International Labour Organization

Skills for Trade & Economic Diversification (STED)

Pharmaceutical Sector

Jordan

Cornelius Gregg

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Regional Office for Arab States

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Foreword

"Skills development is [...] essential to address the opportunities and challenges to meet new demands of changing economies and new technologies in the context of globalization."

Conclusions on skills for improved productivity, employment growth and development, International Labour Conference, 2008

"On the demand side, the strategic goal is to enable the private sector to move up the value chain and increase value added, to improve its productivity, and to expand its ability to export products and services. On the supply side, the goal is to graduate a skilled and motivated labour force armed with employable skills and technical knowhow as demanded by the labour market."

Jordan's National Employment Strategy 2011 - 2020

This report presents an application of the International Labour Organization's (ILO) Skills for Trade and Economic Diversification (STED) methodology to the pharmaceutical sector of Jordan's economy. STED is a sector-based approach to identifying and anticipating the strategic skills needs of internationally tradable sectors. The pharmaceutical sector is one of Jordan's leading high value added export sectors. It has grown rapidly since 2000, principally through serving markets in the Middle East and North Africa (MENA) region, including its own domestic market. It was selected for the application of the STED methodology in support of the objectives of Jordan's National Employment Strategy, which emphasises the development of high skill exporting sectors, and of skills development as a means towards competitiveness.

STED has been developed in recognition of the fact that having the right skills among workers is crucial for firms or industries to succeed in trade, and, conversely, understanding trade is important to providing workers with the right skills. Availability of skilled workers contributes to higher and more diversified exports, more foreign direct investment (FDI), higher absorption of technology, and more sustainable growth and productive employment creation. At the same time, skills are the key determinant for a worker's success in finding a good job and making a living.

Providing the right skills at the right time is anything but easy, and it is not just a question of putting in more resources. In order for skills supply to match skills demand in the labour market, it is necessary to take a forward looking perspective, and to ask not just what skills are in demand today, but what skills will be in demand in the future. This is what STED does.

The methodology has been applied in two economic sectors in Jordan – Pharmaceuticals and Food Processing – under the Applying the G20 Training Strategy project which is funded by the Russian Federation. In addition to this report, the project has also prepared a similar report on the Jordanian Food Processing sector. The sectors were chosen in consultation with the ILO's tripartite constituents in Jordan, and the STED process was undertaken in collaboration with sector level stakeholder steering committees.

This report, and the companion report on the Food Processing sector, set out a range of recommendations that together amount to a strategic skills agenda for each of the two sectors covered. Implementation of these agendas depends primarily on Jordanian stakeholders at sector and national level, although there is room for development partners to play a supporting and enabling role. The project is following up the reports by supporting implementation of a number of these recommendations in collaboration with stakeholders.

This project also provides technical assistance in four other countries: Armenia, Kyrgyzstan, Tajikistan and Viet Nam.

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Nader Mryyan (Consultant) advised on the research, and organized a section of the consultation with stakeholders. Noora El-Wer (Researcher) undertook much of the research work, including the enterprise interviews.

Logistical support was provided by Diana Al Akkad (Finance and Administrative Assistant– ILO Jordan), Sanaa Abou Sleiman (Programme Assistant, ILO ROAS, Beirut), Moussa Toufaily (Programme and Administrative Assistant, ILO ROAS, Beirut),Tala Kayyali (Administrative Assistant, ILO Jordan) and Marie-Helene Shala (Secretary, ILO Headquarters, Geneva).

Many industry stakeholders from government, private sector, and trade unions generously gave their time and insights during workshops and interviews, and through participating in the steering committee for STED work in the sector. We are particularly grateful to Dr. Hanan Sboul the Secretary General of the Jordanian Association of Pharmaceutical Manufacturers, who chairs the steering committee.

All errors and omissions remain the responsibility of the authors.

Abbreviations:

VTC: Vocational Training Corporation
GFJTU: General Federation of Jordan Trade Unions
NCHRD: National Centre for Human Resource Development
JFDA: Jordan Food and Drug Administration
JCI: Jordan Chamber of Industry
DOS: Department of Statistics
CAQA: Centre of Accreditation and Quality Assurance
GCC: Gulf Cooperation Council
GMP: Good Manufacturing Practice
E-TEVET: Employment, Technical and Vocational Education Training

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Part 1 Introduction & Overview on STED Process

1.1 Introduction

This Summary Report on the Skills Needs of the Pharmaceutical Sector in Jordan was prepared under the ILO's Skills for Trade and Employment project, which is the Jordanian component of the global Applying the G20 Training Strategy project. It reports on the findings of a forward-looking study of the sector's skills needs based on the International Labour Organization's (ILO) Skills for Trade and Economic Diversification (STED) methodology. The methodology combines sector level technical research and consultation with the social partners and other stakeholders to develop a shared analysis of the trade and skills challenges facing the sector, and proposals as to what should be done on skills to meet these challenges and secure a positive future for the sector.

The report sheds light on the situation of the Jordanian pharmaceutical sector from a skills and labour market perspective. It reflects on Jordan's exports within the region and to other international markets, examining the challenges that affect the sector in improving its competitive position, especially in comparison with competitors in regional markets from within the region and from Europe and Asia.

The report summarises key findings of the research and stakeholder consultations, and sets out the main recommendations.

The pharmaceutical sector is one of two Jordanian sectors studied under this project, the other being the food processing and beverages sector. These were chosen based on a combination of technical analysis to identify sectors in which skills could make a meaningful difference to future levels of decent employment in Jordan, and consultations with the ILO's tripartite constituents in Jordan on their priorities. The work is intended to fit with the priorities set out in Jordan's National Employment Strategy, which emphasises strengthening traded sectors with potential to grow exports and generate more employment, and also emphasises raising skills levels in targeted sectors.

When choosing from among Jordan's traded sectors, those other sectors in which sectoral development strategies with a significant skills component had been developed in recent years, were excluded from consideration in order to avoid duplication of effort.

1.2 Methodology

This report is a summary of the findings of the application of the ILO's STED methodology in the Jordanian Pharmaceutical Sector. This methodology is designed to study the existing and emerging skills needs of an internationally traded sector, and to create a practical strategy to develop the skills needed for future market success, and for maximising sustainable decent employment.

Technical aspects of the methodology include considerable desk research, including analysis of a wide range of statistics, a survey of employers in the sector, and integrating the results of this research into an analysis based on the STED analytic frameworks. Statistics were primarily sourced from the Department of Statistics (DoS) with some special data extractions provided by National Center of Human Resource Development (NCHRD) - (Al Manar Project).

Trade statistics were sourced both from DoS and the International Trade Centre's Trade Map. It is understood that additional types of data on Jordanian trade in pharmaceuticals, drawn from administrative sources, are often used in the sector, but the authors felt that including these in the report would add unnecessary complexity to the analysis. Trade statistics are presented in terms of the currency in which they were sourced, As the Jordanian dinar (JOD) is pegged to the US dollar (USD) at a rate of .709 JD to the USD, it is straightforward for a reader to convert between the two currencies.

Ten companies out of 18 in the sector were surveyed, mostly through in-person interviews. The companies surveyed produce a wide range of pharmaceuticals in a range of physical delivery formats, such as tablets, capsules, liquid and semi-solid forms and injectables. Companies surveyed mainly focus on producing and marketing branded generic pharmaceuticals – pharmaceutical products that are out of patent protection, and are marketed under a brand. With few, if any, exceptions, they import the active pharmaceutical ingredients (APIs) for their products. Additional perspectives and data were sourced through individual consultations with steering committee members.

The STED methodology emphasises close collaboration with sector stakeholders on improving the analysis, agreeing a shared vision for the sector's future development and identifying practical recommendations to address the current and future skills gaps identified through the work. In the case of the Jordanian food and beverages sector, this collaboration took place mainly through a steering group made up of employers from the sector, representatives from the Jordan Chamber of Industry and a representative of the Ministry of Labour. A workers' representative was nominated by The General Federation of Trade Unions (GFJTU).

1.3 Where we are in the Process

This report summarizes the outputs resulting from the following main activities:

- Pharmaceutical sector interview survey;
- Desk research on the pharmaceutical sector;
- Reports to a pharmaceutical stakeholder steering committee based on research and analysis under the ILO's STED framework;
- One-to-one consultations with steering committee members;
- Development of proposed recommendations in consultation with the steering committee;
- Planning of sector level project interventions, based on the recommendations, in collaboration with sector stakeholders.

Planned future steps are as follows:

- Sharing knowledge on the process and findings of this study, and of the similar study of the food processing and beverages sector with Jordanian stakeholders, at national level and with other development partners;
- Implementation of sector level project interventions;
- Assisting Jordanian stakeholders and other development partners in identifying how recommendations that are beyond the scope of what can practicably be implemented within the project can be pursued;

Part 2 Pharmaceutical Sector in Jordan

2.1 Sector Profile

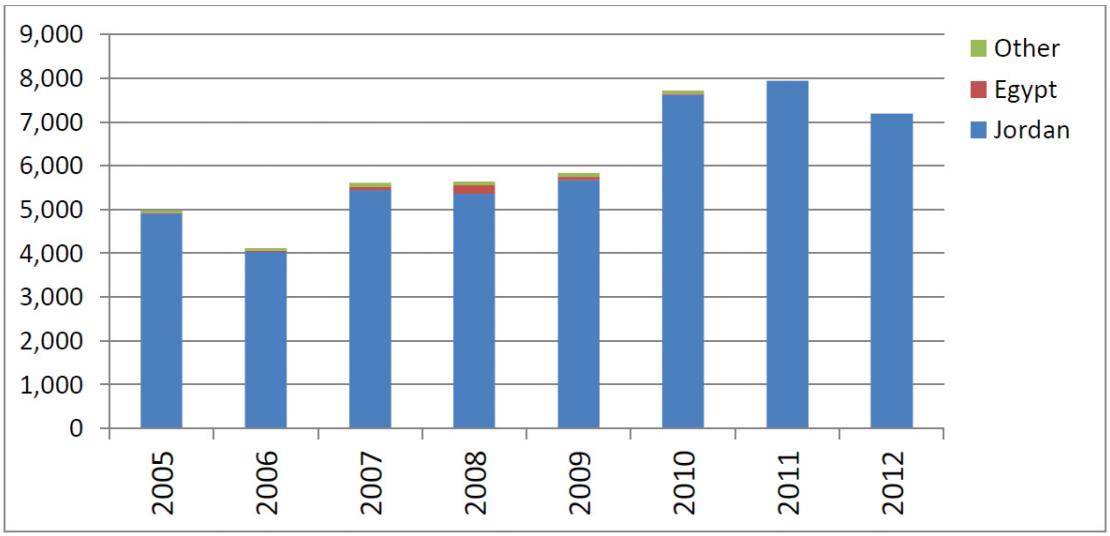
According to the Jordanian Association of Pharmaceutical Manufacturers (JAPM), there are 18 pharmaceutical manufacturers in Jordan, 14 of which are members of JAPM. Department of Statistics (DOS) industry census data indicate a higher number – 55 – but this total includes businesses that only trade in pharmaceuticals. The sector is mainly located in the middle of Jordan, close to Amman, and in the north, closer to the Syrian and Iraqi borders.

