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JORDAN COMPETITIVENESS PROGRAM

JCP COMPETITIVENESS INDEX ANALYSIS REPORT

NOVEMBER 2015



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SUMMARY

Based on the JCP Competitiveness Index Survey, this report analyses factors that impact competitiveness in the four target sectors under the JCP, namely Clean Tech, ICT, Medical Services and Life Science. This way, a set of baseline competitiveness indicators are developed for future comparison to track the development. This comprehensive analysis thus provides a tool for measuring the impact of JCP activities on competitiveness in the target sectors throughout the project life cycle.

Table I presents the overall key area composite indicators.

Table I: Key area composite indicators

Sector	Key area composite indicators					
	Workforce Quality	Supportive Enabling Environ.	Access to Finance	Business Activity and Entrepreneurship	Innovation Capacity	Cluster Network
Clean Tech	4.74	3.66	2.74	3.05	3.20	4.18
ICT	3.87	2.75	2.08	3.16	2.83	3.40
Medical Services	3.98	2.78	2.54	3.68	2.68	3.70
Life Science	4.24	2.73	2.56	3.03	2.80	3.70
All sectors	4.21	2.98	2.48	3.23	2.88	3.74

Note: Clean Tech (n = 97 - 100), ICT (n = 159 - 164), Medical Services (n = 24 - 84), Life Science (n = 87 - 88).

Among the major findings are:

- The Clean Tech sector has the highest overall index score and from a cluster development perspective it is the most developed cluster. However, the cluster network development is increasing in all four sectors.
- Actual access to equity and debt financing is perceived to be limited. Access to finance constitutes one of the most problematic factors for competitiveness and growth for companies in all four sectors, which is also a key finding from World Economic Forum. Globally speaking, in particular SME's have experienced difficulties to obtain financing since the crisis and that could be the case also in Jordan. Interestingly, women-owned companies tend to be more successful in attracting and gaining access to finance.
- Company policies for attracting and retaining skilled staff are in place in general, but skills shortages and skills mismatches are perceived to be a problem – especially for the ICT sector. It is important to take into consideration that the target sectors are characterised by on-going rapid developments and hence some level of skills mismatch is expected. Firm strategies for human resource development is therefore key. University-industry dialogue, increased labour market intelligence through skills anticipation as well as tracer studies on new graduates can improve matching processes.
- The regulatory environment is perceived to be rather burdensome, and the surveyed companies are calling for more efficient support for innovation and competitiveness from agencies and other relevant stakeholders. One of the issues can be asymmetry in information on regulatory reforms in recent years. Monitoring effects of regulatory reforms with focus on benefits and unintended effects can be a way to improve public-private

dialogue on the wider innovation environment. On the positive side, market competition is perceived as being high.

- Export-related business activities are relatively modest and remain a challenge. One of the explanations is likely the unrest in several of the regional markets. Deeper cluster cooperation can enable that companies can overcome the limitation of size and that they can share specialist resources to boost market penetration and export.
- Innovation capacity could be boosted through further international innovation collaboration, which is currently limited.

INTRODUCTION

The USAID Jordan Competitiveness Program (USAID JCP) targets the creation of jobs, the increase of exports and the enhancement of the Jordanian private sector by investing resources in three competitive sectors, i.e. Information and Communication Technology (ICT), Clean Technology (CT) and Healthcare and Life Sciences (HLS), with crosscutting activities in Research and Development. Launched in October 2013, this five-year, \$45 million program will employ a private sector-led and participatory approach to achieve its goals. USAID JCP offers a focused, integrated approach to leveraging and increasing Jordan's competitiveness through four program components:

- **Cluster Development:** engage private-sector stakeholders in a collaborative process to develop and implement plans and growth strategies in the three sectors based on approaches that capitalize on competitive advantages and bring to bear global best practices being developed around the world ensuring that Jordan is among the lead countries in designing these new practices.
- **Supportive Enabling Environment:** provide policy and regulatory reform support to drive competitiveness, innovation and trade; and build the innovative capacity of the Government of Jordan.
- **Workforce Development:** improve Jordanian workforce readiness in USAID JCP's targeted clusters through an approach that strengthens Career Development Centers, establishes Centers of Excellence, and creates internship and training programs - all focused on market needs and competitive growth areas.
- **Access to Finance:** increase access to finance for Jordanian businesses and entrepreneurs by creating awareness of available financing, developing programs to build capacity of firms to offer and access financing, and supporting the development of innovative public-private partnerships and angel investment networks to create new market financing.

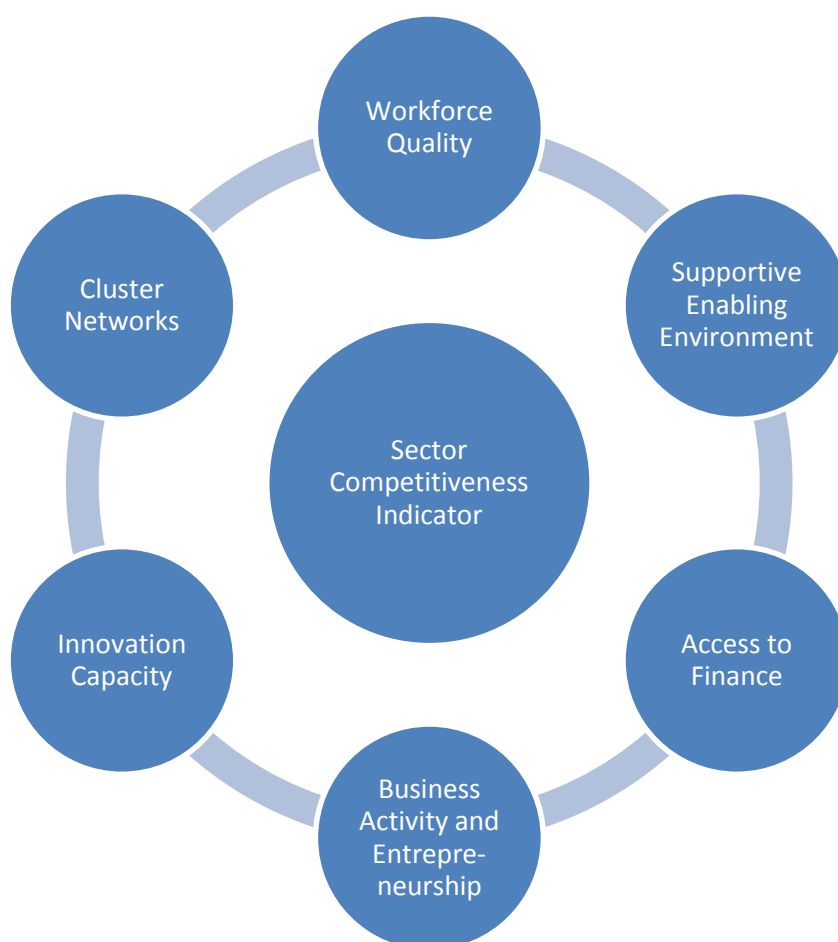
THE COMPETITIVENESS INDEX SURVEY

OBJECTIVE OF THE SURVEY

The JCP Competitiveness Index survey was launched to establish a tool for measuring the impact of the JCP program activities in each of the target sectors of the JCP program. JCP has designed a competitiveness index to measure factors that can impact competitiveness in the target sectors. The index consists of sub-indicators for six key areas – one for each of the four program components and two sub-indicators that capture general features of competitiveness such as innovation capacity, business activity, and entrepreneurial behaviour.

Figure 1 shows the composition of the competitiveness index.

Figure 1: The JCP competitiveness index



The present survey is a baseline survey. Throughout the remaining project life cycle, the competitiveness index survey will be repeated to measure progress made in the target sectors in terms of different dimensions of competitiveness. In addition, the survey can assist in monitoring

selected overall performance indicators from a firm perspective, such as job creation, development in revenue, productivity, acquisition and deployment of new technology and support of female talent.

Report outline

The report has the following sections:

- Key findings
This is the main section of the report, containing a short description of the characteristics of the surveyed companies as well as key findings for the six key areas of the survey (workforce quality; supportive enabling environment; access to finance; business activity and entrepreneurship; innovation performance and cluster networks). A separate section covers female talent.
- Situating findings
This section contrasts JCP survey findings to the findings from World Economic Forum's Competitiveness Survey for Jordan 2015-2016.

In addition to the printed version of the report, the main results of the competitiveness survey can be found online in a visualized and user-friendly format at:

<https://public.tableau.com/profile/danish.technological.institute#!/vizhome/JordanClusterCompetitiveness/DashboardI>

KEY FINDINGS

CHARACTERISTICS OF THE SURVEYED ENTERPRISES

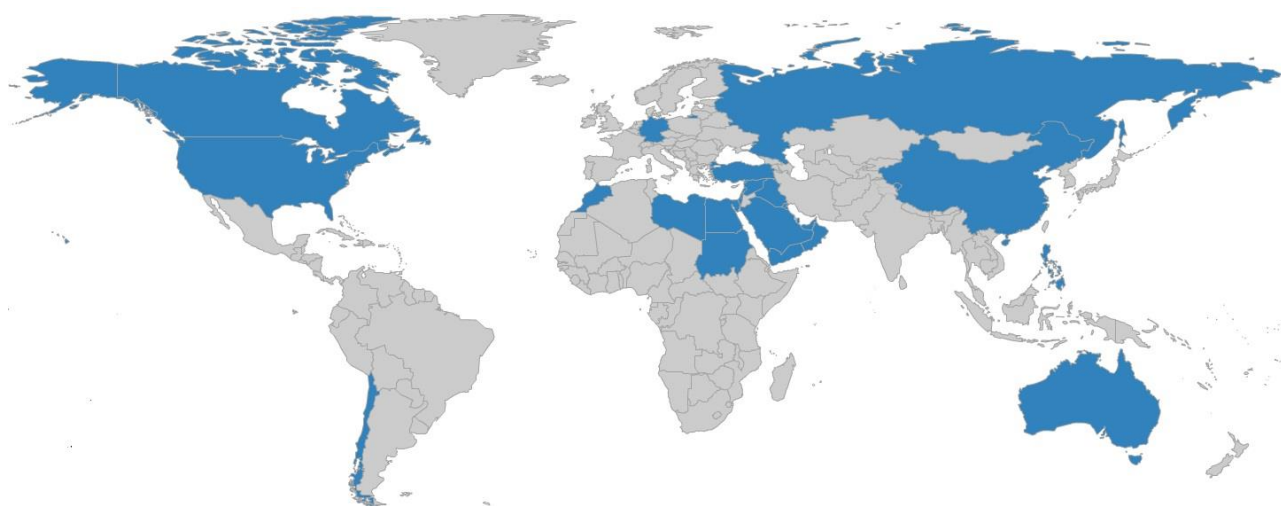
The following section presents a brief overview of the characteristics of the enterprises that were included in the JCP Competitiveness Index Survey.

Enterprise demographics

In total, 438 enterprises participated in the survey. With 164 surveyed enterprises, the ICT sector comprises the largest sector in the sample followed by Clean Tech with 100. Originally, Medical Services and Life Sciences were combined as the Healthcare and Life Science sector, but for analytical purposes, it was subsequently decided to analyze the Medical Services and Life Science sectors separately. The Medical Services and Life Science sample sizes are 84 and 90 respectively.

Most of the surveyed enterprises have headquarters in Jordan. Only 6% of the enterprises have their main offices outside Jordan – mostly in neighbouring countries such as Iraq, Syria, Palestine and Turkey. For the 94% of the enterprises with main offices in Jordan, the vast majority have their main office or facilities in Amman. This does not mean that the surveyed companies are only based nationally. 17% of the companies have offices or facilities outside Jordan as well – mostly in neighbouring countries, but also around the globe. The map in Figure 2 illustrates the location of the offices by country.

Figure 2: Location of offices and facilities

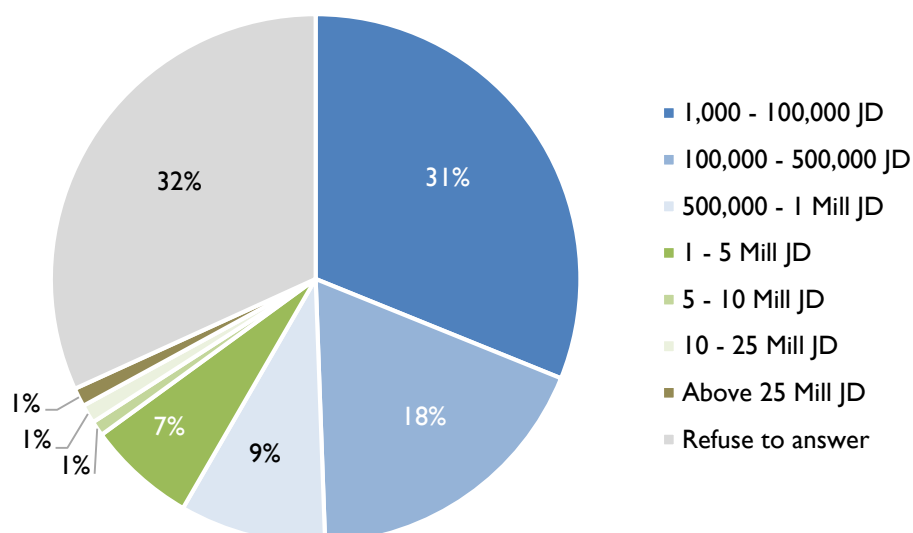


Note: N = 73. The 'blue' countries indicate where the surveyed companies have offices and/or facilities abroad.

Revenue

In terms of revenue, the sample is characterized by SMEs with nearly half of the surveyed enterprises having annual revenues below 500,000 JD. The breakdown of the entire sample is shown in Figure 3.

Figure 3: Annual revenue – all sectors



Note: N = 437.

There are only minor variations across the four sectors when it comes to the size of the enterprises measured by annual revenue. It is worth noting that several enterprises, especially within the Medical Services sector, were reluctant to share information about their revenue.

A little more than half of the surveyed enterprises have experienced no change in their revenues the past year. 32% of the enterprises have seen an increase in their annual revenue, while 17% of the enterprises have experienced a decrease in their revenue in the past year. Table 2 shows the development broken down by sectors.

Table 2: development of revenue in the past year – in total and on domestic market

	Sector	Increased	Decreased	No change
Development in revenue from the domestic market in the past year	Clean Tech	48%	35%	17%
	ICT	48%	26%	26%
	Medical Services	49%	25%	26%
	Life science	61%	22%	17%
Development in total revenue in the past year	Clean Tech	27%	21%	52%
	ICT	37%	15%	48%
	Medical Services	25%	17%	58%
	Life science	35%	19%	46%

Note: Clean Tech (n = 100), ICT (n = 164), Medical Services (n = 84), Life Science (n = 89).

