordan has several options ahead of it for the short, medium and long term. The most feasible competitive short-term strategy is cost leadership in generics. The Jordanian industry should review the value chain of its products and focus on increasing efficiency in all production stages to become a low-cost producer and maintain a price advantage particularly since a substantial growth in generics in the USA prescription drug market has occurred, as shown in figure (7.16) and Box (7.1).

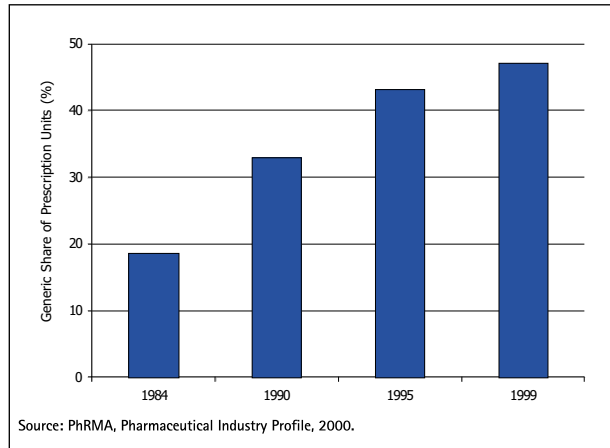


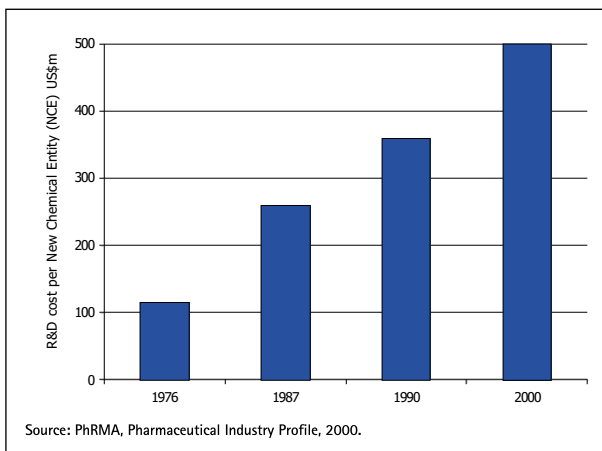
Figure 7.16: Generics Share of the USA Prescription Drug Market, 1984-1999

### Box 7.1: Growth in Generics

In 1984, generic competition intensified, following the adjustment of the Drug Price Competition and Patent Term Restoration Act. Manufacturers no longer have to prove their products are safe and efficient; instead they have to demonstrate that the generic product is bio-equivalent to the branded product. This is currently estimated to be approximately US\$ 1 billion according to figures given by the American Enterprise Institute. In 1995, only six of the top drugs in sales were on patent products from research-based companies; four top sellers were generic products. The growth of generic drugs is expected to increase thereby advancing its share in the USA prescription market based on the expiration of patented drugs. Furthermore, pharmaceutical companies focus on generic lines in developing markets rather than expensive brand names. Examples of companies in the generic group characterized as low R&D spending, and thus low prices charged, are Marion Labs, and Carter Wallace. On the contrary, companies such as Merck, Pfizer and Eli Lilly are part of the proprietary group, which consists of firms with high R&D spending and therefore high prices are charged.

The other short-term option is forming strategic partnerships, whether through strategic alliances and joint ventures, under license, subcontracting production of patented and generic drugs, or a co-marketing and distribution agreement. Currently in Jordan there are viable partnerships and joint ventures. However under-license agreements are limited due to the small size of the local market in comparison to other regional markets such as Egypt and Saudi Arabia. Furthermore, there are no partnerships or joint ventures, which aim at strengthening the capabilities of the R&D segment. Nevertheless, strategic partnerships are feasible since Jordan has access to other markets even though its local market is small. Furthermore, the Jordanian pharmaceutical industry maintains a good reputation and is committed to applying the TRIPS agreement.

In the medium-term, the best option for Jordan is buying the know-how. Although know-how is in general expensive, and Jordanian companies have limited finance, it can still be bought if intra-industry cooperation is enhanced.



In view of a long-term strategy, one option is do it ourselves; to be innovative leaders in terms of inventions, creativity and value-added. However, again Jordan has little capital available for investment in R&D; investment in building factories and plants is preferred over investment in technology and marketing. Furthermore, local research institutions and capabilities are weak, while the cost of bringing one drug to the market is increasing with time as demonstrated in figure (7.17).

In other words, it is almost impossible for the Jordanian pharmaceutical industry, given the present inadequacies and established habits, to

become an innovative world leader in the short or even medium term. However, on the positive side, Jordan has some good drug development expertise that could assist in conducting minor R&D on local diseases and herbal products, improving delivery mode, and reducing development and manufacturing time. Furthermore, some Jordanian companies were able to develop their own original products. They were patented in Jordan and registered in foreign countries. Hence, it is necessary to enhance collaboration between industry and academia, and establish local R&D institutions.

In conclusion, in order to succeed, the formulation of a shared strategy to upgrade the industry as a whole, including supporting industries, should be a priority and not an option.

### Box 7.2: Pharmaceuticals Cluster Analysis Impact:

Following the Pharmaceutical Cluster analysis and upon the request of members of the Jordanian Association of Manufacturers of Pharmaceuticals and Medicinal Appliances (JAMP), the JNCT succeeded in eliminating a 4% tax on inputs through its proposed recommendations to decision-makers.

JNCT also conducted a workshop on strategies beyond TRIPs. The aim of the workshop was to address strategic options that might minimize the disadvantages of the TRIPs agreement, which involved the full participation of managers from leading pharmaceutical companies and deans of pharmacy faculties at Jordanian universities.

The IPRs Agreement comprises a legislative package which introduced amendments to the Trademarks Law, Copyright and Patent Law, Industrial Design and Models Law, Geographical Indications Law, Plant Varieties Law, Protection of Layout-Designs for Integrated Circuits and Protection of Undisclosed Information (trade secrets) and Unfair Competition Law.