Pharmaceutical manufacturing enterprises surveyed had annual revenues ranging from about JOD 2 million to the high tens of millions (not all enterprises answered this question). Companies in the pharmaceutical sector are much larger than the average for Jordanian businesses.

2.2 Employment in Sector

The sector employs about 7,000 – 8,000, and this has tended to rise over time. Employment is approximately one third female. Almost all of those working in the sector were Jordanian as of 2010, the most recent year for which we have sector data on employment of non-Jordanians.

Figure 2.1 Total Number of workers in pharmaceutical sector 2005 – 2012 by Nationality (Jordanian, Egyptian, Others)

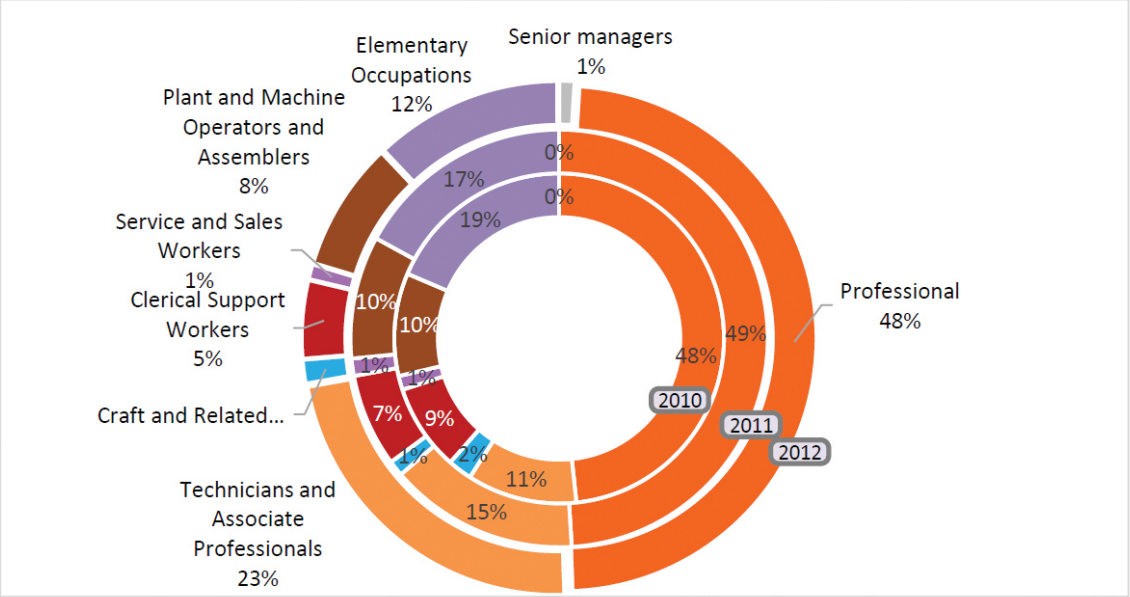


Source: Department of Statistics 2013, extraction from Employment Survey (data for 2005-2010), extraction from Survey of Employment and Unemployment (data for 2011-2012, does not include non-Jordanians).

The occupational composition of employment in the sector reflects the manufacturing focus of the sector and the fact that many of the jobs both in manufacturing and in areas like product development, regulatory affairs, sales and marketing are at a high professional level. According to experts from the sector, the almost 50 per cent of employment at professional level visible in occupational statistics, includes significant numbers of employees in manager occupations, who, in this sector, typically have professional level qualifications.

The data show a striking shift in occupational composition among manufacturing workers between 2010 and 2012, with the share of employment accounted for by technicians rising from 11 per cent to 23 per cent, and the share accounted for by those in elementary occupations falling from 19 per cent to 12 per cent. Experts from the sector firmly agree that this is representative of a major shift in occupational composition that is underway in the sector. However, they suggest that the survey data exaggerate the pace at which the shift has been occurring. As there is a strong trend towards automating low skilled work, and towards employing workers with technician level qualifications to work in manufacturing operations, they expect that the share of workers in low skilled occupations will continue to shrink, and the share of workers in technician level occupations will continue to increase.

Figure 2.2 Occupational Composition of Employment in the Sector



Source: Department of Statistics 2013, extractions from Survey of Employment and Unemployment / Al Manar

Firms in the sector say that they provide equal opportunities for male and females in all occupations. They say that there is no ceiling for females or males, and that the sector invests equally in developing employees of both genders. They highlight that some of the sector's senior managers are female. Some firms note that turnover rates among women are lower than among men in the sector, making it more likely that they will provide a good return on investment in training. Many firms offer a more supportive environment for female workers by allocating them working hours in the day (A) shift (8:00 am - 3:00 pm), rather than in the evening (B) or night (C) shifts. Among those in lower occupations, females tend to work in certain jobs like packaging.

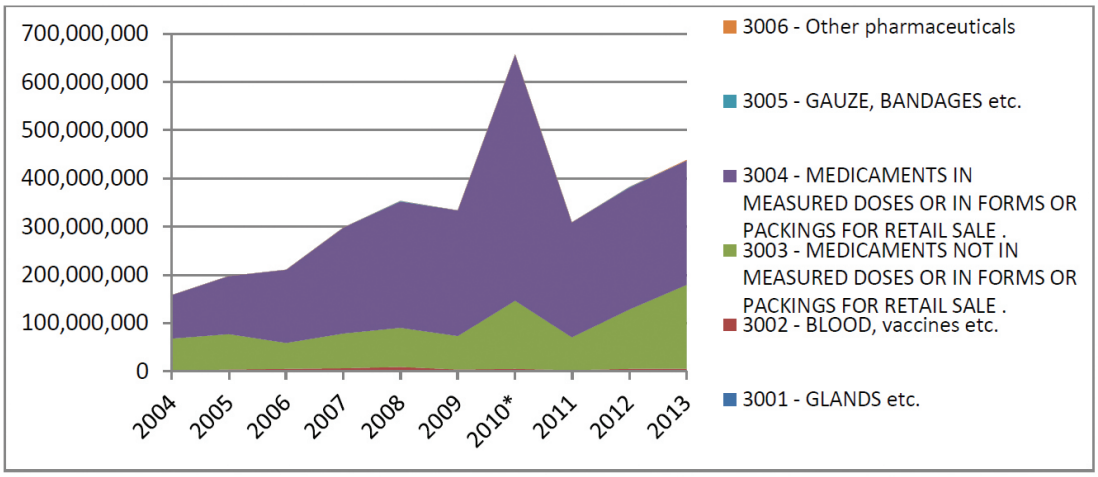
2.3 Trends in International Trade

2.3.1 Exports

Exports of pharmaceuticals products from Jordan are on a steep upward trend. Exports of Jordanian manufactured pharmaceuticals increased from JOD 158 million in 2004 to JOD 438 million in 2013. In parallel, activity in re-exporting imported pharmaceuticals has also grown substantially, from JOD 13 million to JOD 73 million over the same period.

Figure 2.3 Exports of Pharmaceuticals from Jordan

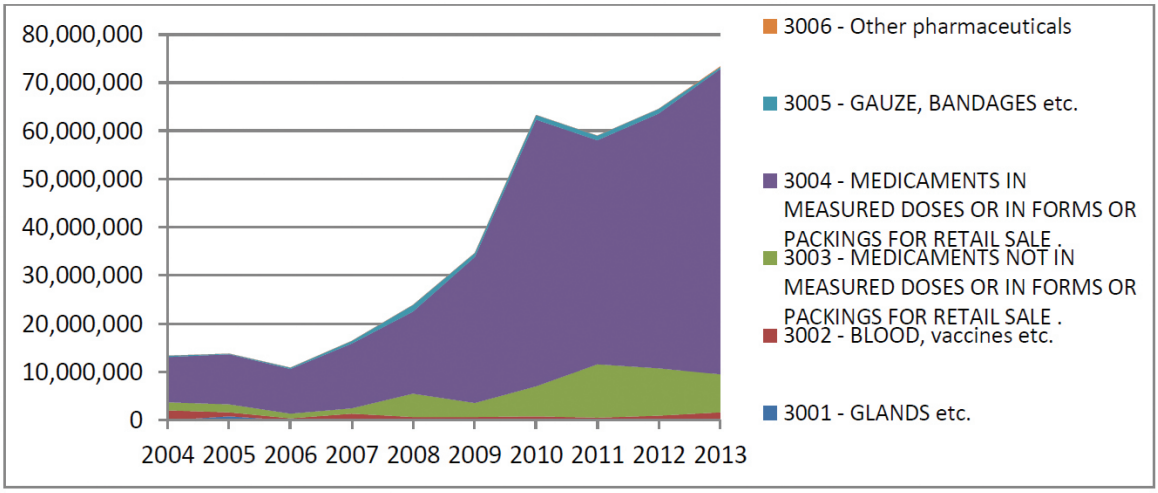
Exports of Jordanian Pharmaceuticals (JOD)



* The spike in exports in 2010 is less prominent in internationally-published versions of the data – see Figure 2.4.