A significant large share of the surveyed enterprises has experienced an increase in their revenues on the domestic market in the past year compared to the development in total revenue. This

indicates that the growth on the domestic market has been stronger compared to the situation in foreign markets, which could be a result of the unrest in the regional markets.

Markets

The majority of the surveyed enterprises only operate in Jordan. Hence, 55% of the companies have indicated that in the past year they have had no export of products or services at all. However, there are some variations across the four sectors as illustrated in Table 3.

Table 3: Exports' share of revenue in the past year

	Sector	No exports	Up to 10%	11% - 50%	More than 50%
% of revenue from exports in the past year	Clean Tech	72%	11%	13%	4%
	ICT	51%	6%	20%	24%
	Medical Services	49%	11%	33%	6%
	Life Science	49%	16%	28%	7%

Note: Clean Tech (n = 92), ICT (n = 162), Medical Services (n = 81), Life Science (n = 86).

The ICT sector is by far the most export-oriented sector. Almost a quarter of the surveyed enterprises in the ICT sector indicate that more than 50% of their revenue in the past year came from exports in the past year. As opposed to this, the Clean Tech sector is more oriented towards the domestic market with 72% of the surveyed enterprises having no export at all in the past year.

The neighbouring region, primarily the Arab countries, constitutes the main exports markets for all sectors. Only a minor share of the exported products and services goes to Europe, USA or Asia.

14% of the surveyed enterprises indicate that they have entered new markets abroad in the past year. Again, there are some variations across the four sectors with the ICT sector being the most export-oriented. 21% of the enterprises in this sector have entered a new geographical market in the past year. The corresponding share for Clean Tech, Medical Services and Life Science is 14%, 5% and 19% respectively. The majority of the companies have entered new markets in the Arab countries and in the MENA region.

In an internationalization perspective, it is interesting that 21% of the enterprises in Medical Services managed to attract clients from new countries in the past year. Again, the clients mainly came from the neighbouring region – especially from the Gulf States. The result is worth noticing taking into account that the United Emirates is a strong competitor.

Composition and size of workforce

Turning to the size of the workforce, Table 4 shows the number of surveyed enterprises falling within the categories micro, small, medium-sized and large companies.

Table 4: Size of enterprises by number of full time staff

Category	Employees	Number of enterprises
Micro	< 10	194
Small	10 – 49	174
Medium	50 – 249	47
Large	250 >	20

Note: N = 435.

Micro and small companies dominate the sample. The average number of full time employees is 74. The size of the companies measured by the number of full-time employees varies significantly across the four sectors. The ICT sector is largely dominated by micro companies with an average of 26 employees. The corresponding average number of employees for the Clean Tech sector is 36, while much larger companies characterize the Medical Services and Life Science sectors. The average numbers of employees for the latter two sectors are 97 for Medical Services and 185 for Life Science.

Job creation

One of the most important goals of JCP is job creation. Therefore, a very interesting and important aspect of the JCP Competitiveness Index Survey is monitoring the development of the number of employees in the surveyed enterprises. Table 5 shows this development in the past year broken down by sectors.

Table 5: Development in total number of employees

	Sector	Increased	Decreased	No change
Development in number of employees in the past year	Clean Tech	41%	19%	40%
	ICT	34%	20%	45%
	Medical Services	32%	13%	55%
	Life Science	44%	19%	37%

Note: Clean Tech (n = 100), ICT (n = 163), Medical Services (n = 84), Life Science (n = 89).

The majority of companies have indicated that they have not seen changes in the total number of employees in the past year. However, it is positive to see that the share of companies that have experienced an increase in the number of employees outnumbers the ones that have experienced a decrease. This is especially the case in the Life Science sector.

Productivity and R&D investment

As part of the survey, the representatives of the companies were asked to indicate how the total productivity of the workforce in the company had developed in the past year. Table 6 shows the distribution of answers.

Table 6: Development in workforce productivity

	Sector	Increased	Decreased	No change
Development in workforce productivity in the past year	Clean Tech	46%	12%	42%
	ICT	58%	7%	35%
	Medical Services	44%	13%	43%
	Life Science	58%	18%	24%

Note: Clean Tech (n = 100), ICT (n = 164), Medical Services (n = 84), Life Science (n = 89).

The majority of the surveyed companies indicate that the productivity has increased within the past year. This is especially the case for Life Science and the ICT sectors. Company size also matters when it comes to the development in productivity. A large share of the small, medium-sized and large companies has indicated a productivity increase compared to the micro companies with less than 10 employees. This could be associated with differences in technology platforms, but also in the skills of the workforce.

The development in productivity is linked to whether the company has invested in R&D in the last year. A significant share of the companies that invested in R&D has experienced an increase in workforce productivity. Table 7 shows the surveyed enterprises' R&D investment as a percentage of revenue.

Table 7: R&D investment – percentage of revenue

	Sector	No revenue invested	Up to 10%	11% - 50%	More than 50%
% of revenue invested on R&D in the past year	Clean Tech	71%	25%	3%	1%
	ICT	69%	16%	14%	1%
	Medical Services	71%	26%	2%	0%
	Life Science	57%	32%	9%	2%

Note: Clean Tech (n = 100), ICT (n = 164), Medical Services (n = 84), Life Science (n = 89).

Looking across all four sectors, almost seven out of ten companies did not invest in R&D in the previous year. At the other end of the spectrum, 1% invested more than 50% of their revenue in R&D. A significantly larger share of the companies in the Life Science sector invested in R&D compared to the other three sectors.

WORKFORCE QUALITY

The workforce quality composite indicator combines the workforce supply for the four target sectors and the companies' policies and initiatives for attracting and retaining skilled staff. The indicator can contribute to a dialogue between the targeted sectors and the higher education sector on skills supply and demand, and it can help the target sectors to reflect on their human resource policies and practices. The quality of the workforce and firm ability to attract and retain talent are one of the keys to productivity and innovation. The workforce quality is therefore a key enabler for competitiveness in the JCP, and hence the workforce quality indicator is of great importance.

The workforce quality indicator is composed of three components of which one component is only relevant for Medical Services. Table 8 shows the three components broken down by sector as well as the composite indicator for workforce quality.

Table 8: Workforce quality indicator- and component scores

Sector	Components – Workforce Quality			Overall – Workforce Quality
	Company policies for attracting and retaining skilled staff	Workforce supply	Skills development in medical tourism	
Clean Tech	5.26	4.35	-	4.74
ICT	4.78	2.96	-	3.87
Medical Services	4.64	3.63	3.04	3.98
Life Science	4.95	3.53	-	4.24
All sectors	4.91	3.62	-	4.21

Note: Clean Tech (n = 97 - 98), ICT (n = 164), Medical Services (n = 24 - 84), Life Science (n = 87 - 88). The 'skills development in medical tourism' component score for the Medical Services sector is only based on 24 answers and should be interpreted with caution. The component- and indicator scores for All sectors are calculated as the arithmetic mean of the cluster indicator scores so that the individual sector scores have equal weight.

The mean score for all four clusters is 4.21 on a 1 - 7 Likert scale. However, in a comparative perspective, there are significant differences across the clusters. Scoring 4.74, the Clean Tech sector has the highest score on the workforce quality indicator. At the other end of the spectrum, we find the ICT sector with a score of 3.87. The main reason for the relatively low score of the ICT sector on the workforce quality indicator is due to the 2.96 score on the workforce supply component. The surveyed companies have assessed their ability to recruit newly educated and skilled professionals and technicians with the skills needed as very low. It is not only in Jordan that there are concerns about the quality of the ICT professional workforce. Also in Europe, there is major policy focus on the skills of the ICT workforce - including graduates. Lessons show that the e-skills framework as well as strong partnerships between industry and the higher education sector are important levers to ensure the relevance of ICT graduates. Furthermore, the level of ICT specialization of ICT firms makes it imperative that companies have internal training schemes in place to ensure that recent graduates quickly become familiar with the business and the technology profile of the hiring company.

The following sections address each component of the workforce quality indicator in more detail.

Company policies for attracting and retaining skilled staff

The 'Company policies for attracting and retaining skilled staff' component is based on two survey questions concerning firm policies and practices for attracting and retaining innovative technical staff as well as female talent. In addition, a question concerning investment in staff training is included.

The mean score for the component is 4.91. Even though there are some variations across the four sectors, the general picture is that policies, practices and investments in attracting, retaining and improving skilled staff are in place – even though there is room for improvement.

Digging a bit deeper, Table 9 shows the distribution of the surveyed companies' assessment on a 1-7 point scale (1 being the lowest) on the three survey questions forming the component.

Table 9: Detailed composition of the 'company policies for attracting and retaining skilled staff' component

Company policies for attracting and retaining skilled staff	Sector	1	2	3	4	5	6	7
To what extent does your firm have policies and practices in place that are successful at attracting and retaining innovative and technical staff?	Clean Tech	0.0%	0.0%	1.0%	4.1%	31.6%	39.8%	23.5%
	ICT	4.9%	3.7%	1.8%	14.0%	30.5%	27.4%	17.7%
	Medical Services	7.2%	6.0%	7.2%	3.6%	22.9%	26.5%	26.5%
	Life Science	3.4%	2.3%	6.8%	1.1%	12.5%	30.7%	43.2%
To what extent are there policies and practices in place in your firm to attract, promote and retain female talent?	Clean Tech	14.0%	2.0%	4.0%	17.0%	18.0%	23.0%	22.0%
	ICT	9.8%	3.7%	3.0%	13.4%	32.3%	22.6%	15.2%
	Medical Services	8.3%	11.9%	1.2%	3.6%	25.0%	17.9%	32.1%
	Life Science	14.8%	3.4%	2.3%	13.6%	14.8%	15.9%	35.2%
To what extent does your firm invest in staff training to improve your firm performance?	Clean Tech	2.0%	0.0%	5.0%	16.0%	45.0%	19.0%	13.0%
	ICT	10.4%	6.1%	9.1%	22.6%	25.6%	16.5%	9.8%
	Medical Services	21.4%	8.3%	13.1%	16.7%	19.0%	19.0%	2.4%
	Life Science	29.5%	2.3%	2.3%	11.4%	22.7%	18.2%	13.6%

Note: Clean Tech (n = 98 - 100), ICT (n = 164), Medical Services (n = 83 - 84), Life Science (n = 88).

Much larger companies dominated the Medical Services and Life Science sectors compared to, in particular, the ICT sector, which could explain why policies and practices for attracting and retaining talent apparently are more in place in these sectors. However, it is interesting that there seems to be a paradox within the Life Science sector regarding female talent. The sector has the largest share of companies scoring highest on the 7-point scale and at the same time has the largest share scoring only 1. Networking within the sector can be a means to share and diffuse best practices.

Finally, it is worth noting that almost one third of the companies within the Life Science sector do not invest at all in staff training to improve their performance.

It is also worth noting that across the four sectors relatively few firms see a direct linkage between sector performance and human resources practices, even though OECD studies have shown a direct correlation between human resource practices and innovation performance. Sector- and cluster-specific skills anticipation studies can direct and support the relevance of firm-based training, whether firms provide in-house training or make use of external training providers. Experiences from the Nordic countries show that firm networks that focus on the soft side of innovation - such as work organization practices, leadership practices that encourage staff to contribute to on-going improvements and business idea generation over time - have an impact on human resources practices in firms.

Workforce supply

Securing a constant supply of qualified professionals with relevant skills combined with firm investments in continuing education and training improve firm responsiveness in volatile markets. According to the Global Competitiveness Report 2015-2016 from WEF, one of the most problematic issues for doing business in Jordan is an inadequately educated workforce (World Economic Forum, 2015).

Skills shortages and skills mismatches may be caused by several factors:

- an insufficient number of ICT graduates, technicians, and skilled workers;
- lack of relevance of the qualifications of recent graduates, technicians, and skilled workers;
- an insufficient dialogue between education providers and businesses;
- over-expectations from companies, i.e. that the newly educated employees possess highly specialized skills and business skills that they can only adequately develop through the job- and career-relevant training; and
- work organization practices that do not support the ongoing professional development of the workforce.

Depending on the factors at play, different strategies can be pursued. However, keys to improving the situation are enhanced dialogue between the sector and the education providers, work organization practices that support a productive deployment and on-going development of the skills of the workforce. Job postings critical to growth will most likely require graduates with some level of labour market experience. Consequently, it is important that strategies and practices to upgrade the skills of the existing workforce be developed. This can potentially also improve the functional flexibility of the firms.

Likewise, it will important for the sector to discuss the type of measures that can alleviate the situation. Any further action should build on quantitative and qualitative information to assess the nature and scale of the challenges. This should also include an assessment of the present number of unemployed ICT graduates, if any. Qualitative skills analysis studies can be used to identify very precisely and efficiently the type of skills profiles that companies experience difficulties in recruiting as a basis for the continuing training of the existing workforce.

In Europe, there are positive experiences with targeted training of unemployed university graduates, also with other skills profiles than ICT. Likewise, there have been successful targeted efforts to attract more women into an ICT career.

The workforce supply component measures workforce supply in the overall competitiveness index. The component is formed by two survey questions regarding the companies' ability to recruit supplemented by an assessment of the Jordanian education and training providers' ability to meet the specialized skills needs in the companies. For the Clean Tech sector, a fourth question on recruitment of newly educated engineers is included in the workforce supply component.

The mean score for all clusters on this component is 3.62 with the Clean Tech sector scoring significantly above (4.35) and the ICT sector scoring significantly below (2.96) the mean score. Table 10 shows the companies' assessment on the questions forming the workforce supply component.

Table 10: Detailed composition of the ‘workforce supply’ component

Workforce supply	Sector	1	2	3	4	5	6	7
To what extent are you able to recruit newly educated skilled workers and technicians with the skills you need?	Clean Tech	9.0%	12.0%	14.0%	9.0%	28.0%	12.0%	16.0%
	ICT	32.9%	22.0%	19.5%	5.5%	11.0%	7.3%	1.8%
	Medical Services	20.2%	13.1%	25.0%	2.4%	20.2%	11.9%	7.1%
	Life Science	24.1%	12.6%	11.5%	3.4%	19.5%	20.7%	8.0%
To what extent is it difficult to fill job opening that are critical to your company's growth and have remained vacant for more than 6 months?	Clean Tech	4.0%	13.0%	7.0%	8.0%	31.0%	25.0%	12.0%
	ICT	12.8%	29.9%	15.9%	15.2%	12.2%	9.8%	4.3%
	Medical Services	4.8%	11.9%	13.1%	4.8%	29.8%	21.4%	14.3%
	Life Science	12.5%	10.2%	18.2%	3.4%	9.1%	31.8%	14.8%
To what extent do Jordanian education and training providers offer specialized technical and vocational training in your field?	Clean Tech	12.0%	11.0%	10.0%	25.0%	29.0%	11.0%	2.0%
	ICT	27.4%	22.0%	14.6%	17.7%	10.4%	4.9%	3.0%
	Medical Services	46.4%	6.0%	14.3%	10.7%	11.9%	8.3%	2.4%
	Life Science	52.3%	9.1%	11.4%	8.0%	12.5%	3.4%	3.4%
To what extent are you able to recruit newly educated and skilled engineers with the skills you need?	Clean Tech	7.2%	8.2%	15.5%	16.5%	27.8%	12.4%	12.4%
	ICT	-	-	-	-	-	-	-
	Medical Services	-	-	-	-	-	-	-
	Life Science	-	-	-	-	-	-	-

Note: Clean Tech (n = 97 - 100), ICT (n = 164), Medical Services (n = 84), Life Science (n = 87 - 88).

One third of the surveyed companies in the ICT sector have indicated that they are not at all able to recruit newly educated professionals with the skills needed. In general, the responses from the sectors show the urgency of establishing some mechanisms of cooperation between the education sector and the sectors in question. Furthermore, it is necessary to establish some form of mechanisms to monitor labour market demands medium term to guide the future education supply including guidance of students in the secondary education system. In case this is not already in place, there are lessons to be learned from the USA as well as Europe. Moreover, companies within the Life Science sector indicate that they seem to have a recruitment challenge with a significant share of the companies having vacant job openings for more than 6 months. Interestingly enough, companies with main offices outside Amman seem to have more success with their recruitment compared to Amman-based companies, even though the difference is not significant.

The survey indicates the scale of the problem regarding the supply of a skilled workforce. A recent European study on science, technology, engineering, and math graduates indicates that companies in Europe increasingly expect graduates to be able to fulfil their work role from day one to cut introductory costs, and, at the same time, they have reduced investments in continuing education and training. Whether the situation is the same in Jordan is an open question.

Skills development in medical tourism

The last component forming the workforce quality composite indicator only includes companies in the Medical Services sector. The question concerns skills development in medical tourism provided by hospitals in cooperation with the tourism sector. Such a provision could drive the development of integrated service concepts. However, 38% of the surveyed companies indicate that this is not the case. A reason could be that the nature of collaboration between the two sectors is still in the

making. However, it should be noted that only a limited number of companies have answered this question.

Skills and workforce development

The supply of a skilled workforce is to some extent an externality from the perspective of Jordanian companies. They depend on a well-functioning educational system. However, there are ways for companies to affect the workforce supply positively, e.g., through human resource development, training of staff, and cooperation with universities, including the offer of traineeships. A dedicated budget for human resources development is a good proxy for the extent to which companies have formalized human resources development and have strategies and practices in place. 35% of the surveyed companies have a budget for human resource development ranging from only a few Jordanian Dinars a year for some companies to more than 25,000 JD a year for some of the large companies. Table 11 shows the share of companies with a budget for human resource development broken down by sectors.

Table 11: Share of companies having a budget for human resource development

Sector	Yes	No
Clean Tech	28%	72%
ICT	30%	70%
Medical Services	36%	64%
Life Science	57%	43%
All sectors	35%	65%

Note: All sectors (n = 326), Clean Tech (n = 93), ICT (n = 123), Medical Services (n = 50), Life Science (n = 60).

More than half of the companies in the Life Science sector have a budget for human resource development, which is a significant larger share compared to the other three sectors. The size of the companies in the Life Science sector could be one explanatory factor; regulatory requirements could also be an explanation.

Approx. 40% of the companies offer training hours to their technical staff, including skilled workers, technicians and professionals. Among the companies that do offer training, half of the companies offer no more than two hours of training per employee per year.

Cooperation between universities and companies can take many forms, such as advisory functions on curriculum development, guest teachers at universities, student placements or staff training. Despite this variation of cooperation opportunities, almost one third of all the surveyed companies do not cooperate with the universities at all.

Table 12 shows the companies' degree of university cooperation broken down on sectors.

Table 12: University cooperation

Sector	No cooperation	Minor cooperation	Some cooperation	Extensive cooperation
Clean Tech	29%	14%	37%	21%
ICT	31%	20%	31%	18%
Medical Services	27%	22%	20%	31%
Life Science	44%	21%	19%	17%
All sectors	32%	19%	29%	21%

Note: All sectors (n = 344), Clean Tech (n = 87), ICT (n = 154), Medical Services (n = 55), Life Science (n = 48). Responses were given at a 1 to 7 Likert scale. 1 = No cooperation, 2 and 3 = Minor cooperation, 4 and 5 = Some cooperation, 6 and 7 = Extensive cooperation.

Note: The percentages do not always add up to 100% due to rounding.

For companies in the Life Science sector, more than four out of ten companies do not cooperate with universities at all. At the other end of the spectrum, one third of the companies in the Medical Services sector cooperate extensively with universities. Experiences from Europe show that a third player, in the case of Europe the European Commission, can play an enabling and supportive role in bringing industry and higher education institution together in a broad based dialogue on human resources and innovation. In Jordan, JCP can potentially play a similar role to some extent.

SUPPORTIVE ENABLING ENVIRONMENT

The enabling environment is defined as the set of interrelated conditions, such as the legal, institutional, political, fiscal, and cultural conditions, that impact the performance of firms within that environment. Hence, the supportive enabling environment (SEE) is one of the enablers of competitiveness following the definitions of competitiveness used in this survey. The JCP aims to alleviate barriers to cluster development from a policy and regulatory perspective (JCP, 2015).

The SEE indicator is composed of three components capturing the impact of regulations, innovation supportive initiatives and competitiveness, and the degree of market competition. Table 13 shows the SEE indicator and components broken down by sector.

Table 13: Supportive enabling environment indicator- and component scores

Sector	Components – Supportive Enabling Environment			Overall – Supportive Enabling Environment
	Impact of regulations	Supporting innovation and competitiveness	Market competition	
Clean Tech	3.60	3.23	6.10	3.66
ICT	2.63	2.37	5.20	2.75
Medical Services	2.92	2.05	5.77	2.78
Life Science	2.80	1.97	6.11	2.73
All sectors	2.99	2.41	5.80	2.98

Note: Clean Tech (n = 100), ICT (n = 160 - 163), Medical Services (n = 84), Life Science (n = 88). The component- and indicator scores for All sectors are calculated as the arithmetic mean of the cluster indicator scores so that the individual sector scores have equal weight.

The mean score on the overall SEE indicator is 2.98. However, there are major differences in the companies' assessment of the three components as well as some variations among the four sectors. The survey results show that companies in the Clean Tech sector have assessed the SEE significantly higher than companies from the other three sectors did. This could reflect the relative development in cooperation within the sector. While market competition in general is assessed high on a 7-point Likert scale, the supporting innovation and competitiveness component is scored low by the companies. The following sections take a closer look at the SEE indicator.

Impact of regulations

The impact of the regulations component consists of five survey questions. Four of these questions are based on a 7-point Likert scale while one question is based on a 'yes' or 'no' response. Table 14 shows the distribution of answers for the four questions based on the 7-point Likert scale broken down by sectors.

Table 14: Detailed composition of the 'impact of regulations' component

Impact of regulations	Sector	1	2	3	4	5	6	7
Is it burdensome for firms in your industry to comply with government regulations, requirements and procedures?	Clean Tech	20.0%	10.0%	13.0%	16.0%	16.0%	13.0%	12.0%
	ICT	32.3%	19.5%	17.7%	6.7%	10.4%	8.5%	4.9%
	Medical Services	36.9%	4.8%	14.3%	3.6%	7.1%	14.3%	19.0%
	Life Science	45.5%	4.5%	10.2%	4.5%	8.0%	10.2%	17.0%
To what extent is the process of obtaining government permits and approvals for business operations clear and straightforward?	Clean Tech	17.0%	8.0%	23.0%	9.0%	13.0%	15.0%	15.0%
	ICT	31.3%	17.2%	10.4%	9.2%	6.1%	16.0%	9.8%
	Medical Services	38.1%	4.8%	6.0%	3.6%	11.9%	15.5%	20.2%
	Life Science	44.3%	5.7%	13.6%	2.3%	5.7%	11.4%	17.0%
To what extent are there proper incentives and conditions for growth and innovation in your industry?	Clean Tech	32.0%	6.0%	17.0%	10.0%	18.0%	12.0%	5.0%
	ICT	54.6%	14.7%	6.7%	11.7%	6.7%	4.9%	0.6%
	Medical Services	41.7%	13.1%	16.7%	7.1%	11.9%	9.5%	0.0%
	Life Science	54.5%	6.8%	11.4%	9.1%	9.1%	4.5%	4.5%
To what extent does the quality of the overall business environment represent obstacles to growth and competitiveness of your firm?	Clean Tech	13.0%	16.0%	12.0%	27.0%	15.0%	12.0%	5.0%
	ICT	26.5%	15.4%	16.0%	16.7%	3.1%	6.8%	15.4%
	Medical Services	29.8%	3.6%	20.2%	17.9%	15.5%	2.4%	10.7%
	Life Science	36.4%	3.4%	10.2%	12.5%	17.0%	6.8%	13.6%

Note: Clean Tech (n = 100), ICT (n = 162 - 164), Medical Services (n = 84), Life Science (n = 88).

Companies in the ICT sector find the impact of regulations more burdensome compared to companies in the other three sectors. However, the general picture is that a large share of the surveyed companies in all sectors is negatively impacted by regulations. This includes the impact of regulations, requirements and procedures as well as the process of obtaining permits and approvals for business operations. In addition, a large share of the companies does not find that there are proper incentives and conditions for growth and innovation in place. That is especially the case for the ICT and Life Science sectors, where 55% of the companies have answered that there are no proper incentives at all.

Asked if any legal or regulatory changes have improved business conditions in the industry in the past year, 85% of the surveyed companies responded negatively. However, it should be noted that some companies may not know about progressive reforms and, thus, answer negatively even if regulatory changes actually have taken place. This hypothesis is supported by a significant correlation between companies that have answered negatively to the question about improved business conditions as well as a question about the degree of knowledge of formal programs that support research and innovation.

Supporting innovation and competitiveness

With a mean score of 2.41, the 'Supporting innovation and competitiveness' component has the lowest mean score of the three components constituting the SEE indicator. The component consists of five survey questions all based on the 7-point Likert scale.

Table 15 shows the companies' assessment of the five questions broken down by sectors.

Table 15: Detailed composition of the ‘supporting innovation and competitiveness’ component

Supporting innovation and competitiveness	Sector	1	2	3	4	5	6	7
What is your knowledge of formal programs that support research and innovation in your sector?	Clean Tech	30.0%	7.0%	12.0%	18.0%	15.0%	14.0%	4.0%
	ICT	39.9%	11.7%	9.2%	18.4%	13.5%	3.7%	3.7%
	Medical Services	61.9%	9.5%	10.7%	3.6%	9.5%	4.8%	0.0%
	Life Science	71.6%	3.4%	3.4%	10.2%	3.4%	2.3%	5.7%
To what extent do you believe that policy reforms implemented in the past year are conducive to firm innovation and competitiveness and reflect the voices of the industry?	Clean Tech	31.0%	10.0%	12.0%	26.0%	13.0%	5.0%	3.0%
	ICT	63.6%	13.6%	7.4%	9.3%	3.1%	1.9%	1.2%
	Medical Services	75.0%	7.1%	9.5%	2.4%	2.4%	1.2%	2.4%
	Life Science	72.7%	6.8%	9.1%	3.4%	5.7%	0.0%	2.3%
How confident are you that the government agencies have sufficient resources and internal capacity to implement the legislative framework to boost your industry?	Clean Tech	21.0%	13.0%	23.0%	17.0%	17.0%	6.0%	3.0%
	ICT	45.7%	11.1%	9.3%	8.6%	10.5%	7.4%	7.4%
	Medical Services	75.0%	8.3%	8.3%	3.6%	3.6%	1.2%	0.0%
	Life Science	75.0%	3.4%	5.7%	6.8%	1.1%	2.3%	5.7%
To what extent are business associations and other key sector players cooperating with governmental agencies in the implementation of the legislative framework?	Clean Tech	23.0%	4.0%	16.0%	24.0%	14.0%	11.0%	8.0%
	ICT	48.4%	10.6%	6.2%	10.6%	11.8%	9.3%	3.1%
	Medical Services	46.4%	6.0%	10.7%	14.3%	9.5%	8.3%	4.8%
	Life Science	54.5%	10.2%	5.7%	11.4%	6.8%	9.1%	2.3%
How effective are anti-monopoly policies in ensuring competition?	Clean Tech	43.0%	7.0%	10.0%	23.0%	7.0%	6.0%	4.0%
	ICT	69.1%	11.1%	1.9%	13.0%	1.9%	1.9%	1.2%
	Medical Services	59.5%	4.8%	8.3%	13.1%	10.7%	1.2%	2.4%
	Life Science	64.8%	8.0%	11.4%	8.0%	8.0%	0.0%	0.0%

Note: Clean Tech (n = 100), ICT (n = 161 - 163), Medical Services (n = 84), Life Science (n = 88).

Looking across all the questions, the companies in the Life Science sector have given the lowest assessment of the questions forming this component. The mean score for the Life Science sector is 1.97. At the other end of the spectrum, we find the Clean Tech sector with a mean score of 3.23. Nevertheless, the general picture is that from a firm perspective there are major challenges for all sectors in the regulatory and policy environment that negatively impact innovation and competitiveness. Three out of four companies in both the Medical Services and Life Science sectors have indicated that they are not confident at all that the government agencies have sufficient resources and internal capacity to implement the legislative framework to boost their industries. Nor do they find that the policy reforms implemented in the past year are conducive at all to firm innovation and competitiveness and reflect the needs and voices of the industries. The survey indicates that there is a lack of confidence in the government's ability to enable innovation and competitiveness through legislation and other initiatives. However, at the same time, there is also a need for more information and probably also a dialogue about existing formal programs that support research and innovation - if there are any such programs.

Market competition

The last component of the SEE indicator is market competition. Several studies have demonstrated the close linkages between competition, competition policy, private sector development and growth. One way to measure the degree of competition in a local market indirectly is to ask the companies

operating in this market to assess the degree of competition (even if such a self-assessment can never stand alone when studying weak competition on markets). Table 16 provides an overview of how companies assessed the intensity of market competition broken down by sectors.