Source: Jordan Department of Statistics, Trade and Investment System, Jordan (Economic Territory)

Re-exports of Pharmaceuticals (JOD)

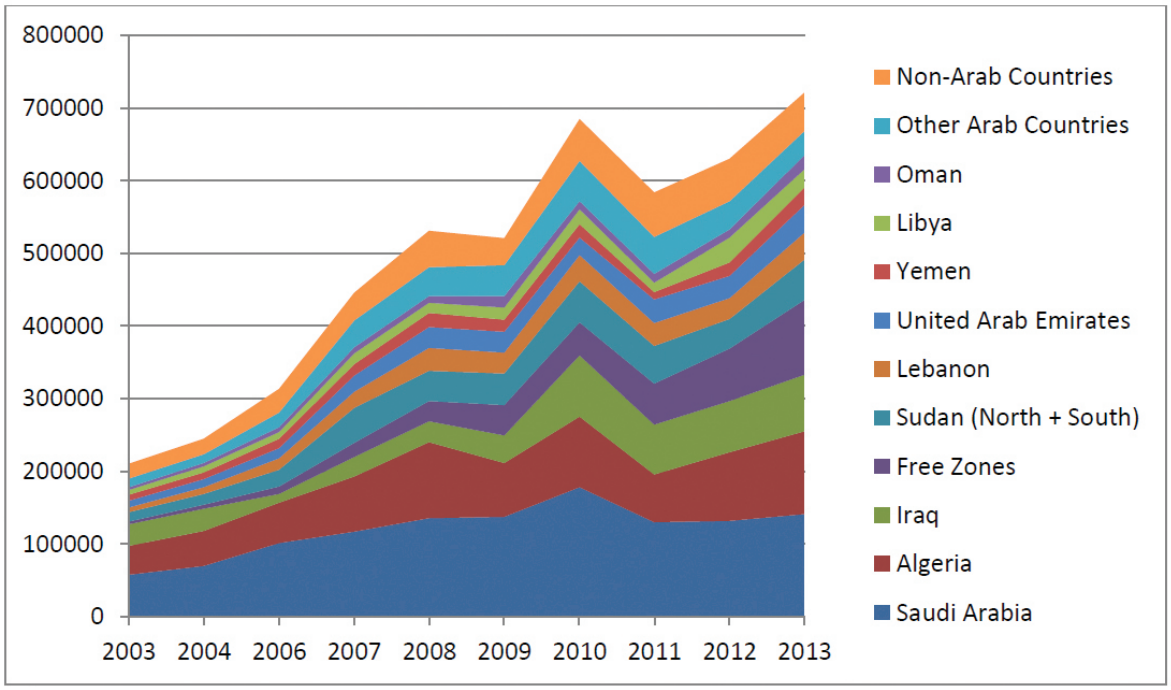


Source: Jordan Department of Statistics, Trade and Investment System, Jordan (Economic Territory)

Reflecting the fact that the sector's activities are chiefly in producing and selling finished pharmaceutical products, the majority of the sector's exports and re-exports are of products in "HS3004 – Medicaments in measured doses or in forms or packing for retail sale".

Exports are mainly to other Arab countries in the MENA region, particularly to Saudi Arabia, Algeria and Iraq.

Figure 2.4 Exports of Pharmaceuticals (HS 30) from Jordan by Destination (USD000)



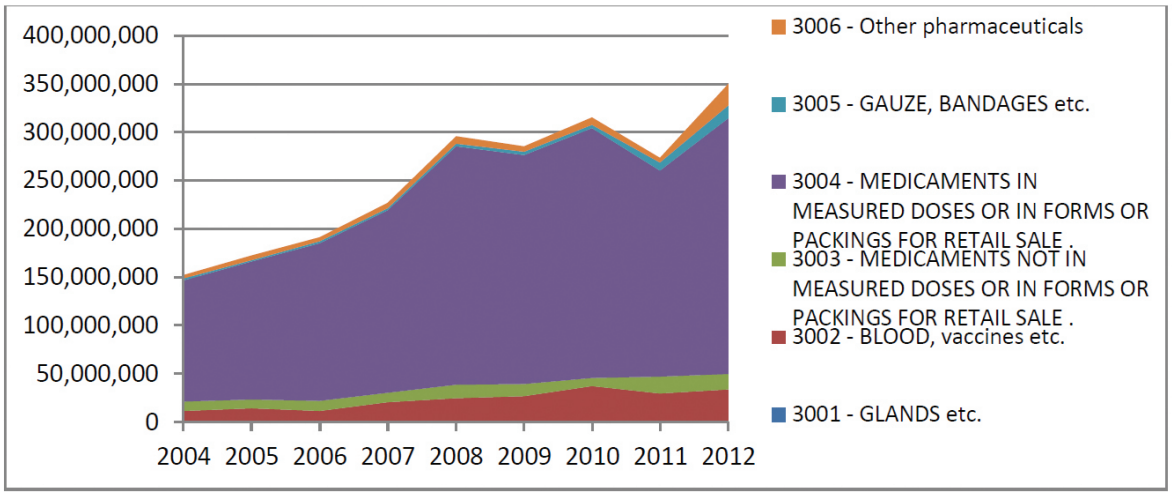
Source: ITC Trade Map

HS3004- Medicaments: Heading code 3004 covers medicaments - or medicinal preparations - that can be made up of either mixed or unmixed products. Medicinal preparations contain active substances and are used to treat or prevent diseases or ailments in both humans and animals. They can be used internally or externally. Products that just maintain general health and well-being are specifically excluded from this heading code.
(source: https://www.gov.uk/guidance/classifying-pharmaceutical-products)

2.3.2 Imports

Imports of pharmaceuticals into Jordan have also increased strongly, from JOD 152 million in 2004 to JOD 350 million in 2012. This partly reflects growth in re-exports, but mainly reflects growth in sales of imported pharmaceuticals in the Jordanian market.

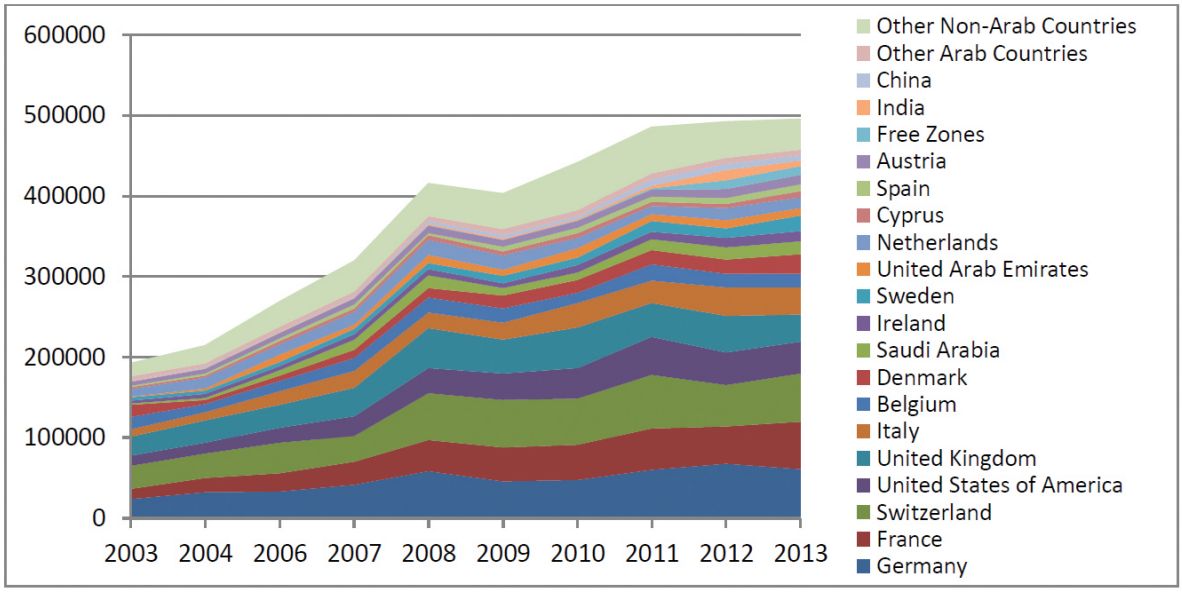
Figure 2.5 Imports of Pharmaceuticals from Jordan (JOD)



Source: Jordan Department of Statistics, Trade and Investment System

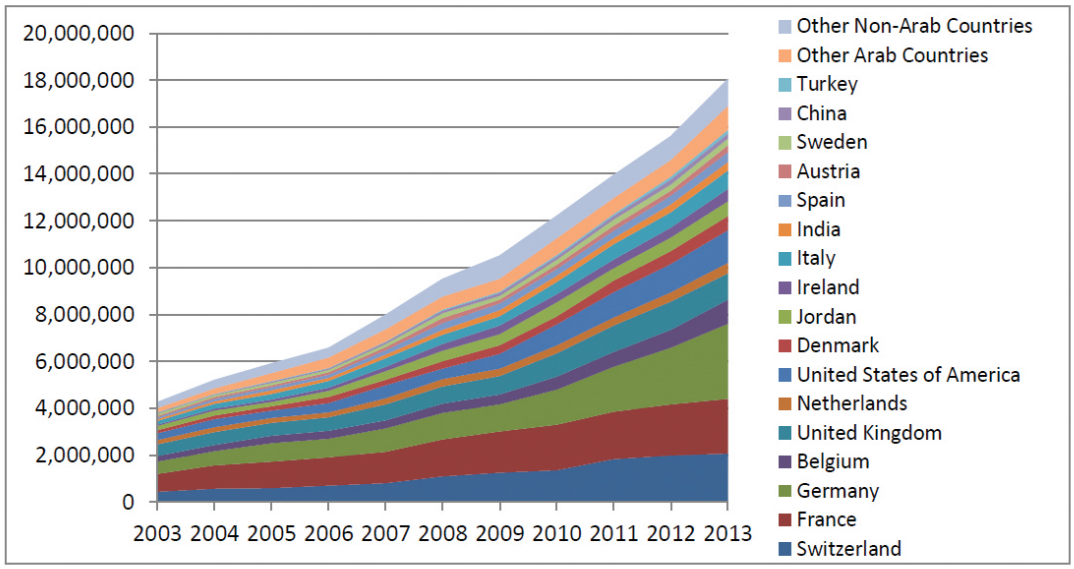
Imports are mainly from the EU (plus Switzerland), the US and Japan, with some imports also coming from other Arab countries (notably Saudi Arabia) in the MENA region, other countries in Europe, the Americas and East and South Asia (notably India and China).

Figure 2.6 Imports of Pharmaceuticals (HS 30) from Jordan by Exporting Country (USD000)



These trade patterns partly reflect rapid growth in demand for pharmaceuticals. Total pharmaceutical imports across all countries globally more than doubled in value between 2004 and 2013, increasing by a factor of 2.1). Over the same period, imports of pharmaceuticals into member states of the Arab League almost quadrupled, increasing by a factor of 3.91 (see Figure 2.7). Arab/MENA country markets have been a key area of pharmaceutical market opportunity in recent years, and show good prospects for the future.