Table 16: Detailed composition of the ‘market competition’ component

Market competition	Sector	1	2	3	4	5	6	7
How intense is the composition in the local markets within your industry?	Clean Tech	2.0%	0.0%	2.0%	13.0%	5.0%	21.0%	57.0%
	ICT	4.9%	8.0%	6.1%	10.4%	19.6%	15.3%	35.6%
	Medical Services	8.3%	3.6%	4.8%	1.2%	4.8%	22.6%	54.8%
	Life Science	5.7%	2.3%	2.3%	0.0%	9.1%	15.9%	64.8%

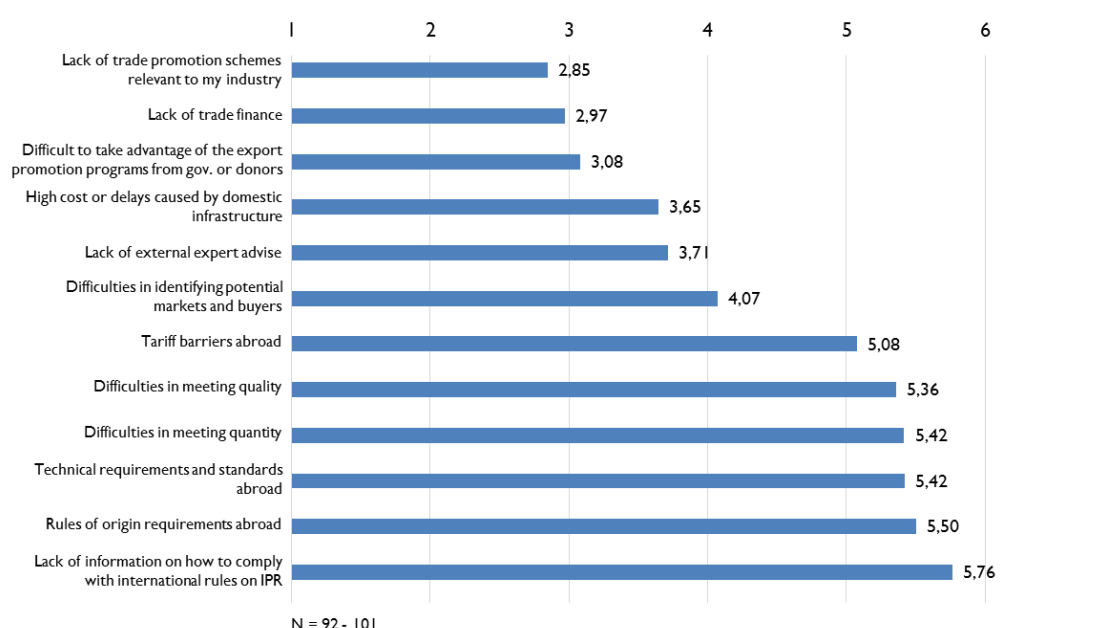
Note: Clean Tech (n = 100), ICT (n = 163), Medical Services (n = 84), Life Science (n = 88).

More than half of the surveyed companies in the Clean Tech, Medical Services and Life Science sectors find that the competition is extremely intense. For the ICT sector, the corresponding share is approx. one third. If the survey results can be taken at face value, this is very positive for the general competitiveness. A Jordanian study from 2012 showed that the intensity of market competition has a strong impact on the organizational performance of companies. The same study also concluded that Jordanian companies in general face intense competition due to the attractive investment climate of the Jordanian market (Al-Rfou, 2012).

Barriers to export

Among all the surveyed companies, 16% of the companies had tried to export during the past year. The export companies were asked to rank five factors that they consider as being barriers to export. The 7-point Likert scale was used for ranking the factors – 1 indicating that the factor was most problematic. Figure 4 shows the ranking.

Figure 4: Barriers to export



Note: N = 92 - 101. Only companies who have stated that they have experienced major barriers to export or have tried to export in the past year have been asked to rank the barriers. Consequently, only the total for all sectors are shown in the figure.

According to this self-assessment, the exporting companies indicate that they have the capacity to export more. The companies also indicate that they do not have difficulties in meeting the qualitative and quantitative requirements, and they are well informed about technical requirements and international rules. What the companies see as the most problematic factors are the lack of trade promotion schemes relevant to the specific industries and lack of trade finance. Hence, implementing relevant and transparent trade promotion schemes and providing trade finance could be initiatives to boost exports according to the surveyed firms. International lessons, however, also show that internal cluster cooperation is a means to overcoming some export barriers and limitations to size, as clusters can share export expertise resources and make joint promotion efforts. It should be noted that only a limited number of companies have ranked the export barriers.

Quality of business environment

The survey included 15 factors that could be an obstacle to growth for the companies, and the companies were asked to assess these factors on a 7-point Likert scale. Table 17 shows the mean score of the assessment of the 15 factors broken down by sectors. A high score means that there are no or minor obstacles to growth while a low score means that there are major obstacles to growth.

Table 17: Obstacles to growth and competitiveness

	Access and stability of ICT infrastructure	Effective deployment of ICT	Transportation infrastructure	Access to development capital	Protection of IPR	Relevance of skills of new university graduates	Relevance of skills of new technicians and skilled craftsmen	Regulation specific to your industry	Policies regarding trade	Innovation policies	Access to state-of-art technology in your industry	Access to state-of-art knowledge relevant to the industry	Ability to attract foreign direct investment	Internal innovation capacity in the company workforce	Policies and practices to attract, promote and retain female talent
Cleantech	5.82	5.99	4.22	3.69	4.82	4.24	4.01	3.87	4.18	5.09	5.29	5.42	3.96	5.62	5.93
ICT	4.39	5.43	4.11	2.78	4.75	2.86	3.07	3.07	3.81	4.82	5.57	5.88	2.78	5.32	5.29
Medical Services	5.74	6.09	3.58	3.38	5.78	4.32	4.17	3.92	5.33	5.58	5.22	5.37	3.94	5.96	5.89
Life Science	5.48	6.16	3.72	2.80	5.81	4.20	4.28	3.80	5.20	5.47	5.24	5.76	3.70	6.09	5.86
All sectors	5.20	5.83	3.96	3.11	5.18	3.73	3.74	3.57	4.47	5.17	5.37	5.65	3.46	5.67	5.67

Note: Clean Tech (n = 95 - 98), ICT (n = 154 - 159), Medical Services (n = 78 - 83), Life Science (n = 85 - 86).

The lowest mean scores are found in the ICT sector. Three factors have a mean score below 3, meaning that these factors are considerable obstacles to growth. This includes access to development capital, relevance of skills of new graduate candidates, and the ability to attract foreign investment. Looking across all four sectors, access to development capital has the lowest mean score meaning that it is considered a major obstacle to growth. In this regard, the JCP Competitiveness Index Survey is in line with the 2015 WEF Competitiveness Report showing that the most problematic factor for doing business in Jordan is access to financing (World Economic Forum, 2015). For high-tech sectors, the lack of access to finance can impede opportunities to invest in technological upgrading and R&D. Since the global economic crisis, this has been a problem for many SMEs in many other countries than Jordan.

ACCESS TO FINANCE

Limited access to finance may constrain business development and undermine competitiveness. To drive competitiveness and boost growth across the four sectors, sufficient access to finance is identified as a key enabler under the JCP.

The access to finance indicator combines both the availability and awareness of funding sources and the actual access to both equity and debt financing as perceived by businesses within the four sectors. The indicator is composed of four components that are uniform for all sectors, and one additional component that is only relevant for the Clean Tech sector. Table 18 presents the components broken down by sectors, as well as a composite score for an overall access to finance indicator.

Table 18: Access to finance indicator and component scores

Sector	Components - Access to Finance					Overall – Access to Finance
	Avail. and aware. of funding sources	Equity investment to comp.	Debt financing to comp.	Efforts to raise aware. of funding sources	Strategic financing for Clean Tech	
Clean Tech	4.62	1.33	1.66	2.32	4.01	2.74
ICT	3.72	1.27	1.28	2.04	-	2.08
Medical Services	5.45	1.09	1.43	1.86	-	2.54
Life Science	5.30	1.19	1.72	1.48	-	2.56
All sectors	4.77	1.22	1.52	1.92	-	2.48

Note: Clean Tech (n = 98 - 100), ICT (n = 162), Medical Services (n = 84), Life Science (n = 88). The component- and indicator scores for All clusters are calculated as the arithmetic mean of the cluster indicator scores so that the individual cluster scores have equal weight.

The table shows that the overall access to finance indicator score for all sectors is 2.48 on a 1 to 7 Likert scale. The ICT sector has the lowest indicator score with 2.08 while the other three sectors are at slightly higher level, with the Clean Tech sector in the lead. A variety of factors, such as company size, number years in operations and overall performance, can impact firms' access to finance. These factors could explain why the ICT sector scores lower than the other sectors, as the Jordanian ICT sector is highly diverse spanning the whole value chain with firms of different sizes and years in operations. The overall indicator score for Clean Tech is inflated by the relatively high score of 4.01 on the component related to strategic financing for Clean Tech. The findings also indicate that businesses in the target sectors in general are more aware of the availability of financing sources compared to the actual access to equity and debt financing.

The following sections address each component of the access to finance indicator in more detail.

Availability and awareness of funding sources

This component presents relatively high scores across the clusters with an overall score of 4.77, with the ICT sector trailing behind and with the Healthcare and Life Science sectors ahead. The component addresses to which extent investment in start-ups is available, the general business awareness of potential financing sources and the perceived readiness of businesses to meet the requirements of investors and banks to obtain financing. The relatively high mean score suggests that funding sources are available to some degree and businesses are aware of this.

The Medical Services and Life Science clusters score 5.45 and 5.30 respectively, while ICT trail behind with 3.72. The Clean Tech score is somewhere in between with a score of 4.62. An in-depth

analysis shows that the majority of businesses in ICT do not believe that investment for start-ups is available, while the picture is completely different in the Healthcare and Life Science sectors. This is the indicator where sector differences are the greatest as illustrated in Table 19.

Table 19: Detailed composition of the ‘availability and awareness of funding sources’ component

Avail. and aware. of funding sources	Sector	1	2	3	4	5	6	7
To what extent is investment available for the start up of new firms in your industry?	Clean Tech	18.0%	4.0%	9.0%	40.0%	12.0%	10.0%	7.0%
	ICT	36.4%	20.4%	6.2%	20.4%	3.1%	8.0%	5.6%
	Medical Services	3.6%	0.0%	4.8%	10.7%	25.0%	25.0%	31.0%
	Life Science	10.2%	1.1%	12.5%	8.0%	15.9%	19.3%	33.0%
To what extent are you ready to meet investors or banks’ requirements in order to obtain financing from them?	Clean Tech	2.0%	1.0%	3.0%	31.0%	18.0%	23.0%	22.0%
	ICT	11.7%	3.7%	4.3%	32.1%	21.6%	14.2%	12.3%
	Medical Services	1.2%	0.0%	2.4%	10.7%	25.0%	31.0%	29.8%
	Life Science	6.8%	3.4%	9.1%	5.7%	15.9%	22.7%	36.4%
How aware are you about available potential financing sources? (equity investment, bank loans, loan guarantees, grants)	Clean Tech	8.0%	2.0%	4.0%	24.0%	24.0%	21.0%	17.0%
	ICT	17.3%	6.2%	9.3%	31.5%	13.6%	9.9%	12.3%
	Medical Services	14.3%	0.0%	2.4%	3.6%	23.8%	34.5%	21.4%
	Life Science	8.0%	2.3%	1.1%	11.4%	14.8%	23.9%	38.6%

Note: Clean Tech (n = 100), ICT (n = 162), Medical Services (n = 84), Life Science (n = 88).

The divergence in answers between the sectors is not as marked when it comes to the two other question, even though the ICT sector still ranks the lowest and the Healthcare and Life Science sectors rank the highest. However, it is worth noticing that even though most businesses in the Medical Services cluster are well aware of potential funding sources, around 14% still do not have any knowledge about business development funding options.

Equity investment to companies

Across all four clusters, the score of this component is very low with an overall score of 1.22, which suggests that businesses believe that it is difficult to obtain equity investments. The component is formed by survey questions on the extent to which businesses in the past year have received equity investments from either foreign or domestic sources, or whether they have received grants or received funding from a public R&D and innovation scheme in the past year.

There are only minor differences between sectors as all scores are within a range of 1.09 and 1.33. These results underline the fact that businesses within the target sectors experience difficulties in attracting both foreign and domestic investment. In general, company size can be a barrier to attracting equity investments, while the geographic location is also a potential barrier when it comes to inward investment from abroad due to conflicts in the wider region. Very few business have received funding from public R&D and innovation schemes, either because such schemes are not widely available, the schemes that do exist may be too difficult for businesses to apply for, or businesses may not be aware of the existence of such schemes. There are no marked differences across sectors on whether businesses have been successful in attracting investments or received funding through grants or support schemes. Nevertheless, the poor performance on this specific component highlights the importance of promoting measures that can strengthen the capability of firms, regardless of their size, to apply for R&D and innovation funding schemes. However, it is

important that R&D and innovation schemes are aligned to firm capacity and maturity, as R&D investments may have a longer pay-off and be more risky than more targeted innovation schemes. In other countries, e.g., Germany and Austria, cluster bodies play an important role in supporting companies or groups of companies to access R&D and innovation funding schemes, not only through the application procedure, but also by identifying external partners. These cluster bodies are an example of how firms can overcome the limitation of size by organizing themselves in clusters and establishing competent shared services.

This finding supports the priorities of the JCP program, which has several initiatives that target both the funding supply and demand side, to ensure better access to equity investments. Initiatives on the supply side include the establishment of effective angel networks and increased focus on promoting venture capital funds. Initiatives on the demand side include innovative public private partnerships and business support centers to increase the ability of start-ups and SMEs to attract equity investors. The establishment of a credit bureau under the JCP could potentially also help to eliminate asymmetric information between companies and potential investors as more transparent information on company credit worthiness becomes available. A key challenge is to create an environment, beyond security and safety guarantees enabled by a transparent regulatory environment to attract FDI to the productive sectors to gain the full benefit from the openness of the Jordanian economy and its trade liberalizing agreements. Attracting FDI that can boost technological advancement, job creation or export-oriented activities will require more efforts than deregulating FDI entry and operations. In this respect, cluster activities and the depth of clusters are important enablers. Lessons learned from the World Economic Forum's Competitiveness Survey show that it is equally important that there be a proper balance between the need to reform policies, regulations, and procedures and the need to maintain a stable legislative environment. A stable business environment conducive to FDI implies that planning horizons are not subject to frequent policy reversals when governments change.

Debt financing to companies

Even though an overall score of 1.52 indicates that access to debt financing seems to be slightly more accessible than equity financing, it is also perceived as a severe challenge across all four sectors. The results point towards a financial sector that does not have the capacity to respond fully to the needs of the private sector or that the Jordanian financial sector is reluctant to invest in business operations, which has been an issue in many countries since the financial crisis, in particular in relation to SMEs and newly established firms. This component covers survey questions on the extent to which businesses have received bank loans or loan guarantees in the past year.

As with equity investments, there are only minor differences across sectors in terms of access to debt financing. All scores are within a range of 1.28 to 1.72. However, it seems to be slightly easier to obtain debt financing for businesses in the Life Science and Clean Tech sectors. In general, more businesses have obtained bank loans, while very few have received loan guarantees. Close to 15% of the surveyed companies have received a bank loan in the past year, which, compared to the share of businesses that received equity investment, is relatively high.

For the most part, the same issues are seen in firm perceptions on access to debt financing for equity financing. Asymmetry in information between the commercial banks and businesses is likely to be one of the factors that hamper access to debt financing. Again, these findings support the initiatives of the JCP, as the program, among other things, aims to increase access to debt financing for medium-term lending and working capital in the target sectors.

Efforts to raise awareness of funding sources

This component addresses the efforts by industry associations, municipalities and local bank branches to raise awareness about potential financing sources. With an overall score of 1.92, it suggests that targeted efforts are needed, and already implemented measures should be assessed in terms of improving relevance and outreach to the target sectors. There are marked differences between the sectors. Awareness raising on potential financing sources is much more widespread in Clean Tech, where 22% of businesses indicate that such events have taken place.

Strategic financing for Clean Tech

The final component that forms part of the access to finance indicator focuses solely on the Clean Tech sector. This component addresses the extent to which businesses are aware of bank financing and loan guarantee programs specifically for Clean Tech projects and the investor awareness of efficiency and cost-savings associated with Clean Tech. The score is relatively high at 4.01, which indicates that the focus on strategic financing is somewhat high. This is also reflected in the fact that awareness raising on potential financing sources is more widespread in the Clean Tech sector than in the other target sectors.

BUSINESS ACTIVITY AND ENTREPRENEURSHIP

Business activity and entrepreneurship are essentially two separate, yet closely related, aspects of business development and competitiveness, with the main common denominator being innovation. Improved business activities through development and implementation of new or improved products, processes and services can increase productivity and performance of businesses, while entrepreneurship can stimulate economic growth, job creation and competitiveness, which is critical to growth in Jordan due to the relatively high level of unemployment.

The business activity and entrepreneurship indicator combines components of business activity development as well as entrepreneurial behaviour and support. Table 20 presents the two components broken down by sector and the overall indicator for business activity and entrepreneurship.

Table 20: Business activity and entrepreneurship indicator and components

Sector	Components – Business Activity and Entrepreneurship		Overall – Business Activity and Entrepreneurship
	Business activity development	Entrepreneurial behaviour and support	
Clean Tech	2.94	3.28	3.05
ICT	3.32	2.84	3.16
Medical Services	3.87	3.20	3.68
Life Science	3.03	3.05	3.03
All sectors	3.29	3.09	3.23

Note: Clean Tech (n = 100), ICT (n = 160 - 161), Medical Services (n = 79 - 84), Life Science (n = 88). The component- and indicator scores for All clusters are calculated as the arithmetic mean of the cluster indicator scores so that the individual cluster scores have equal weight.

The overall indicator score for all sectors is 3.23 with Medical Services as the top scorer. Overall, the two components score more or less at the same level, but the pattern across sectors varies. The Clean Tech sector scores relatively low on business activity development while aspects of the entrepreneurial behaviour and support component score higher. The opposite is true for the ICT cluster. The Medical Services cluster performs relatively strongly on business activity development while Life Science performs equally on both components.

Business activity development

The business activity development component encompasses information on the extent to which businesses have developed business activities to improve the quality of products and services, development of new products and services for export, and whether they have enhanced their production to meet increased demand. A separate question on development in patient outcome measures is included for the Medical Services cluster.

The overall score for all clusters is 3.29, with Medical Services presenting the strongest performance on this component with a score of 3.87, while the Clean Tech cluster presents the lowest performance with 2.94. However, the aspect of patient outcome measures inflates the Medical Services component score, as 90% of the businesses in this sector have experienced an improvement in such measures because of their services. Table 21 shows that the Clean Tech cluster struggles in terms of developing business activities related to export as only around one in eight businesses in the sector had introduced new products or services for export or increased revenue from export in the previous year. In general, export-related business activities seem to be a challenge for most

businesses in the target sectors. However, the ICT sector performs significantly better than the other sectors. Businesses across all sectors tend to perform better on business activities related to improvement of products and services and enhancement of production. The Medical Services sector, which is mainly service-driven, has succeeded well in improving the quality of their services. This is also reflected in the high performance on patient outcome measures. Incremental innovations generally come at a lower cost, which is an advantage, and they can contribute substantially to improving productivity and customer service orientation. However, in highly competitive international markets, incremental innovation tends to have its limitations.

Table 21: Detailed composition of the ‘business activity development’ component

Business activity development	Sector	Yes	No		Yes	No
In the past year, did your firm invest in measures to improve the quality of products and services?	Clean Tech	59.0%	41.0%	In the past year, did your firm increase the volumes of products or services produced due to an increased demand?	45.0%	55.0%
	ICT	48.4%	51.6%		44.7%	55.3%
	Medical Services	70.2%	29.8%		47.6%	52.4%
	Life Science	52.3%	47.7%		51.1%	48.9%
In the past year, did your firm produce new products or services for export?	Clean Tech	13.0%	87.0%	In the past year, did your firm increase the revenue from exports/foreign clients?	12.0%	88.0%
	ICT	28.0%	72.0%		33.5%	66.5%
	Medical Services	13.1%	86.9%		20.2%	79.8%
	Life Science	15.9%	84.1%		15.9%	84.1%
In the past year, did patient outcome measures and satisfaction rates improve as a result of your services?	Clean Tech	-	-			
	ICT	-	-			
	Medical Services	89.9%	10.1%			
	Life Science	-	-			

Note: Clean Tech (n = 100), ICT (n = 161), Medical Services (n = 79 - 84), Life Science (n = 88).

Entrepreneurial behaviour and support

This component addresses the overall entrepreneurial and risk taking behaviour of businesses and the degree to which facilities and services for entrepreneurs are provided to a sufficient degree. The Clean Tech and Medical Services clusters present the highest scores of 3.28 and 3.20 respectively, while the ICT cluster presents the lowest score of 2.84.

Table 22: Detailed composition of the ‘entrepreneurial behaviour and support’ component

Entrepreneurial behaviour and support	Sector	1	2	3	4	5	6	7
How would you assess the overall entrepreneurial and risk taking behaviour in your industry?	Clean Tech	14.0%	14.0%	12.0%	36.0%	8.0%	14.0%	2.0%
	ICT	25.3%	15.4%	11.7%	14.2%	14.2%	8.0%	11.1%
	Medical Services	16.7%	6.0%	4.8%	15.5%	11.9%	35.7%	9.5%
	Life Science	18.2%	6.8%	5.7%	10.2%	22.7%	25.0%	11.4%
To what extent does the sector provide the sufficient facilities/services for entrepreneurs?	Clean Tech	30.0%	11.0%	20.0%	22.0%	9.0%	5.0%	3.0%
	ICT	50.6%	20.6%	4.4%	12.5%	7.5%	3.8%	0.6%
	Medical Services	63.1%	9.5%	10.7%	7.1%	6.0%	2.4%	1.2%
	Life Science	76.1%	5.7%	3.4%	5.7%	2.3%	3.4%	3.4%

Note: Clean Tech (n = 100), ICT (n = 160 - 162), Medical Services (n = 84), Life Science (n = 88).

When looking at the underlying aspects in more detail in Table 22, it turns out that the Medical Services and Life Science clusters seem to be more entrepreneurial in their business orientation than Clean Tech and ICT. However, the Clean Tech sector indicates that more sufficient facilities and services for entrepreneurs are in place compared to the other sectors. This could indicate that the collaboration within the Clean Tech sector is more mature. This is also reflected in the framework conditions for the Clean Tech sector, as facilities and services for entrepreneurs seem to be more developed in this sector.

INNOVATION CAPACITY

A country's innovation capacity is impacted by both microeconomic and macroeconomic factors, such as firm agility and firm strategies, the skills of the workforce, the institutional and regulatory environment, the depth of clusters and many more. Consequently, this is an overarching key area, and this section therefore links to other parts of the report.

The innovation capacity indicator combines different aspects on actions and investments undertaken in the businesses to improve innovation capacity and innovation outcomes through, e.g., external innovation collaborations as well as other enabling R&D factors. Table 23 presents the components that represent the innovation capacity indicator broken down by the target sector.

Table 23: Innovation capacity indicator- and component scores

Sector	Components – Innovation Capacity				Overall – Innovation Capacity
	Actions to improve inno. capacity	Innovation outcomes	External innovation collaborations	R&D enabling environment	
Clean Tech	3.68	2.34	2.05	4.11	3.20
ICT	3.02	2.69	2.00	3.25	2.83
Medical Services	3.21	2.06	1.86	3.22	2.68
Life Science	3.32	2.23	1.75	3.41	2.80
All sectors	3.31	2.33	1.91	3.41	2.88

Note: Clean Tech (n = 99 - 100), ICT (n = 159 - 162), Medical Services (n = 83 - 84), Life Science (n = 88). The component- and indicator scores for All clusters are calculated as the arithmetic mean of the cluster indicator scores so that the individual cluster scores have equal weight.

For all sectors combined, the innovation capacity indicator score is 2.88, with only the Clean Tech cluster scoring above the mean with 3.20. The mean scores for all sectors vary across the four components, and indications are that external R&D collaboration are not very developed, while actions taken by businesses to improve their innovation capacity and the R&D enabling environment in general score higher. One explanation could be that the strategic cooperation with universities in Jordan is not very developed in general. It could also be a question of lack of finances to invest in strategic industrial focused R&D.

The following sections address each component in more detail.

Actions to improve innovation performance

In order for companies to increase their innovation performance, it is necessary to undertake actions and investments that support an increased innovation capacity in the company. Different strategies can be pursued, such as taking advantage of new technologies and new organizational approaches, to improve agility or marketing innovations. This component addresses the extent to which businesses over the past two years have engaged in activities that promote new production processes, organizational and marketing approaches, and whether they have dedicated human resources to innovation and investment in ICT-enabled innovation.

Businesses in the Clean Tech sector are generally the most advanced in terms of undertaking actions to improve their innovation performance, and the sector presents a score of 3.68, which is well above the other sectors. A closer look at actions taken in Table 24 reveals that the main focus has been on actions oriented towards investments in ICT-enabled innovation and introduction of organizational innovation, while only few businesses across clusters have entered into joint ventures with foreign partners. Every fifth company has allocated human resources dedicated to innovation.

However, even though it may not hamper their innovation capacity as such, it signals that companies do not have dedicated development and R&D units.

Table 24: Detailed composition of the ‘actions to improve innovation capacity’ component

Actions to improve innovation capacity	Sector	Yes	No		Yes	No
In the past two years, has your firm implemented new marketing approaches?	Clean Tech	67.0%	33.0%	In the past two years, has your firm invested significantly in ICT enabled innovation?	68.0%	32.0%
	ICT	43.8%	56.2%		51.2%	48.8%
	Medical Services	32.1%	67.9%		63.1%	36.9%
	Life Science	47.7%	52.3%		58.0%	42.0%
In the past two years, has your firm invested in new production infrastructure?	Clean Tech	33.0%	67.0%	In the past two years, has your firm introduced organizational innovations to improve agility?	60.0%	40.0%
	ICT	26.5%	73.5%		44.4%	55.6%
	Medical Services	51.2%	48.8%		48.8%	51.2%
	Life Science	38.6%	61.4%		46.6%	53.4%
In the past two years, has your firm agreed to a new joint venture with a foreign partner?	Clean Tech	28.0%	72.0%	Does your firm have a unit or human resources dedicated to innovation?	12.0%	88.0%
	ICT	15.4%	84.6%		20.8%	79.2%
	Medical Services	6.0%	94.0%		20.2%	79.8%
	Life Science	17.0%	83.0%		23.9%	76.1%

Note: Clean Tech (n = 100), ICT (n = 159 - 162), Medical Services (n = 84), Life Science (n = 88).

The Clean Tech sector performs well regarding the implementation of new marketing approaches and introduction of innovative organizational structures as the top scorer on this component. The Clean Tech sector also over-performs when it comes to entering into joint ventures with foreign partners compared to the other sectors. However, it is worth noticing that only 12% of Clean Tech businesses have human resources dedicated to innovation, which is significantly lower than the other sectors. It could be an effect of innovation in organizational practices and marketing approaches, so that innovation is much more embedded in the firms as a whole and that customers play a role in market-driven innovation strategies.

Innovation outcomes

This component is closely related to the previous component on actions to improve innovation performance. The innovation outcomes component covers aspects such as development of new product lines or new services, development of prototypes or proofs of concept, and patent applications. It furthermore comprises actions regarding investment in new technology leading to substantial changes in production processes.

The overall score on innovation outcomes is rather low at 2.33. The ICT sector outperforms the other sectors with a score of 2.69, with especially the Medical Services sector lacking behind with 2.06. Table 25 provides a more detailed overview of this component.

A limited number of businesses across all four sectors have applied for a patent. This deflates the overall scores on the innovation outcomes component. Even though the number of patents taken is an aspect indicator of innovation outcome, it is not relevant when it comes to, e.g., market or service innovation. In other words, if the extent of patent applications, which will score low in many countries, is disregarded, the overall innovation performance will be at a higher level. Furthermore, the Medical Services component score is deflated as very few businesses have completed any new prototypes or proofs of concepts, which is most likely of less relevance in the Medical Services

sector unless collaborations are established with, e.g., medico-tech companies. Interestingly, the ICT and Medical Services sectors have acquired new technologies that have substantially changed production or services processes, which is not so much the case for Clean Tech and the Life Science sectors. It is more common for businesses across all sectors to develop new services compared to new product lines.

Table 25: Detailed composition of the ‘innovation outcomes’ component

Innovation outcomes	Sector	Yes	No		Yes	No
In the past two years, has your firm developed a new product line that is new to the market?	Clean Tech	31.0%	69.0%	In the past two years, has your firm developed a significant new service?	42.0%	58.0%
	ICT	36.0%	64.0%		46.6%	53.4%
	Medical Services	21.4%	78.6%		41.7%	58.3%
	Life Science	18.2%	81.8%		45.5%	54.5%
In the past two years, has your firm completed any new prototypes or proofs of concept?	Clean Tech	19.0%	81.0%	In the past two years, has your firm applied for a patent?	2.0%	98.0%
	ICT	24.7%	75.3%		4.3%	95.7%
	Medical Services	2.4%	97.6%		0.0%	100.0%
	Life Science	20.5%	79.5%		2.3%	97.7%
In the past two years, has your firm acquired new technology that changed the prod. of the main product or allowed prod. of new products?	Clean Tech	18.0%	82.0%			
	ICT	28.0%	72.0%			
	Medical Services	22.6%	77.4%			
	Life Science	15.9%	84.1%			

Note: Clean Tech (n = 100), ICT (n = 161 - 162), Medical Services (n = 84), Life Science (n = 88).