Figure 2.7 Imports of Pharmaceuticals (HS 30) into Arab League Countries by Source Country (USD000)



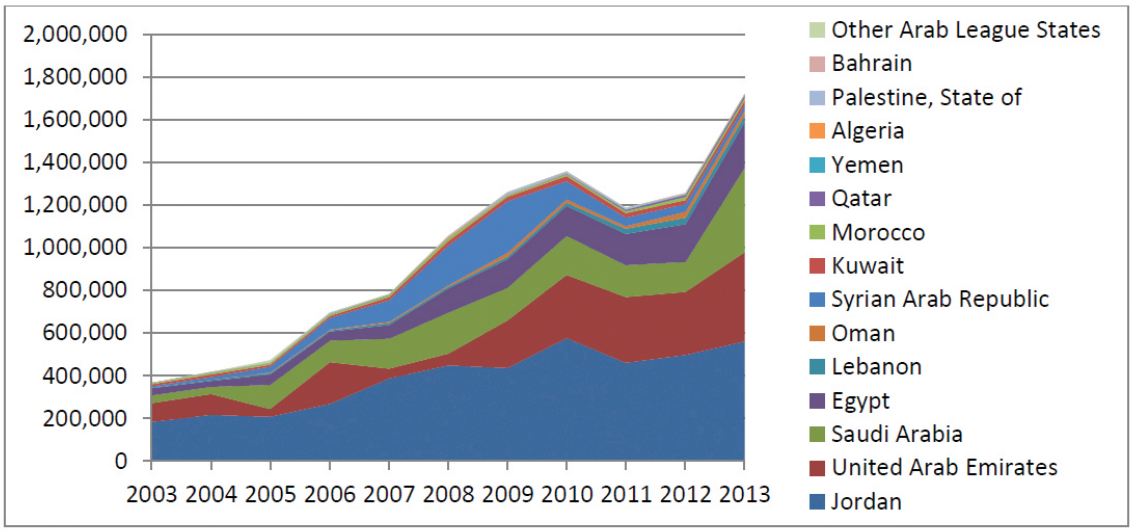
Source: ITC Trade Map

Imports of pharmaceuticals into Arab/MENA countries principally come from Europe and the US. Jordan itself is the biggest Arab supplier of imported pharmaceuticals into Arab/MENA countries.

While India and China are globally important suppliers of pharmaceuticals, they are not among the major direct suppliers to Arab countries. Their involvement is mostly indirect, through supplying pharmaceutical ingredients (often including Active Pharmaceutical Ingredients – APIs) to manufacturers that supply the region, including many Jordanian pharmaceutical companies.

Based on data on imports of pharmaceuticals into Arab/MENA countries, the main exporters of pharmaceuticals trading within the region are Jordan (as noted already), UAE, Saudi Arabia and Egypt.

Figure 2.8 Imports of Pharmaceuticals (HS 30) from Arab League Countries into other Arab League Countries, by Source Country (USD000)



Source: ITC Trade Map

According to Jordanian experts, the pharmaceutical sectors of these other pharmaceutical exporting countries within the region, are similar to those of Jordan, specialising mainly in producing finished generic pharmaceuticals from imported inputs, and marketing them under their own brands. This makes them competitors for market niches similar to those in which Jordanian companies are most active.

Part 3 Findings from Research and Stakeholder Consultations

3.1 Introduction

This Part of the report summarizes some of the key findings from the research and consultation. Parts 4 and 5 of this report draw conclusions based on the findings, and propose recommendations based on these conclusions.

3.2 Sector Overview

According to the Jordanian Department of Statistics (DoS), the Pharmaceutical Sector is the third highest value sector for exports, after phosphate and potash, accounting for 8% of all Jordanian exports by value. Pharmaceutical products account for 20% of manufacturing sector GDP. Industry sources estimate that 70 per cent to 80 per cent of output is sold in export markets, and the remaining 20 per cent to 30 per cent is sold domestically.

Industry interviews highlight that the sector is heavily reliant on imports, including Active Pharmaceutical Ingredients (APIs), other ingredients and materials, and all manufacturing and testing equipment. The advanced industries that produce pharmaceutical sector chemicals and equipment do not operate in Jordan.

Interviews highlight that key features of the sector are:

- The main focus is on manufacturing, testing, packaging, regulatory management includes responsibilities related to product compliance, linking with national and super national regulatory bodies, and advising internally on relevant regulatory frameworks, marketing and sales.
- There is no drug discovery. The sector is strictly a manufacturer of generic pharmaceuticals.
- The sector does not manufacture APIs, which are imported. Most APIs come from India, China and Europe.
- Most equipment comes from China or Europe. The manufacturers provide training and ongoing service on the equipment.
- Clinical research organizations in Jordan support tests and trials necessary for imports and regulatory certification. Some offer specialized training.
- Logistics and sales to export markets are mostly organized through agents with a local presence, but direct sales teams and distributors are increasingly being used in important export markets.

This positions the Jordanian sector in a specific part of global pharmaceutical value chains – in between global manufacturers of APIs and other pharmaceutical ingredients, and in-country marketing to (mainly) the MENA region.

For some products, notably new biosimilar pharmaceuticals (generic bio-pharmaceuticals), the sector is involved in a narrower part of the value chain, importing formulated or finished pharmaceuticals, and focusing on testing, qualification, certification, marketing and sales for the domestic market and Arab region markets.

3.3 Jordan's Position in Export Markets for Pharmaceuticals

The Jordanian Pharmaceutical Sector exports its products to 60+ countries worldwide. Jordanian products are marketed in high income (mainly GCC), middle income, and low income countries as being high quality, low in price, and at least as effective as the original brand. To underpin this, all companies follow internationally important standards including Good Manufacturing Practice (GMP) standards and applicable ISO standards. In many cases, in addition to having approval from the Jordanian Food and Drug Administration, businesses have regulatory approval for specific drugs from a major international regulatory system – most often the EU system made up of the European Medicines Agency and national regulatory bodies.

Most of what the sector markets internationally is finished, branded, packaged pharmaceuticals for consumers and healthcare providers. Only a minority of firms produce intermediate materials for businesses, sold to other pharmaceutical companies.

Major export markets include Saudi Arabia, Algeria and Iraq. While there is potential to enter other markets, the MENA region is still seen by businesses in the sector as the most attractive market for Jordanian pharmaceuticals.

There is significant and rising competition within the region, notably from the Saudi pharmaceutical sector which, according to interviews, is able to maintain high standards and produce at a significantly lower price than the sector in Jordan, and which targets market segments similar to those targeted by the Jordanian sector.

North Africa has large markets and underdeveloped national pharmaceutical industries. Egypt's demography makes it very attractive, but there are restrictions on imports of pharmaceuticals from Jordan in the form of a lengthy and costly approval process. Even so, many Jordanian companies are engaged in the necessary paper work. Algeria is attractive, but the introduction of new regulations has excluded many products from the market, and many Jordanian companies have not yet re-entered it. Post-war Libya could absorb a lot of Jordanian pharmaceuticals, but security risks and uncertainty in the security of their investment are preventing Jordanian companies from venturing strongly into the market.

Outside the MENA region, the most attractive new markets for Jordanian products tend to be import-oriented markets in countries with large populations, lacking a strong national pharmaceutical industry.

Jordanian companies are now penetrating new markets in Africa (East, West, and South) which have very high demand for cost-effective products. The strongest competition in these markets is from Indian companies, which usually operate on a larger scale than Jordanian companies. Specific African markets mentioned as interesting in the survey of Jordanian pharmaceutical enterprises include Sudan, Ethiopia, other countries in east and central Africa, and South Africa. The high demand for medicine, and low individual purchasing power in this region, could make Jordanian products especially appealing, given their good quality and good reputation. Eastern Europe is also seen as a potential market for Jordanian products for the same reasons – high demand and under-developed national industries.

Jordanian pharmaceutical companies still rely heavily on agents to export their products. Companies need representation in the countries to which they are exporting. Having an agent means that the representative is a local, who knows the market, and does not need micromanagement from the Jordanian company. However, companies in the sector are increasingly establishing their own sales and marketing teams in key export markets, notably in GCC markets (e.g. Saudi Arabia, Oman, Kuwait), and North Africa (Algeria), thereby gaining greater control over in-country sales and marketing.

3.4 Biosimilars

Biosimilars are the equivalent of generic pharmaceuticals for biologically-produced pharmaceuticals. Historically, most pharmaceuticals have been synthesized chemically, but since the 1980s, an increasing number have been produced biologically using genetically modified organisms – mostly micro-organisms that can be grown in a factory. Significant numbers of these are now coming off patent, making it possible for competitors to bring biologically similar products to market. Both barriers to market entry and margins are higher than for typical chemically synthesized generics, making biosimilars very attractive to pharmaceutical companies that can participate in the value chain.

A number of Jordanian pharmaceutical enterprises are in the process of entering the biosimilars market, based on partnerships with international companies that specialize in these products. Initially at least, they are taking finished biosimilars from their partners, and handling the regulatory affairs, product qualification, testing, sales and marketing functions that are necessary to bring them to markets in which they are active, with a particular focus on MENA markets.

As a sector that specializes in branded generics, with strong distribution access to a key regional level market with excellent growth prospects, the Jordanian sector is an attractive value chain partner for producers of active pharmaceutical ingredients (APIs) wishing to benefit from that market. It is an attractive partner for producers of new generic pharmaceuticals, such as biosimilars, interested in gaining access to fast growth MENA markets. Partnering with producers of APIs and new generic pharmaceuticals allows Jordanian pharmaceutical enterprises to benefit from introducing new products while limiting investment, risks and time to market, and focusing on value chain elements where they are capable and competitive. It gives value chain partners a route to fast-growing final consumption markets through manufacturing, quality assurance, and regulatory management mechanisms located within the region that are credible and have a strong reputation, and through making use of established distribution channels. Jordanian consulted pharmaceutical enterprises see this as a major area of opportunity.