External innovation collaboration

A way to boost innovation capacity is to engage in innovation collaboration with external entities such as universities or other companies. This component captures the extent to which businesses engage in applied R&D and innovation activities with universities or science institutes, or collaborative R&D and innovation with other businesses in the sector. With a mean score of 1.91 for all sectors, external innovation collaboration is the component that presents the lowest score under the innovation capacity indicator.

The Clean Tech and ICT sectors perform slightly better than the two other sectors, but the scores are low for all sectors indicating that external innovation collaboration is limited. The level of collaboration with other businesses within the cluster is slightly more common than engaging in applied R&D collaboration with universities. Increased external collaboration on innovation could strengthen the innovation capacity as it can give access to more developed R&D infrastructures, important specialist skills and open up for increased technology transfer. However, it requires that universities have an industrial orientation in their R&D efforts focusing on R&D collaboration that leads to value added innovation. International experiences show that networking on R&D and innovation themes of common interest to businesses and universities can be a way to stimulate collaboration. Several European countries have also developed industrial PhD programmes with the aim of strengthening public-private partnerships.

R&D enabling environment

The presence of an R&D enabling environment is key to promoting increased innovation by nurturing innovation capacity in businesses. This component addresses different aspects that contribute to an R&D enabling environment, such as the quality of research institutions and an assessment of businesses' overall capacity to innovate. A separate question on the availability of engineers and scientists who can generate new technical innovation is included for the Clean Tech cluster.

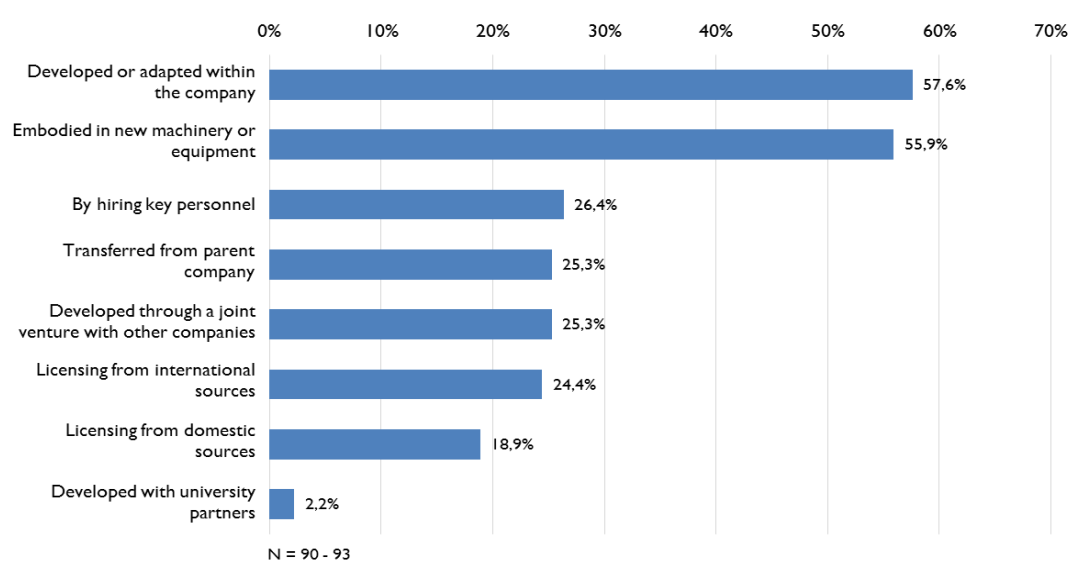
With an overall component score of 3.41, the general picture is that an enabling R&D business environment is in place especially for the Clean Tech sector, which performs markedly better than the other sectors on this component. However, it is interesting that the survey companies assess the general innovation capacity of the companies in their industry to be very high. This rather high self-assessment inflates the overall component scores for all sectors. However, when assessing the overall quality of research institutions, the survey companies indicate that the overall quality of research institutions is rather poor. In other words, when asking the businesses they indicate that their internal innovation capacity is high and that most barriers to increased innovation performance are external, such as the possibilities for external knowledge cooperation. However, businesses in the Clean Tech sector assess that the supply of engineers and scientists who can generate new technical innovation and facilitate technology transfer is more or less sufficient. This is also the main reason that the Clean Tech sector performs significantly higher than the other sectors.

Acquisition and impact of new technologies

Among all the surveyed companies, only around 22% had acquired new technology that had substantially changed their production processes during the past two years. These companies were then asked how they had acquired this new technology. Figure 5 shows that technology developed or adapted within the company and technology that is embodied in new machinery or equipment are by far the most common sources of new technology across all sectors. Hiring of key personnel, technology transfer from a parent company, joint ventures with other companies and licensing from international sources are also important sources of acquiring new technology. Collaboration with university partners to develop new technology plays a limited role.

The results presented in Figure 5 are for all sectors, as only a limited number of companies had acquired new technology during the past two years. Consequently, breaking the results down to individual sectors would give sector-specific results with very low reliability.

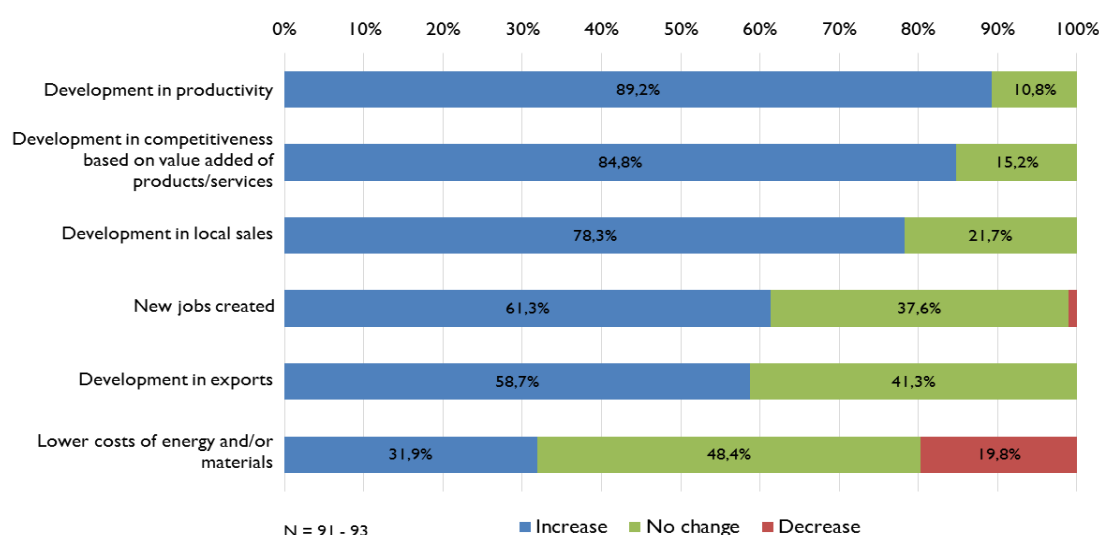
Figure 5: Ways of acquiring new technology



Note: N = 90 - 93. Only companies who have stated that they have acquired new technology over the last two years have been asked how the technology was acquired. Consequently, only the total for all sectors are shown in the figure.

Introducing new technology has the potential to support the innovation capacity of a business and accelerate its innovation performance and productivity. The companies that had acquired new technology were asked to assess the impact of the introduction of new technology. The outcomes are presented in Figure 6.

Figure 6: Impact of new technology



Note: N = 91 - 93. Only companies who have stated that they have acquired new technology over the last two years have been asked about the impact of the new technology. Consequently, only the total for all sectors are shown in the figure.

The most positive outcomes from the introduction of new technology are seen in productivity and competitiveness based on increased value added of products, where close to 90% of the companies experienced an increase. This is positive because such results can improve export opportunities and performance. In general, the introduction of new technologies has had positive effects for most companies on a range of performance indicators. For example, in terms of job creation, more than 60% of the companies have been able to create new jobs due to the introduction of new technologies. Quite surprisingly, 20% of the companies indicate that they have experienced an

increase in the cost of energy and materials due to the introduction of new technology. Whether this is due to inefficient use of the new technologies or it is due to a general increase in the price of raw materials, or whether there other factors are at play remain an open question.

CLUSTER NETWORKS

JCP has adopted a cluster development approach¹ to improving the competitiveness of its target sectors. JCP was designed to promote simultaneously the private sector's sense of ownership regarding a set of transformative initiatives while also helping public and private sector stakeholders to collaborate on addressing specific enablers to create a competitive environment (JCP, 2015). Consequently, the cluster networks indicator measures the progress of the JCP cluster development approach. It combines a measure of the organized efforts to support the development of the clusters (cluster support) with a measure of how internally interconnected the clusters are, i.e., the depth of the clusters.

Table 26 shows the two components broken down by target sectors as well as the overall cluster networks indicator.

Table 26: Cluster networks indicator- and component scores

Sector	Components – Cluster Networks		Overall – Cluster Networks
	Cluster support	Cluster network development	
Clean Tech	3.90	5.02	4.18
ICT	2.69	5.16	3.40
Medical Services	3.08	5.25	3.70
Life Science	2.92	5.64	3.70
All sectors	3.15	5.27	3.74

Note: Clean Tech (n = 99 - 100), ICT (n = 160), Medical Services (n = 84), Life Science (n = 88). The indicator scores for all sectors are calculated as the arithmetic mean of the sector indicator scores so that the individual sector scores have equal weight.

The mean score on a 7-point Likert scale is 3.74 with some minor variations between the four sectors. From a cluster approach perspective, the survey data show that the most developed cluster is the Clean Tech sector, while the ICT sector seems to be more fragmented in terms of its cluster features. Table 26 shows that the surveyed companies have assessed the availability and value of the cluster support and the cluster quite differently. We go into more detail about the two components in the following sections.

Cluster support

The cluster support component is composed of six survey questions that are all based on the 7-point Likert scale. One of the questions concerns the Clean Tech sector only.

Table 27 shows the companies' assessment of the six questions broken down by sector.

¹ For a discussion about the advantages of business clusters see: <http://www.ecgroup.com/methodology/cluster.htm>.

Table 27: Detailed composition of the ‘cluster support’ component

Cluster support	Sector	1	2	3	4	5	6	7
To what extent are the right support services available for your industry, such as research and qualified consultants?	Clean Tech	17.0%	10.0%	8.0%	32.0%	17.0%	14.0%	2.0%
	ICT	50.0%	20.0%	9.4%	13.8%	4.4%	2.5%	0.0%
	Medical Services	31.0%	3.6%	14.3%	21.4%	15.5%	13.1%	1.2%
	Life Science	43.2%	2.3%	9.1%	11.4%	15.9%	13.6%	4.5%
In your industry, to what extent are good quality supporting services provided by business-to-business associations and other organizations?	Clean Tech	20.0%	8.0%	14.0%	25.0%	23.0%	7.0%	3.0%
	ICT	45.6%	14.4%	10.0%	16.2%	11.2%	1.9%	0.6%
	Medical Services	41.7%	6.0%	7.1%	22.6%	10.7%	11.9%	0.0%
	Life Science	43.2%	9.1%	9.1%	21.6%	10.2%	6.8%	0.0%
To what extent are you engaged in strategic cooperation with firms within the cluster?	Clean Tech	6.0%	4.0%	5.0%	26.0%	29.0%	23.0%	7.0%
	ICT	16.9%	15.6%	16.2%	12.5%	16.2%	13.8%	8.8%
	Medical Services	23.8%	8.3%	9.5%	6.0%	14.3%	22.6%	15.5%
	Life Science	23.9%	5.7%	6.8%	9.1%	22.7%	17.0%	14.8%
To which degree do the supporting knowledge institutions facilitate strategic cooperation between businesses in the cluster?	Clean Tech	29.0%	10.0%	8.0%	32.0%	16.0%	2.0%	3.0%
	ICT	46.9%	18.8%	6.9%	15.0%	10.0%	1.9%	0.6%
	Medical Services	35.7%	9.5%	15.5%	22.6%	7.1%	7.1%	2.4%
	Life Science	43.2%	2.3%	15.9%	14.8%	19.3%	3.4%	1.6%
To what extent are you aware of the availability of a clear and unified strategy for growth of your industry as a whole?	Clean Tech	25.0%	7.0%	9.0%	26.0%	13.0%	9.0%	11.0%
	ICT	38.8%	7.5%	7.5%	30.0%	6.2%	6.2%	3.8%
	Medical Services	60.7%	6.0%	8.3%	7.1%	10.7%	6.0%	1.2%
	Life Science	70.5%	3.4%	8.0%	6.8%	8.0%	3.4%	0.0%
In your industry, to what extent are potential investors of CT and customers aware of the benefits, technologies and basic information about CT?	Clean Tech	2.0%	6.1%	7.1%	35.4%	27.3%	15.2%	7.1%
	ICT	-	-	-	-	-	-	-
	Medical Services	-	-	-	-	-	-	-
	Life Science	-	-	-	-	-	-	-

Note: Clean Tech (n = 99 - 100), ICT (n = 160), Medical Services (n = 84), Life Science (n = 88).

The general picture is that companies in the ICT, Medical services and Life Science sectors indicate that there is no good quality support and collective services in place. Similarly, in particular the ICT and Life Science sectors, a relatively large number of respondents indicate that knowledge institutions to a limited extent support strategic cooperation within the sector with a view to further development of the sectors' cluster potential. The Clean Tech sector stands out and seems to have more well-functioning and well-known cluster support initiatives and mechanisms. The relative maturity of the Clean Tech sector compared to the other target sectors is seen throughout the survey scores. Interestingly enough, there is no indication that companies located in Amman

have a higher degree of support than companies outside Amman do, since it could be expected that there would be a more varied level of business support services in the Jordanian capital. On the positive side, there are some indications of engagement in strategic cooperation between companies in all four sectors because the internal strategic cooperation between firms is key to developing a strong cluster. In Denmark, the Danish Agency for Science, Technology and Innovation recently published a cluster strategy, which is also available in English.²

Asked directly, if there are services missing that the companies believe are central to competitiveness and growth, more than 40% of the companies provide an affirmative answer though with marked differences between the sectors. Table 28 shows the distribution of answers by sector.