3.5 Skills Supply in the Sector

Five universities provide Bachelor's degree courses in pharmaceuticals, and three grant master degrees in the discipline. These are the main specialist university level courses relevant to the sector, and many of the sector's professionals and managers come from these courses. However, based on a review of curricula, the universities do not provide specialist technical courses in manufacturing pharmaceutical products. The sector draws on a range of qualifications and education institutions for its other professionals and for those entering the sector at technician level.

With EU support, the VTC has established a Centre of Excellence for Pharmaceuticals to provide operator and technician level training in pharmaceutical manufacturing, targeting those working in the sector. The Centre has established a pilot factory, and provides technical training for the sector, leading to qualifications certified under CAQA. A review of the centre's curriculum indicates a need for additional training modules to be designed and developed to cover additional types of production lines that are present in the sector, as well as potential for development of apprenticeships in the sector.

3.6 Threats to the Sector

The survey of employers highlighted the following as being significant threats to the Jordanian pharmaceutical sector:

Cost Competitiveness

- Rising operational costs.
- Taxes and customs.
- At the time when the survey was undertaken, businesses identified rising energy costs, which some businesses could absorb, and some could not, as an important issue.

Market Prices

- A squeeze on margins in domestic market, with costs going up and Jordanian regulators aiming to reduce prices.
- Price controls in export markets, especially in GCC markets, partly driven by prices in these markets being referenced to domestic market prices in the exporting country.

Competition

- Competition from similar branded generic pharmaceutical industries in neighbouring countries such as Saudi Arabia.
- Difficulties in competing with more experienced European and US companies in export markets;
- Significant competition from imports in the Jordanian domestic market.

Market Access

- Egyptian restrictions on Jordanian pharmaceutical products.

Lack of Skills Among Workers

- There are skills gaps between the technical skills required by the sector and the skills provided by sector skills providers (E-TEVET, universities, and community collages) that provide Semi Skilled, Skilled, or Professional labour

Business Environment

- Political instability, the security situation, and the regional political situation affecting access to markets such as those of Syria and Libya.
- The weak economic climate affecting consumer purchasing power.
- High or unstable prices of raw materials.

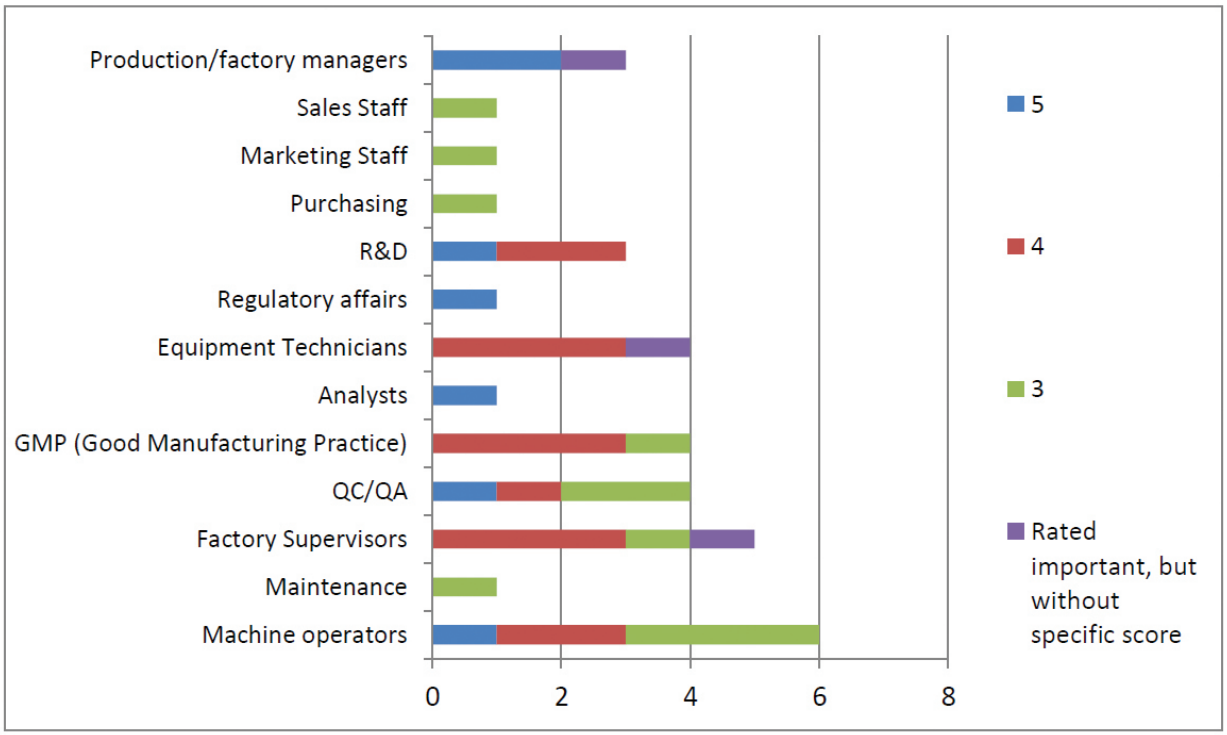
New Products

- A range of issues around introducing new products, which are particularly difficult for smaller companies, including: the cost of R&D; the time and cost required for clinical studies on generics for domestic market; the length of time required for JFDA approval; lengthy procedures for registration in export markets; and lengthy procedures from Ministry of Industry and Trade.

3.7 Difficulties in Hiring Workers, by Occupation

Many of the employers surveyed highlighted problems with recruiting for one or more occupations. Figure 3.1 shows the number of firms that highlighted each a range of occupations for which they have difficulty recruiting. There are particular problems with recruiting machine operators at the level of (Semi Skilled, Skilled and Professional), but there are also problems with a range of other occupations in pharmaceutical operations, including supervisors, production managers and technicians. Some employers also confirmed problems in recruiting people with the right skills in marketing and in sales.

Figure 3.1 Occupations in which Pharmaceutical Firms have Difficulty Recruiting Workers
Number of Firms that Rated this Occupation at 3 or Higher for Difficulty of Hiring on a Scale of 1 to 5



Source: Survey of Employers undertaken for this study

3.8 Other Skills Issues Highlighted by Employers

Employers highlighted a range of issues with the skills of their existing workforces. They focused on issues related to core skills, and to skills that are generic across a range of occupations in the sector, more than on occupation specific technical skills.

When asked what challenges the pharmaceutical sector has with human resources, employers highlighted the following:

- High labour turnover rates, particularly among machine operators and low skilled young employees
- Low loyalty & commitment
- Lack of knowledge of the fundamentals of health and safety
- Poor communication between management and workers
- Weakness in English language skills among workers which limits their understanding of documentation for machines and production lines
- Lack of knowledge among workers about the preventive maintenance procedures
- Lack of Knowledge about chemical handling through the supply chain
- Lack of knowledge about regulatory (including JFDA) and quality standards
- Weak soft skills in areas like team work, time management and problem solving that are required for a well-functioning work environment, and impact on productivity, compliance and quality
- Weak motivation systems and personal development

However, employers also highlighted general issues that impact on occupation-specific technical skills. An underlying issue they identified is that there are no clear standards for most pharmaceutical industry occupations, and that this is reflected in education and training intended to develop skills for the sector.

They indicate that there is too great a reliance on on-the-job training at all occupational levels, with too little training in specialized skills for new recruits and existing employees.

The list of occupations for which employers confirmed deficiencies in skills among their existing workforce was much the same as the list of occupations for which they have difficulty in recruiting workers, covering the full range of workers in operations, at all occupational levels, and also in marketing and sales.

Issues with quantity and quality of available workers are not all independent of each other. The overall picture is that most companies are prepared to hire people without experience for jobs in occupations other than management, supervision and some specialized white collar roles – although many prefer to hire experienced people when they can get them.

The most significant areas of difficulty are in the skills of production workers including machine operators, in research and development, and in quality assurance, with high turnover and lack of access to recruits with the right skills and attitudes. Although many employers invest in training workers in technical skills, there is now a need to train workers to a higher level than in the past, as companies implement more automated production systems. The operational problems caused by labour turnover are therefore greater than in the past, and the imperative to reduce labour turnover is greater.

Many employers are not satisfied with the level of skills of their workers, including those who have a BSc, a Diploma or vocational training qualification. There was significant criticism of the quality of the qualifications of new entrants into the sector.

Employers represented on the steering group identified a need for special training in international marketing to increase their ability to penetrate new or develop current international & regional markets. They also confirmed a disconnect between their human resource management function and their production and operations function, and highlighted a need for closer collaboration between these two functions towards resolving the human resource and skills issues they identified.

3.9 Other Issues

Non-skills issues highlighted by employers included the following.

- **Pricing** - Employers argued that government policies on pricing of pharmaceuticals do not take adequate account of changing business costs (including energy costs) in Jordan. They also argued that prices set by the Ministry of Health do not take adequate account of the impact that prices imposed in Jordan have on the prices that Jordanian pharmaceutical companies can obtain in some export markets. They would like to see more scope for dialogue on pricing.
- **Regulation and Approvals** – Employers noted that information on how to obtain approvals from some countries is difficult to understand, making gaining approvals and continuing to comply difficult. They also suggested that there is scope for the Jordanian Food and Drug Administration to make its procedures clearer, and to provide better information on them, allowing businesses to obtain approvals more quickly and at a lower expense.
- **Financial Constraints** – They noted that registering medicines in new countries and entering markets is costly. They also note that substantial investment is required to update equipment, and that for some companies, a significant amount of equipment is out of date. Some noted that they have difficulty in obtaining finance for necessary spending in these areas. This points towards a need to strengthen medium-term and long-term financing capacity for manufacturing industry in Jordan, both guaranteed against equipment and unsecured. While pharmaceutical firms consulted did not highlight trade finance as a major issue unprompted in interviews, it is noted that that there are moves underway to strengthen the provision of trade finance in Jordan, for example through finance Trade Facilitation Programmes such as that agreed recently between the Jordanian government and EBRD.
- **Value Chain** – Some noted that they can be affected by problems elsewhere in the value chain. Examples mentioned included: suppliers sometimes importing materials that are not of the correct quality; and the sales and marketing practices of each individual Jordanian pharmaceutical company having an impact on the reputation of all.

Part 4 Gaps in Business Capabilities and Skills

4.1 Introduction

A key feature of the STED methodology is to analyse the capabilities in which businesses in the sector will have to be stronger in future in order to underpin their future productivity and competitiveness, and in order to achieve the strategic goals that stakeholders wish to see the sector achieve. Experience with STED-based analysis across a range of sectors in a range of countries shows that the gaps that this analysis highlights provide good strategic guidance for identifying skills development priorities.

In addition to looking to future priorities, it is also necessary to identify gaps in skills that are already constraining businesses in the sector from meeting their goals.

4.2 Business Capability Gaps

4.2.1 Introduction

Research into the sector, employer interviews and subsequent consultations with the sector's stakeholders have highlighted the following areas in which stronger business capabilities are necessary to underpin future competitiveness.

- Manufacturing efficiency
- Manufacturing quality and regulatory compliance (including implementing Good Manufacturing Practice (GMP))
- Regulatory management, including drug registration for domestic and export markets
- Domestic and international marketing, including channel management
- Product development, including partnering

4.2.2 Manufacturing Efficiency

Efficiency in manufacturing will be important to the sector's ability to compete both in domestic markets and in export markets. The sector is under price pressure from competitors with lower cost bases within the region, and indeed from price regulation within Jordan and in export markets. Price pressure in export markets is often a direct consequence of price pressure within Jordan, as major export customers often reference the price they are prepared to pay to the Jordanian price.

In some cases, the sector can also come under price pressure from competitors based outside the region, such as in Europe, principally rooted in efficiencies arising from greater scale or greater automation. There is not much direct competition in the Jordanian sector's main markets from

pharmaceutical sectors with both greater scale and lower costs, such as that of India, but it is possible that this could emerge in future.

4.2.3 Manufacturing Quality and Regulatory Compliance

Quality and regulatory compliance in manufacturing are centrally important to the ability to trade in pharmaceuticals both internationally and within Jordan. This is most importantly about market access – pharmaceutical manufacturers must manufacture in line with relevant approvals and regulations in order to be allowed to sell, and must document that they have done so in accordance with regulatory requirements.

Manufacturing must be in line with Good Manufacturing Practice (GMP) as required by relevant regulatory authorities, and must be in line with the manufacturing processes specified by the manufacturer when they have obtained product approvals. Relevant regulatory authorities include the Jordanian Food and Drug Administration (JFDA), and other regulatory authorities from which a business has obtained approval for a product. These may include the national regulatory authorities of specific countries to which products are exported, and internationally respected regulatory authorities such as those of the European Union (European Medicines Agency, which recognizes approvals by EU national regulatory authorities) and the US Food and Drug Administration.

As part of their compliance requirements, pharmaceutical businesses must also work in compliance with certifications they have under applicable ISO quality standards.

The practical operation of quality and compliance systems in manufacturing impacts on manufacturing efficiency. Compliance involves labour intensive activities, in areas such as quality assurance, documentation and testing, and the efficiency with which these are designed and operated has a significant impact on overall manufacturing efficiency. Moreover, deficiencies in the quality of manufacturing can cause substantial waste, as raw materials, work effort and products will be wasted.

Several of the employers interviewed for this study indicated that they are dissatisfied with aspects of their ability to manage quality and compliance efficiently and consistently. As businesses in the sector continue to move into new markets, and as regulators in target markets become more demanding, this will become a bigger issue if it is not tackled adequately.

4.2.4 Regulatory Management

As the Jordanian sector focuses on producing generic pharmaceuticals, it does not have the burden of regulatory management in the areas of drug discovery and major clinical trials to prove effectiveness and safety. As it sources its active pharmaceutical ingredients from others, it can make use of their work on validation. Even so, businesses in the sector have a substantial regulatory burden concerned with demonstrating therapeutic equivalence to the existing approved drug, and gaining, managing and maintaining approvals from JFDA and other regulatory authorities.

Managing this effectively is central to success. Approvals are key to market access and to the reputations of individual manufacturers and the sector as a whole. The efficiency of production processes is to a significant extent determined by the processes submitted for approval for each drug by each business.

Managing regulatory processes efficiently is also critically important. The cost of obtaining and maintaining regulatory approval for a drug in a market is a main determinant of whether it is viable to introduce the drug in that market, and can have a key influence on the net profitability of sales. The length of time taken to gain approval is a determinant of time-to-market, which is important both because it determines how soon revenues can flow, and because the economic returns to a late market entrant with a generic drug may not be sufficient to justify entering the market. Early movers for a generic drug new to a market may get better returns before other entrants arrive, and launching a generic brand early may yield a sustainable competitive advantage.

Many of the businesses consulted indicated that they need to perform better in this area in the future. Businesses entering biosimilars markets highlight that they need to develop capabilities in regulatory management for biosimilars, which in some respects have more demanding regulatory requirements than for traditional chemically-synthesised pharmaceuticals.

4.2.5 Marketing, Sales and Channel Management

Businesses consulted for the study say that they need to become better at marketing, sales and channel management, both in the domestic Jordanian market and in export markets. The need is particularly acute in export markets, where many businesses in the sector expect to invest significantly through launching new products, moving into new country markets, and upgrading their presence in key country markets by establishing sales and marketing operations in-country. This sort of investment is necessary in order to compete effectively in MENA country markets with similar pharmaceutical sectors based in other MENA countries, and pharmaceutical manufacturers exporting from Europe and North America. It is also necessary to have a realistic chance of success in the country markets outside the region – both developing country and developed country – that some businesses in the sector plan to target.

4.2.6 Product Development and Partnering

The Jordanian pharmaceutical sector focuses on bringing generic pharmaceuticals based on imported inputs to market. The focus in product development is on identifying suitable products to bring to market, developing or adapting manufacturing processes, sourcing the required inputs, demonstrating therapeutic equivalence to established out-of-patent products, establishing testing regimes, developing packaging and branding, and undertaking related regulatory management. This frequently involves

some level of partnering with suppliers of key inputs such as active pharmaceutical ingredients (APIs). In the case of biosimilars, Jordanian companies are initially partnering with international suppliers of finished pharmaceuticals, so they are not developing manufacturing processes, but are undertaking their other usual product development activities.

Bringing new products to market is important to the ability of Jordanian pharmaceutical businesses to increase their sales, and to move into higher growth and higher margin market segments. Improving their ability to bring new products to market, particularly in attractive categories like biosimilars, will be important to their achieving these outcomes.

4.3 Skills Gaps

4.3.1 Introduction

The business capability gaps identified have significant implications for skills. In addition, the research has identified a range of existing skills gaps that should be addressed in order to underpin the sector's effectiveness.

4.3.2 Skills Gaps Relating to Business Capability Gaps

For each of the main business capability gaps identified, skills gaps form an important component of the wider capability gap identified.

Manufacturing – Efficiency, Quality and Regulatory Compliance

Getting manufacturing operations right in future, depends on improving skills across a range of occupations at a range of levels.

Key TVET level occupations are:

- Pharmaceutical machine operators
- Pharmaceutical machine technicians
- Pharmaceutical laboratory technicians
- Pharmaceutical quality assurance and compliance occupations

For each of these occupations, there is a need to level up technical and core skills among those already working, and to upgrade education and training provision in relevant courses. The requirement is: to achieve a higher base level of technical skill appropriate to increasingly automated systems; to attain stronger core skills in areas like communication, team working and problem solving; and to develop the skills needed to work effectively in a sector in which manufacturing operations are highly regulated.

There is also a need to strengthen skills at more senior levels, particularly in the closely related areas of people management and regulatory/quality management. Production operations that are both efficient and compliant with GMP, quality standards and other regulatory requirements depend on a good working culture and appropriate work organization, as well as on formal management and technical processes. Improving skills in these areas is relevant to production managers and supervisors, human resource managers and managers of quality and compliance systems. As scientists often move from technical work into line management positions in pharmaceuticals, and as they are often directly involved in quality and regulatory management, there is also a wider need to develop these skills among professional level science and engineering staff.

Regulatory Management, including Drug Registration

Key occupations contributing to regulatory management include: regulatory affairs professionals; scientists; senior people in quality and regulatory management within manufacturing operations; and senior managers. The existing regulatory affairs masters' degree programme makes an important contribution in this area, but there will be an on-going need for structured learning as the sector brings more drugs to market in more national markets. There is a particular need to develop an understanding of regulatory management of biopharmaceuticals among a wide range of professional level employees in the sector.

Marketing, Sales and Channel Management

Skills have a central part to play in strengthening capabilities in marketing, sales and channel management. The need to improve skills in sales and marketing for the domestic market is incremental, as businesses in the sector already have effective sales and marketing operations focused on Jordan. For export markets, more staff will be needed, both based in Jordan and in-market, as businesses establish direct presences in more country markets. Selling to more countries, and to a more culturally diverse range of countries, though agents will also require more staff with a wider range of skills.

Key occupations include: pharmaceutical sales; sales management; marketing; commercial management; and call centre/telesales occupations.

Product Development

In the segment of the pharmaceutical value chain in which the Jordanian pharmaceutical sector operates, key skills relating to product development are professional level skills in sciences, production engineering, sourcing/procurement, regulatory management and product marketing. Introducing new products can require access to strong skills at technician level, both in production and in testing.

Relevant science skills are in pharmacy and chemistry, and in biosciences as the sector moves further into biopharmaceuticals.

As partnerships – with sources of technology and with suppliers of raw materials – play an important role in the sector in acquiring access to the means to produce new products, the skills of senior managers relating to working with international partners are also important.

4.3.3 Existing Skills Gaps Needing to be Bridged

The discussion of skills gaps so far, has focused on what will be needed for the sector to be successful in the future. It is also necessary to look more narrowly on the skills gaps that are currently visible in the sector, and are already causing problems.

An issue confirmed by a range of employers in the sector is that they are not satisfied with the quality of graduates available at university or TVET level. They argue that there is a need to improve the quality of qualifications and the relevance of courses.

Another issue confirmed by a range of employers is that there are some difficulties in work culture among their employees, with a lack of consistent commitment to working productively and in compliance with standard procedures. As people management practices seems to be a significant factor in this, it points towards skills gaps to be bridged for production managers, supervisors and human resource managers, as well as for other employees in production operations.

As work on this study progressed, there was a number of cases where employers faced disruption when they had to staff up production lines at short notice, sometimes because the staff on an existing line had been hired away. A combination of improved human resource management practices and establishing a more consistent skills pipeline at TVET level might help alleviate these issues in the future. The Level 3 course now being made available by the VTC's Pharmaceutical Centre of Excellence may also help the sector to respond more quickly to unanticipated increases in demand for new production workers.