Table 28: Are there services missing that are central to competitiveness and growth?

Sector	Yes	No
Clean Tech	35%	65%
ICT	54%	46%
Medical Services	25%	75%
Life Science	48%	52%
All sectors	43%	57%

Note: All clusters (n = 432), Clean Tech (n = 100), ICT (n = 160), Medical Services (n = 84), Life Science (n = 88).

More than half of the companies in the ICT sector indicate that they miss services central to competitiveness and growth. The corresponding share for companies in the Medical Services is 25%. The character of the demanded services varies substantially. Some of the most demanded common services are financial or legal support, e-marketing and promotion, human resources and support to enter new markets. These are typical support services provided by cluster support organizations.

Cluster network development

The cluster development component is composed of two survey questions that focus on the development of business relationships. The companies were asked to assess the number of business relationships in the past year – both with Jordanian companies and foreign companies.

Table 29: Detailed composition of the 'cluster network development' component

Cluster support	Sector	Increased	Decreased	No change
In the past year, has the number of business relationships between your firm and other domestic firms increased, decreased or has there been no change?	Clean Tech	51.0%	14.0%	35.0%
	ICT	53.8%	11.9%	34.4%
	Medical Services	59.5%	4.8%	35.7%
	Life Science	70.5%	5.7%	23.9%
In the past year, has the number of business relationships between your firm and foreign firms increased, decreased, or has there been no change?	Clean Tech	41.0%	10.0%	49.0%
	ICT	39.4%	3.8%	56.9%
	Medical Services	28.6%	0.0%	71.4%
	Life Science	48.9%	4.5%	46.6%

Note: Clean Tech (n = 100), ICT (n = 160), Medical Services (n = 84), Life Science (n = 88).

² <http://ufm.dk/en/publications/2013/strategy-for-denmarks-cluster-policy>.

With a mean score of 5.27, the general picture is that the cluster network development is in a positive process. Especially the business relationships with domestic firms have increased in the past year for a majority of companies in all sectors. Turning to the development of business relationships with foreign companies, the picture is more mixed. However, it still shows a positive development, particularly because the Jordanian home market is relatively small, collaboration with foreign businesses is central to technology and knowledge diffusion, and it provides opportunities for Jordanian firms to engage in new markets.

Text box 1: Definition of clusters

Cluster definition

Clusters are defined as 'groups of companies and institutions co-located in a specific geographic region and linked by interdependencies in providing a related group of products and/or services' (Porter, 1990; Porter, 1998a; Porter, 1998b). Clusters are a natural manifestation of the specialised knowledge, skills, infrastructure and supporting industries in enhancing productivity as the key determinant of sustaining high levels of prosperity in a location. A combination of supplier relations, common labour markets, rivalry, knowledge spillovers and learning effects, affect the economic environment that companies face in clusters.

Source: C. Ketels (2008), 'From clusters to cluster-based economic development'.

Lessons from the German cluster bodies show that cluster formation can bring opportunities even for small firms to tap into global value chains as a development partner, because cluster formation overcomes limitation of size. Moreover, the typical complementary profile of businesses in a cluster provides an added value to global specialized trade. Experience from the Danish innovation network initiative, which funds 22 innovation networks and a secretariat for each, shows that regular seminars and interventions, which are defined and developed in close cooperation with the involved businesses, is a way to strengthen latent clusters. It is also a mechanism that can facilitate collaboration with knowledge providers on joint innovation projects.

FEMALE TALENT

The ability to attract, promote and retain female talent is very likely to be one of the key factors for competitiveness and growth. The entire MENA region has made significant progress in reducing the gender gap in human development recently. However, according to World Bank data, the labour force participation rate for women is only 16% in Jordan, and the participation rate has remained unchanged for more than 10 years (World Bank, 2015). In Jordan, where female participation rates in the labour force continue to be low, entrepreneurship can offer new opportunities for women to generate their own income and support their families accordingly. Furthermore, numerous studies have shown that there is often a direct link between gender diversity in a company and business success. Hence, one of the key objectives of the JCP is attracting, promoting and retaining female talent to the four target sectors.

Female employees

Table 30 shows the share of female employees in the surveyed companies broken down by sector. The table shows both full-time and part-time employees as well as the share of female technical employees and female top managers.

Table 30: Share of female employees

Sectors	0%	Up to 10%	Between 11% and 20%	Between 21% and 50%	More than 50%
Female share of full-time employees					
Clean Tech	24%	11%	20%	36%	9%
ICT	19%	11%	21%	39%	10%
Medical Services	6%	0%	1%	38%	55%
Life Science	22%	2%	18%	44%	14%
All sectors	18%	7%	16%	39%	19%
Female share of part-time employees*					
Clean Tech	46%	0%	8%	12%	35%
ICT	52%	0%	0%	17%	31%
Medical Services	48%	0%	0%	33%	19%
Life Science	72%	0%	11%	11%	6%
All sectors	53%	0%	4%	18%	25%
Female share of technical employees					
Clean Tech	85%	0%	3%	11%	1%
ICT	52%	2%	12%	29%	5%
Medical Services	14%	2%	3%	32%	50%
Life Science	60%	0%	9%	19%	12%
All sectors	53%	1%	7%	23%	16%
Female share of top managers					
Clean Tech	55%	3%	4%	33%	5%
ICT	72%	0%	4%	22%	3%
Medical Services	51%	1%	10%	29%	10%
Life Science	58%	1%	6%	30%	6%
All sectors	61%	1%	6%	27%	5%

Note: All clusters (n = 94 - 432), Clean Tech (n = 26 - 100), ICT (n = 29 - 163), Medical Services (n = 21 - 83), Life Science (n = 18 - 88).

* In general, substantially fewer responses to female share of part-time employees, as few companies have indicated that they have either male or female part-time employees. Thus, the share of female part-time employees across sectors should be interpreted with caution.

In general, the surveyed companies are male-dominated. Almost one out of five companies has no female employees at all. Looking at the share of female technical staff and female top managers, the lack of gender diversity is even more pronounced. The companies in the Medical Services sector are less male-dominated. Half of the surveyed companies within this sector even have a majority of

female employees, including technical employees. The survey sample also includes a few companies run by women alone.

It is also worth noting that more than half of the companies with part-time employees have no women among their part-time staff. This is interesting as women are often looking for companies that provide flexibility. In general, women are employed part-time more frequently in companies in the United States and Europe. In Europe, data clearly show that female full-time labour market participation rates are highly impacted by regulation on maternity/paternity leave and the availability, quality and costs of early childhood care and education.

Training of female talent

As described in the workforce quality section, approx. 40% of the companies offer training hours to their technical staff, including skilled workers, technicians and professionals. For these companies it is interesting to look into how these training hours are distributed among the employees from a gender perspective.

Table 31: Female/Male in training ratio

Sector	Male preferential treatment	Balanced treatment	Female preferential treatment
Clean Tech	59%	13%	28%
ICT	33%	12%	55%
Medical Services	44%	38%	19%
Life Science	55%	28%	18%
All sectors	47%	21%	33%

Note: Clean Tech (n = 46), ICT (n = 58), Medical Services (n = 32), Life Science (n = 40). The ratio is calculated as the share of training hours that goes to females in the company. If the ratio is below 0.8 there is a male preferential treatment, if the ratio is between 0.8 and 1.20 there is a balanced treatment and if the ratio is above 1.20 there is a female preferential treatment.

It is evident from Table 31 that there is male preferential treatment when it comes to training, as 47% of the companies offered relatively more training hours to their male employees. However, in the ICT sector the situation is different, as 55% of the companies actually train their female employees relatively more than they do their male employees. This could be an asset for this sector in the struggle to improve their workforce's quality and to attract female talent in the future.

Access to finance for completely and partially women-owned companies

Access to financing is one of the biggest obstacles to growth, if not the most problematic factor at all for doing business in Jordan as indicated by the surveyed firms in the JCP survey as well as the WEF Competitiveness report. Among the 438 surveyed companies in the JCP survey, 20 companies are completely women-owned and 111 companies are partially women-owned. Table 32 shows how fully or partially women-owned companies assess access to finance:

Table 32: Access to finance for completely- and partially women-owned companies

Sector	Very difficult	Rather difficult	Rather easy	Very easy
Clean Tech	6 %	6 %	55 %	33 %
ICT	27 %	23 %	42 %	8 %
Medical Services	0 %	8 %	14 %	78 %
Life Science	6 %	6 %	32 %	56 %
All sectors	9 %	10 %	35 %	47 %

Note: All clusters (n = 129), Clean Tech (n = 33), ICT (n = 26), Medical Services (n = 36), Life Science (n = 34). Responses were given at a 1 to 7 Likert scale. 1 = Very difficult, 2 and 3 = Rather difficult, 4 and 5 = Rather easy, 6 and 7 = Very easy.

80% of the completely or partially women-owned companies find it rather easy or very easy to access finance. As opposed to the general picture of access to finance in Jordan, women-owned businesses within the JCP target sectors tend to be more successful in attracting or gaining access to finance. A study on female entrepreneurship in Jordan published in 2007 showed that female entrepreneurs largely made use of *friendly capital*, i.e. their own capital or family financial sources (IFC, The Center of Arab Women for Training and Research, 2007).

There are no statistical significant differences between completely women-owned companies and partially women-owned companies in terms of access to finance. However, there are statistical significant differences between the sectors. As shown in Table 32, 27% of the women-owned or partially women-owned businesses in the ICT sector find it very difficult to gain access to finance.

Female entrepreneurs

According to the World Bank, female-run enterprises are growing all over the world. However, women also are confronted with obstacles that prevent potential female entrepreneurs in actualizing their business ideas. Some barriers are general to all entrepreneurs, while others may be gender specific. Lack of capital is often an obstacle, even if this does not appear to be particularly the case in Jordan. Social constraint is another obstacle to female entrepreneurship that is mentioned often. Due to family responsibilities, women may have less time to devote to starting up a business, particularly if public childcare and care of the elderly is not available. The study on female entrepreneurs in Jordan showed that the biggest challenge facing women business owners in Jordan at that time was balancing work and family life. As part of the JCP survey, the companies in each sector were asked to assess the development in the number of female entrepreneurs in the industry. Table 33 shows the assessment of the development of female entrepreneurs broken down by sector.

Table 33: Development in the number of female entrepreneurs in the past year

Sector	Increase	Decrease	No change	Don't know
Clean Tech	31 %	1 %	16 %	52 %
ICT	41 %	4 %	25 %	30 %
Medical Services	30 %	0 %	24 %	46 %
Life Science	10 %	3 %	38 %	49 %
All clusters	30 %	3 %	25 %	42 %

Note: All clusters (n = 433), Clean Tech (n = 100), ICT (n = 161), Medical Services (n = 84), Life Science (n = 88).

A majority of the surveyed companies did not have a sufficient overview of the market to answer this question, which limits the number of answers significantly. 30% of the surveyed companies found that the number of female entrepreneurs had increased in the past year. Only 3% though otherwise. Especially in the ICT sector, the number of female entrepreneurs has increased significantly according to the respondents. In general, the ICT sector is a sector with a lot of entrepreneurs and one-man (one-woman) businesses.

If it is a policy objective to promote entrepreneurship as a whole or female entrepreneurship more specifically, indicators can be a useful to target and prioritize policy interventions.

A study was published in 2015 on the state of entrepreneurship as a whole in Jordan. It concludes that one of the biggest barriers to entrepreneurship in Jordan is the perceived risk of failure. Secondly, the study concludes that unless the quality (and quantity) of entrepreneurship improves, the likely impact of Jordanian entrepreneurship, especially female entrepreneurship, will remain centred around poverty reduction (Omet, Sham, Bino, & Khalaf, 2015).

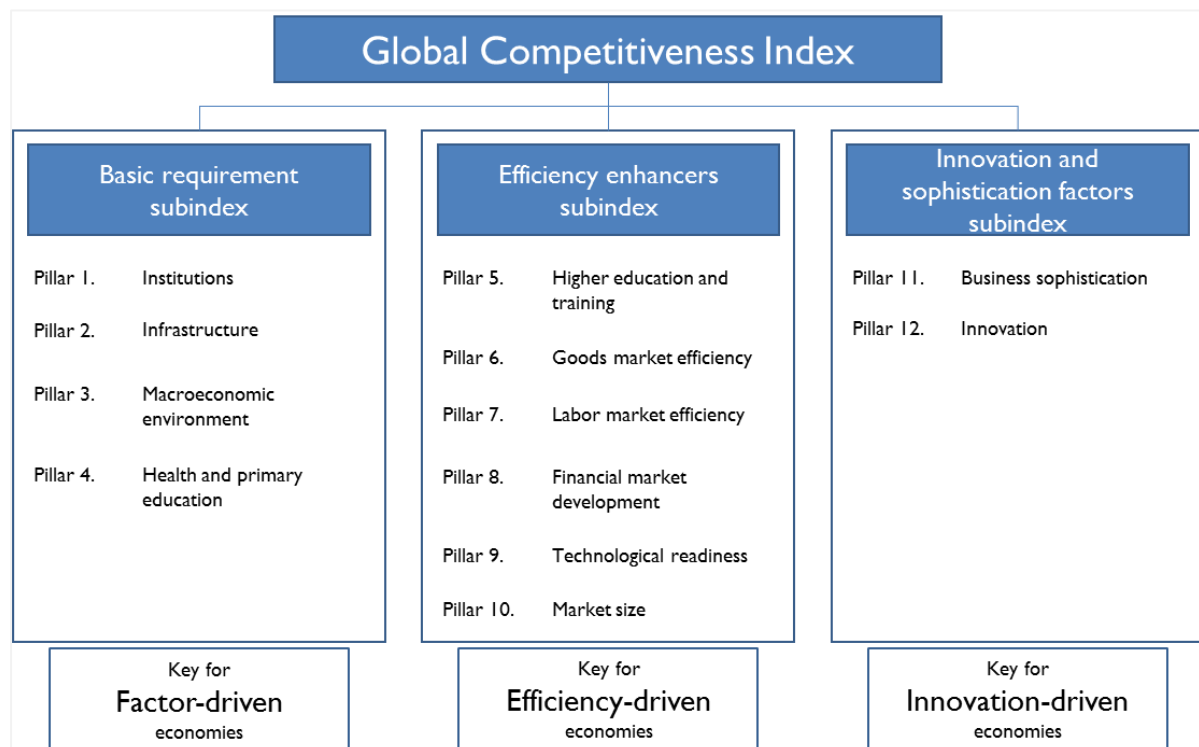
SITUATING FINDINGS

WEF COMPETITIVENESS SURVEY – A JCP PERSPECTIVE

The World Economic Forum's Global Competitiveness Index measures the overall competitiveness of 140 economies in the world.