Part 5 Conclusions & Recommendations on Skills Development

5.1 Introduction

This part of the report summarises the conclusions of the research and stakeholder consultations. It then outlines a vision for the future of the sector agreed with the main stakeholders. Finally, it sets out a number of recommendations for the sector's stakeholders, for government, for education and training institutions, and for the ILO and other development partners.

Employers on the Steering Committee members indicated that they are interested in continuing to be involved in the project and in collaborating to implement the proposed skills development activities.

5.2 Conclusions

The sector's output has grown rapidly since 2001, serving both export and domestic markets. Both exports and imports have grown rapidly, as market integration within the region has increased. The sector exports to 60+ countries worldwide, with a particular focus on Arab/MENA markets, notably Saudi Arabia, Algeria and Iraq & GCC countries. Imports of raw materials are mainly from China, India and Europe.

According to Jordan Chamber of Industry, 70 per cent to 80 per cent of pharmaceutical sector output is sold in export markets and the remainder sold domestically. As of the most current data, more than 95 per cent of employees in the sector are Jordanian.

The Jordanian Pharmaceutical Sector contributes to one of the most important components of GDP. Its product exports are third highest in value after phosphate and potash, 8% of value of all Jordanian exports. Pharmaceutical products account for 20% of manufacturing sector GDP. Supporting sector's development through skills development will have a direct and significant impact on the Jordanian economy.

While some markets have been affected by conflict in the region, both domestic trade and exports have increased substantially over time. The demand for pharmaceuticals is increasing globally, and particularly rapidly within Jordan and the MENA region.

Companies must produce products efficiently and in compliance with standards to meet the increasing demand competitively. They also have to be efficient in identifying and introducing new products, through sourcing technologies and materials, through efficiently gaining product approvals, establishing efficient and compliant processes for manufacturing and testing, and maintaining regulatory approvals.

They must be effective in sales and marketing. They are progressively moving into more markets using local agents, and in key markets are increasingly establishing their own sales and marketing operations.

Having the right people with the right skills is crucially important to efficient and compliant production, effective marketing and successful introduction of new products. Development of these skills must be at the core of a human resource and skills strategy for the sector.

While there has been a trend towards increasing employment in the sector, the rate of increase in employment has been much slower than the rate of increase in output. This reflects rapid increases in labour productivity, arising mainly from more automated production technologies, which have changed the skills required. This shift towards greater automation has been a key factor in increasing the share of employment in the sector accounted for by technicians and reducing the share accounted for by low skilled occupations. Increased use of automation that drives rapidly increases in labour productivity, is a common feature of pharmaceutical industries globally.

While the sector has been successful, it faces significant market challenges, with strong competition from regional, European and Asian competitors both in its main export markets and in its domestic market. Its cost base is higher than for some regional competitors. It faces disadvantages in economies of scale and experience relative to the pharmaceutical sectors of developed countries. It also faces these diseconomies relative to the major emerging economy pharmaceutical sectors of India and China. As it does not produce its own APIs, it has to import these, mostly from Europe, India and China.

The sector's market position and strategies are shaped by these challenges. As a sector mainly concerned with branded generic pharmaceuticals with a strong reputation and good access to MENA markets, it specialises in converting imported APIs into finished pharmaceuticals, in bringing them to MENA markets, and in the regulatory affairs, compliance, testing, quality assurance, sales, marketing and channel management activities required to support this. While competing with the pharmaceutical sectors of developed countries in MENA markets, it can co-exist alongside them in these markets through competitive pricing, a strong reputation, appropriate regulatory approvals and managing routes to market efficiently and effectively. The products and capacities the sector requires for success in MENA markets also give it opportunities in a range of other types of market, ranging from developed countries to low income countries.

While the sector is at a cost disadvantage relative to some other similar pharmaceutical sectors within the region, costs are not the only determinant of market success. Advantages in areas like productivity, quality, compliance with standards, efficiency in gaining regulatory approvals, sourcing of materials, partnering, sales and marketing could together significantly outweigh disadvantages in areas including energy costs, labour costs or logistics costs. So far, the Jordanian sector appears to be prospering despite competition from similarly-positioned sectors, such as the Saudi Arabian pharmaceutical sector. Successfully introducing economically attractive new products makes a significant contribution to this.

Maintaining, or improving upon, this position relative to international competitors requires continuous work to upgrade the Jordanian sector's capabilities. Skills have a major contribution to make to this;

productivity gains, quality, compliance with standards, efficiency in gaining and maintaining regulatory approvals, sourcing of materials, partnering, sales and marketing are all highly skill intensive.

Stakeholders, including leading employers, believe that it is realistic to aim to increase employment over time, subject to the right skills being available.

Looking further into the future, therefore, a range of possible scenarios for employment in Jordan's pharmaceutical sector are possible, depending on developments in its competitiveness relative to international competitors.

A loss of competitiveness would lead to a significant loss in employment over the medium and long term, affecting not just the sector itself, but also Jordanian other health sectors and Jordanian economy as well. If the sector stands still, it will lose competitiveness as international competitor sectors improve.

Maintaining or gaining competitiveness relative to international competitors could plausibly hold employment steady, or drive a significant increase in employment over the medium term and long term.

Research into the sector and consultations with the sector's stakeholders have highlighted the following areas in which stronger business capabilities are necessary to underpin future competitiveness.

- Manufacturing efficiency
- Manufacturing quality and regulatory compliance (including implementing Good Manufacturing Practice (GMP)
- Regulatory management, including drug registration for domestic and export markets
- Domestic and international marketing, including channel management
- Product development, including partnering

As skills are central to all of these areas of business capability, this report's recommendations focus on doing what is needed to bridge gaps between the skills in these areas that are required for the future success of the sector and the skills that are available now. Stakeholders confirmed progress on skills for manufacturing efficiency, quality and regulatory compliance as the most urgent of these, and for this reason the report places a special and urgent emphasis on tackling skills gaps relevant to these areas of capability. For each of these areas of business capability, skills development is a key part of a wider package of actions that is needed.

For manufacturing efficiency, quality assurance and regulatory compliance, skills development must contribute to a wider improvement in work organization and people management practices required to bring the Jordanian pharmaceutical sector up to the standards of business practice attained by internationally competitive pharmaceutical sectors in developed countries. While the sector has made significant progress in this area, interviews with enterprises make it clear that there are significant deficiencies in people management and leadership skills among managers and supervisors in the sector. They also make it clear that that there are significant issues with working culture in many businesses, in terms of qualities like work ethic, team working, willingness to change, and willingness and ability to work accurately, and consistently comply with ISO, GMP, quality and safety standards. There are also some issues with labour turnover, and it is not unusual for production to be affected by the loss of skilled production staff.

The difficulties described by stakeholders are familiar from the history of manufacturing in many developed and developing countries in recent decades. Solutions to these issues are well known internationally, and have been implemented in manufacturing, including in pharmaceuticals, across many countries. These solutions involve changing work organization and people management to engage a higher level of commitment, performance and productivity from workers, and rewarding them by providing adequate pay, interesting work, respect from managers and improved working conditions. Investment in training across all manufacturing occupations is a key part of the shift, and firms find that they are well rewarded for the investment and change in management approach by higher performance and retention among their workers.

Based on the analysis undertaken, action is also needed in the following additional areas. These are:

- Bringing together action on the specific skills needs of the pharmaceutical sector with Jordan's strategies for development of TVET (Technical Vocational Education and Training), which emphasise developing and implementing up-to-date curricula and qualifications that meet employer needs; and
- Developing the skills needed to bridge the other business capability gaps identified by the project: manufacturing efficiency; manufacturing quality and regulatory compliance (including implementing Good Manufacturing Practice (GMP); regulatory management; domestic and international marketing, including channel management; and product development, including partnering.

Compared with some other sectors in Jordan, the education and training infrastructure available to the pharmaceutical sector is relatively well developed. Nine Jordanian universities offer degree level programmes in pharmacy, and many community colleges offer technician level programmes relevant to pharmaceutical production and testing.

Four Jordanian universities provide master's degrees in pharmacy. One has a master's program in pharmaceutical regulatory affairs. One university provides a PhD degree in pharmaceutical science. This means that much of the sector's skills development requirement should already be well provided for, and that there are existing institutions that could deliver much or all of the incremental provision that this report proposes. Even so, in the survey undertaken for this study, up to half of the enterprises consulted expressed dissatisfaction with the quality of education on relevant courses at BSc and diploma level, so it is clear that there is a need not just to ensure that the right skills are available but that they are available to an appropriate level of quality.

5.3 Vision for the Sector

The recommendations that follow are based on a vision of the future of the sector endorsed by the stakeholders involved in the development of this report. The main components of this vision are as follows.

Export Markets: Businesses in the sector aim for more rapid growth in exports to a range of export markets, primarily GCC and other MENA/Arab countries. Some will also address markets outside the region, including higher margin developed country markets in Europe and North America (taking advantage of regulatory approvals that they need anyway to position themselves well in MENA/Arab markets) and fast growth emerging economy markets. They will collectively work with the Jordanian government to address market access challenges within the MENA region.

Domestic Markets: Businesses in the sector cannot realistically compete effectively in all pharmaceutical product categories in the domestic market, but they will aim to have a strong domestic market position in branded generics across an increasingly wide range of products. Overall, they aim to maintain or increase their domestic market share.

New Products: Businesses in the sector will continue to introduce new products, making best use of their position in the supply chain and access MENA region markets. They will make good use of vertical partnerships with suppliers and their own capabilities to introduce economically attractive products both cost-effectively and efficiently in terms of time-to-market. Where it is commercially feasible to undertake activities in Jordan they will do so.

Economic Benefits: Based on market success, businesses in the sector expect to increase overall direct employment in pharmaceuticals. They also expect to continue to raise the skills level of employment in the sector, with more technician level and professional level employment. Businesses themselves benefit from higher profitability and an improved ability to invest. Both as a means to improve competitiveness and as a consequence of greater market success, they are able to deliver higher pay, better working conditions and higher status to their workers, based on improved skills and a further improved focus on quality, productivity and regulatory compliance in the workplace.

Source of Improved Productivity and Competitiveness: The improved productivity and competitiveness driving the improved market position will be based on:

- continued rapid improvement in manufacturing efficiency and labour productivity;
- consistent compliance with standards required/valued by target markets (through strong capabilities and implementation in GMP, QA/QC, regulatory affairs, information systems and business leadership);
- increasing rate of new registrations/approvals in target markets, while reducing costs and delays;

- increasing rate of introduction of new products, prioritised based on sound analysis of market opportunities;
- strong vertical supply chain partnerships to underpin approval, introduction and qualification of new products; and
- improved sales, marketing, branding and channel management.

Underpinnings for Improved Productivity and Competitiveness: Improved productivity and competitiveness will be underpinned by: the right skills at all occupational levels across all business functions; collaboration between managers and workers; adoption of best international approaches to pharmaceutical company management; and support for change from the Jordanian government, the ILO and other partners.

5.4 Recommendations

5.4.1 Introduction to Recommendations

The recommendations here are addressed: to businesses in the sector and their employees; to the Jordanian government including the Ministry of Labour and its agencies, MoPIC and the National Employment Strategy group, the Ministry of Industry and Trade and the Jordan Food and Drug Administration; and to providers of education and training targeting the pharmaceutical sector. They are also addressed to the ILO itself, which has a project and other resources that can be applied to implementation, and to other development partners.

The recommendations here are presented in two sets:

1. Recommendations for an immediate programme of action, setting out specific interventions that should be undertaken, and which could be supported under ILO projects; and

2. Recommendations for a longer term skills strategy for the sector.

5.4.2 Recommendations for Immediate Programme of Action

Following consultations with the project steering committee, it is proposed to implement the following training programmes for employees under the current project:

- a training programme for sales & marketing managers & officers;

- development and piloting of additional modules for training pharmaceutical machine operators; and

- an awareness and training programme in biopharmaceuticals for professional level staff in the sector.

It is envisaged that these would be delivered jointly between companies in the sector at suitable locations, reaching a substantial share of all the sector's employees working in production and logistics operations. It is hoped that it will be possible to arrange for qualifications to be awarded to successful participants.

Recommendation 1 Training Programme for Sales and Marketing Managers

As Jordanian pharmaceutical companies seek to further grow their exports, diversify into new products, and respond to increasing competition from imports in their domestic market, and take greater control over distribution into export markets, they need to develop and strengthen their capabilities in marketing. This will require significant development work over a period of years.

It is proposed to develop and provide a course in marketing for managers with marketing, sales and strategic development responsibilities in companies in the sector, as an immediate short term response to this need. Further work will be required beyond this course to develop skills in pharmaceutical marketing, product management, channel management, sales management and sales.

Recommendation 2 Priority Curriculum Development for a Key Pharmaceutical Sector Occupation

The Jordanian Ministry of Labour and its Centre for Quality and Accreditation are going through an on-going process of developing modern curricula for TVET level occupations and developing the capacity of TVET providers to deliver courses based on these curricula. It is in the interests of the pharmaceutical sector that curricula for pharmaceutical occupations should be updated, so as to improve the quality and relevance of TVET provision. Stakeholders in the sector noted in the course of consultations that there are no clear skills or competency standards for pharmaceutical sector occupations.

The occupation of most immediate concern to pharmaceutical employers is that of pharmaceutical machine operator, where they identify skills shortages, as well as qualitative skills deficiencies among both existing employees and prospective future employees. The VTC's Pharmaceutical Centre of Excellence provides a Level 3 course targeting this occupation, with modules covering the following:

- Current Good Manufacturing Practice and documentation
- Occupational and environmental Health and Safety
- Cleaning equipment and production rooms
- Handling, Storage and dispensing of materials
- In process control testing
- Machines, tools, equipment and production rooms
- Sifting, granulation, drying and mixing
- Blistering, packaging and cartoning
- Tableting and coating
- Encapsulation

The course would benefit from additional modules in injectable liquids and semi-solids to cover the full range of forms in which the sector supplies pharmaceuticals. It is proposed that these should be developed and piloted with support from the ILO. There is scope also to develop a formal apprenticeship for this occupation, built around the same curriculum.

Recommendation 3 Priority Skill Needs for Biotech Pharmaceuticals

One of the key growing product areas in generic pharmaceuticals is in biosimilars. Biopharmaceuticals have grown rapidly in importance since the 1980s. Increasing numbers are coming off patent, creating good opportunities for businesses that can bring biosimilar equivalents to market. Developing biosimilars and proving their equivalence to existing pharmaceuticals is technically challenging and investment intensive, and it is not an area where the Jordanian pharmaceutical sector is currently capable. However, many of the businesses developing biosimilars have a need for partners to give them access to global markets. Jordanian pharmaceutical companies are well positioned to partner with biosimilars businesses to provide them with access to important markets – particularly to high growth MENA markets. So far, two major businesses in the Jordanian sector have entered this area in partnership with international biosimilars specialist businesses, and it seems likely that more will follow.

Initially, the key activities in the value chain to be undertaken by Jordanian pharmaceutical companies are in the areas of regulatory affairs, laboratory testing, sales and marketing.

Consultations with the enterprises in the sector most interested in biosimilars indicate that the key immediate skills requirement in the area is to educate a broad cross-section of professionals and managers in the sector about biosimilars, biosimilars regulation, biosimilars sales and marketing, and biosimilars business in general. It is proposed to develop a course module on the topic to be made widely available in the sector – noting that approximately half of those employed in the sector are at professional and management level.

Where relevant, biosimilar content or modules should be included in curricular or courses developed or delivered under other recommendations.

5.4.3 Recommendations for Longer Term Skills Strategy for the Sector

Recommendation 4 Pharmaceutical Sector Skills Network or Council

The operation of the Pharmaceutical stakeholder steering committee for this project has demonstrated the value of stakeholder guidance for sector level work on skills in this sector. Continued stakeholder guidance will continue to be valuable through the implementation phase of the project under which this report has been prepared, so it is envisaged that the steering committee will continue to operate for the remaining duration of the project, and for any new phase added to the project.

It is recommended that national and sector stakeholders should consider establishing a sector skills network or sector skills council on a more permanent basis. The network or council would include representatives of employers and workers in the sector, and of relevant government ministries and agencies. It would also include representatives of relevant providers of education at TVET and higher levels.

It is envisaged that the network or council would work in collaboration with the ETVET Council, the ETVET Fund and other relevant ministries and agencies including the National Employment Strategy Unit. In addition to coordinating implementation of the strategy set out in this report, the network or council would work with national bodies and with development partners on planning for and meeting the sector's skills needs.

Recommendation 5 Priority Curriculum Development for E-TEVET Level Pharmaceutical Sector Occupations

The proposals for an immediate programme of action on skills include a recommendation about developing additional modules for the existing course for those in employment as pharmaceutical machine operators. However, there is a need for broader action on developing and deploying curricula to enhance the quality and relevance of provision for the sector, both in initial education and training and in training for those employed in the sector VTC pharmaceutical center of excellence with the support of EU developed a one year training programme and occupational standards for machine operators of solid form production machines.

In addition to the occupation of pharmaceutical machine operator, TVET level occupations for which modern curricula would be valuable, include:

- Pharmaceutical equipment technicians and machine maintenance workers
- Pharmaceutical operatives (not including machine operators)
- Pharmaceutical laboratory technicians
- Pharmaceutical quality assurance and regulatory compliance workers (including GMP)

There is a significant skills overlap between these occupations (and that of pharmaceutical machine operator) in areas like core skills, quality and health & safety, and significant overlap in technical skills between some occupations. Curricula and course delivery should therefore be modular, segregating related occupations only where this is desirable due to differences in skills requirements between the occupations. Curricula for pharmaceutical laboratory technicians should support developing skills for testing both traditional pharmaceuticals and biopharmaceuticals.

Curricula should be designed to be suitable for delivery in the VTC pharmaceutical center of excellence, at the workplace, or through an apprenticeship-based system combining workplace and school/college-based learning. Basic training for pharmaceutical industry operatives could alternatively be delivered in the context of programmes aimed at making young people ready for work. Subject to agreement between stakeholders, the occupation of pharmaceutical machine operator would be a good candidate for piloting a pharmaceutical sector apprenticeship.

It is recommended that an initiative to develop curricula for pharmaceutical industry occupations should be undertaken, and that it should be targeted based on the priorities set out above. After piloting, it is recommended that the curricula should be deployed in initial education and training – including apprenticeships if feasible.

Recommendation 6 Improving University Level Provision

Jordanian universities are responsive to the needs of the Jordanian pharmaceutical sector in terms of recognizing the need for, and providing, required specialized courses in areas like pharmacy and regulatory affairs. Even so, several of the employers consulted, identified problems with the quality of new graduates in the pool from which they recruit. Universities and employers should work together to address this deficiency, ideally in the context of the proposed Pharmaceutical Sector Skills Network or Council.

Jordanian universities and pharmaceutical employers should jointly evaluate the requirement for specialist university level biosciences skills for biopharmaceuticals, in order to identify current and future course requirements. In order to coordinate graduate output with employer demand, it may be best to respond initially with adaptation of the existing master degree courses or the last year of bachelor degree. The four to five year delay between deciding to provide a new undergraduate science course and producing graduates makes it difficult to match graduate supply to employer's demand.

Recommendation 7 Wider Skills Agenda for the Sector

In addition to manufacturing efficiency, quality and regulatory compliance, the following areas of skills are also important to the sector's future productivity and competitiveness:

- Sourcing inputs
- Drug registration in export markets
- Domestic and International marketing
- Leadership and people management skills among managers & supervisors
- Logistics & managing exports
- Regulatory management

Taking action on these is a shared responsibility of employers, individual workers, education and training providers (particularly in higher education and in organizations of professionals) and relevant government ministries and agencies. Effective action is likely to cover changes to undergraduate courses relevant to the pharmaceuticalssector, provision of specialist master's degree and professional courses, and provision of shorter courses aimed at professionals already employed in the sector.

It is recommended that the proposed skills network /skills council for the sector should work with education and training providers to identify courses that are required, and to motivate or organize the provision of short courses in these areas as required.

The network / council might collaborate with the Ministry of Trade and Industry on developing initiatives to strengthen international and domestic marketing in the sector, focusing both on skills and on complementary export promotion activities. Key issues are to develop the skills required to reduce reliance on agents for marketing expertise in the main export markets, and to strengthen the skills required for effective branding and marketing in the domestic market. Practical initiatives could include an executive development programme for pharmaceutical sector marketers and commercial managers, and an industry placement and training scheme for marketing graduates.

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