The index is constructed based on 12 pillars, which in turn are constructed based on 114 indicators:

Figure 7: The WEF Global Competitiveness Index framework



Note: Replicated from WEF (2015), 'The Global Competitiveness Report 2015-2016'.

The Global competitiveness survey combines publically available comparable data with survey data from businesses. The survey sampling methodology is defined by WEF to ensure that the surveyed companies mirror the economy in terms of sector composition and size of firms.

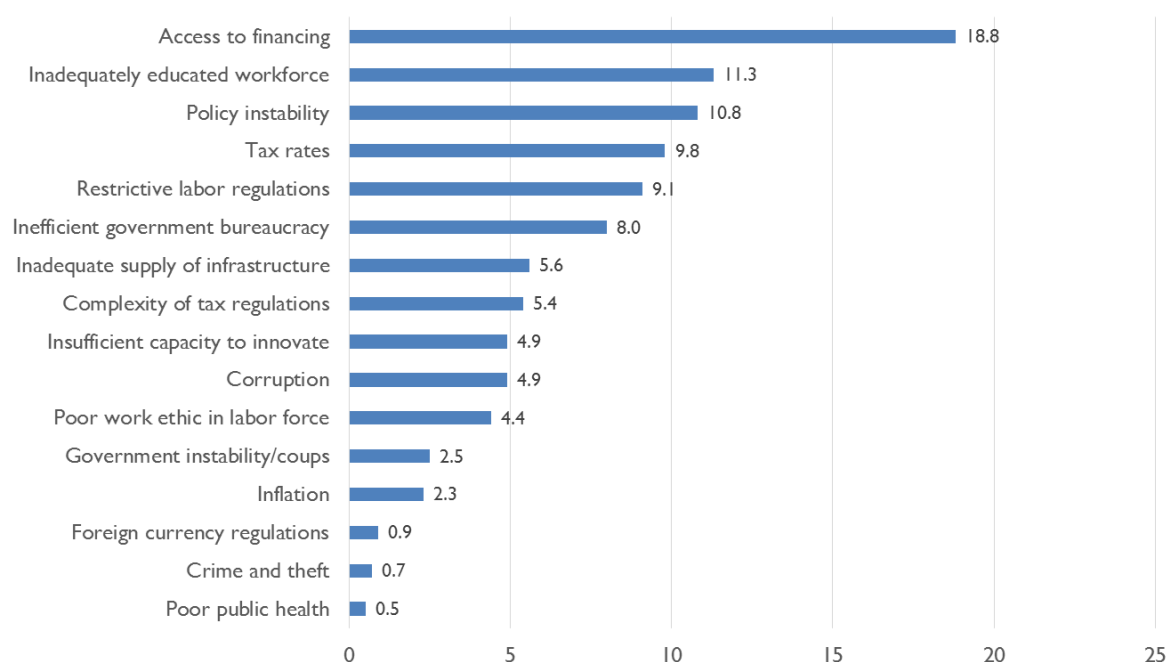
In the 2015/2016 survey, Jordan was placed 64th out of the 140 participating countries, i.e. in the better performing middle half. In a regional perspective, Jordan is placed in the middle. The rating looks as follows:

Table 34: Global Competitiveness Index ranking – Selected countries

Country	GCI Ranking
Qatar	14
UAE	17
Saudi Arabia	25
Kuwait	34
Bahrain	39
Oman	62
Jordan	64
Morocco	72
Iran	74
Algeria	87
Tunisia	92
Lebanon	102

Source: WEF (2015), 'The Global Competitiveness Report 2015-2016'.

Companies have been asked to assess the five most problematic factors for doing business, and the responses largely mirror the responses in the survey. The Global Competitiveness Survey provides the following results with financing, an inadequately educated workforce, and policy instability being the three most important barriers:

Figure 8: The most problematic factors for doing business in Jordan

Source: WEF (2015), 'The Global Competitiveness Report 2015-2016'. See the GCI country profile for Jordan for more details.

Indicators regarding the institutional environment, infrastructures, the macroeconomic environment and health and primary education are combined in one composite indicator, basic requirements where Jordan is at a 75th place. It is worth noting that the burden of government regulation is scored high at a 28th place, which mirrors the reforms that Jordan has undergone in recent years. Efficacy of cooperate boards are, on the other hand, at a 88th place. Inflation is low, but otherwise the assessment of the macroeconomic environment is lower in the other indicators than the 64th place of Jordan.

Jordan is a so-called efficiency driven economy. As countries advance the most important challenge becomes their ability to make connections to international production systems to attract foreign direct investments, and to do so the quality of the higher education system, the efficiency of the labour market, financial market, goods market efficiency and technological readiness become critical factors.

The overall score is at 67 with higher education and training and goods market efficiency at respectively at a 50th and 39th place; labour market efficiency at a 93th place, financial market development at a 71st place and technological readiness at a 76th place.

When it comes to innovation sophistication factors Jordan scores high at a combined 40th place with both business sophistication and the 12th pillar innovation at a score of 40.

Whereas the assessment of business sophistication largely mirrors the Jordanian companies' assessment, e.g., with regard to cluster cooperation in the JCP survey, the JCP survey data on the innovation environment, particularly with regard to industry university cooperation, are scored lower than in the WEF survey, where university industry R&D cooperation is at 52nd place.

A relatively high overall score is given to innovation performance in the WEF survey. It could be that there is a bit of a bias in the JCP survey as companies see the survey as a way to get a voice in the measures taken to improve sector competitiveness through the JCP, whereas the WEF survey could be perceived more as having a benchmark character.

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APPENDICES

APPENDIX I: LIST OF SURVEY QUESTION

Question	Label
Q1	Is your company's main office located outside Jordan?
Q1_if_yes	If yes, in which country?
Q2	If no, in which governate in Jordan?
Q3	Does your company have offices or facilities outside Amman in Jordan?
Q4	Does your company have offices or facilities in any other countries?
Q5	In the past year, has your company participated in JCP sponsored activities?
Q6	What was the company revenue in the past year?
Q7	In the past year, how was the development in revenue in domestic markets?
Q8	In the past year, how was the development in overall revenue (domestic and foreign)?
Q9	In the past year, what percentage of revenue came from export?
Q10	Which countries did your company export to?
Q11	In the past year, did your company enter new geographical markets?
Q11_if_yes	If yes, which countries?
Q12	Only HLS: Have you attracted new patients from new countries?
Q12_if_yes	If yes, which countries?
Q13	What is the total number of full time employees in your company?
Q14	What is the total number of male full time employees?
Q15	What is the total number of female full time employees?
Q16	What is the total number of male part time employees?
Q17	What is the total number of female part time employees?
Q18	What is the total number of male top managers?
Q19	What is the total number of female top managers?
Q20	What is the total number of male technical staff?
Q21	What is the total number of female technical staff?
Q22	In the past year, how was the development in number of employees at your company?
Q23	In the past year, how was the development in the productivity of employees?
Q24	In the past year, what percentage of revenue was spent on R&D?
WF1	To what extent are you able to recruit newly educated skilled workers and technicians with the skills you need?
WF2	Only CT: To what extent are you able to recruit newly educated skilled engineers with the skills you need?
WF3	To what extent does your firm have policies and practices in place that are successful at attracting and retaining innovative technical staff?
WF4	To what extent are there policies and practices in place in your company to attract, promote and retain female talent?
WF5	To what extent is it difficult to fill job openings that are critical to your company's growth and have remained vacant for more than 6 months?
WF6	To what extent do Jordanian education and training providers offer specialized technical and vocational training in your field?
WF7	To what extent does your firm invest in staff training to improve your firm performance?
WF8	Do you have a budget for human resource development?
WF8_if_yes	If yes, how much?
WF9	How many man hours of training do you offer to technical staff annually (skilled workers, technicians, professionals)?
WF9_female	What percentage of these training hours go to women?
WF10	To what extent is your company involved in cooperation with universities?
WF11	Only HLS: To what extent do hospitals offer skills development programs related to medical tourism in collaboration with the tourism or hospitality industries?
SE1	Is it burdensome for companies in your industry to comply with government regulations, requirements and procedures?
SE2	To what extent is the process of obtaining government permits and approvals for business operations clear and straightforward to follow?

SE3	In the past year, have any legal or regulatory changes improved business conditions for your industry?
SE4	To what extent are there proper incentives and conditions for growth and innovation in your industry?
SE5	What is your knowledge of formal programs that support research and innovation in your sector?
SE6	In your opinion, how useful are these formal research and innovation programs in supporting innovation in your sector?
SE7	To what extent do you believe that policy reforms implemented in the past year are conducive to firm innovation and competitiveness and reflect the needs and voices of industry?
SE8	How confident are you that government agencies have sufficient resources and internal capacity to implement the legislative framework (such as building code) to boost your industry the sector?
SE9	To what extent are business associations and other key sector players cooperating with governmental agencies in the implementation of the legislative framework (such as building code)?
SE10	Have you experienced any major barriers to export in the past year?
SE10_if_na	If No or NA, have you tried to export during the previous year?
SE10_a	Rank export barrier: Take advantage of the export promotion programs, available from government agencies or donors?
SE10_b	Rank export barrier: Lack of trade promotion schemes relevant to my industry?
SE10_c	Rank export barrier: Lack of trade finance?
SE10_d	Rank export barrier: Difficulties identifying potential markets and buyers?
SE10_e	Rank export barrier: Difficulties in meeting quality?
SE10_f	Rank export barrier: Difficulties in meeting quantity?
SE10_g	Rank export barrier: High cost or delays caused by domestic infrastructure?
SE10_h	Rank export barrier: Lack of external expert advice knowledgeable about my industry and relevant markets?
SE10_i	Rank export barrier: Technical requirements and standards abroad?
SE10_j	Rank export barrier: Rules of origin requirements abroad?
SE10_k	Rank export barrier: Tariff barriers abroad?
SE10_l	Rank export barrier: Lack of information on how to comply with international rules on IPR?
SE11	How intense is competition in the local markets within your industry?
SE12	How effective are anti-monopoly policies in ensuring fair competition?
SE13	To what extent does the quality of the overall business environment represent obstacles to growth and competitiveness of your firm?
SE13_a	Rank obstacle: Access and stability of ICT infrastructure?
SE13_b	Rank obstacle: Effective deployment of ICT?
SE13_c	Rank obstacle: Transportation infrastructure?
SE13_d	Rank obstacle: Access to development capital?
SE13_e	Rank obstacle: Protection of Intellectual Property Rights (IPR)?
SE13_f	Rank obstacle: Relevance of skills of new university graduates?
SE13_g	Rank obstacle: Relevance of skills of new technicians and skilled craftsmen?
SE13_h	Rank obstacle: Regulation specific to your industry?
SE13_i	Rank obstacle: Policies regarding trade?
SE13_j	Rank obstacle: Innovation policies?
SE13_k	Rank obstacle: Access to state of the art technology in your industry?
SE13_l	Rank obstacle: Access to state of the art knowledge relevant to the industry?
SE13_m	Rank obstacle: Ability to attract foreign direct investment?
SE13_n	Rank obstacle: Internal innovation capacity in the company workforce?
SE13_o	Rank obstacle: Policies and practices to attract, promote and retain female talent?
AF1_a	In the past year, did your firm receive any equity investment from foreign sources?
AF1_b	If yes, how much?
AF2_a	In the past year, did your firm receive any equity investment from domestic sources?
AF2_b	If yes, how much?
AF3_a	In the past year, did your firm receive a bank loan?
AF3_b	If yes, how much?
AF4_a	In the past year, did your firm receive a grant?
AF4_b	If yes, how much?
AF5_a	Has your firm successfully applied for funds for a public R&D and Innovation Scheme?
AF5_b	If yes, what is the nature of the scheme
AF6_a	In the past year, did your firm receive a guarantee on a bank loan from a loan guarantee program?
AF6_b	If yes, how much?
AF7	To what extent is investment available for the start-up of new firms in your industry?
AF8	To what extent are you ready to meet investors' or banks' requirements in order to obtain financing from them?

AF9	How aware are you about available potential financing sources. (For example equity investment, bank loans, loan guarantees provided by a bank or government, grants)?
AF10	In the last 12 months, has your industry association, municipality where your business is located, or your local bank branches sponsored any events or workshops to raise awareness about potential financing sources available for your business?
AF11	Is the company women-owned to some degree?
AF11_if_yes	If Yes, please comment on how easy is it to gain access to finance in your industry?
AF12	Only CT: To what extent are enterprises aware of available bank financing and loan guarantee programs for Clean Tech projects?
AF13	Only CT: To what extent are financiers and investors aware of the efficiency and cost savings available from Clean Tech?
AF14	Only CT: In the last 12 months, has your industry association, municipality where your business is located, or your local bank branches sponsored any events or workshops to raise awareness about the benefits of Clean Tech for your business?
BA1	How would you assess the overall entrepreneurial and risk taking behavior in your industry?
BA2	In the past year, did your firm invest in measures to improve the quality of products and services?
BA3	In the past year, did your firm increase the volumes of products or services produced due to an increased demand?
BA4	In the past year, did your firm produce new products or services for export?
BA5	In the past year, did your firm increase the revenue from exports/foreign clients?
BA6	To what extent does the sector provide the sufficient facilities/services for entrepreneurs?
BA7	Only HLS: In the past year, did patient outcome measures and satisfaction rates improve as a result of your services?
BA8	In the past year, did the number of female entrepreneurs in your industry increase, decrease, no change?
IC1_a	Has your firm undertaken the following activity in the past two years - Developed a new product line, new to the market?
IC1_b	Has your firm undertaken the following activity in the past two years - Developed a significant new service?
IC1_c	Has your firm undertaken the following activity in the past two years - Implemented new marketing approaches?
IC1_d	Has your firm undertaken the following activity in the past two years - Invested significantly in ICT enabled innovation?
IC1_e	Has your firm undertaken the following activity in the past two years - Invested in new production infrastructure?
IC1_f	Has your firm undertaken the following activity in the past two years - Introduced organizational innovations to improve agility?
IC1_g	Has your firm undertaken the following activity in the past two years - completed any new prototypes or proofs of concept?
IC1_h	Has your firm undertaken the following activity in the past two years - Engaged in applied R&D innovation activities with a university or a science institute?
IC1_i	Has your firm undertaken the following activity in the past two years - Entered into collaboration with firms in your industry/cluster in the country on collaborative R&D or innovation?
IC1_j	Has your firm undertaken the following activity in the past two years - Agreed to a new joint venture with foreign partner?
IC1_k	Has your firm undertaken the following activity in the past two years - Applied for a patent?
IC2	Has your company acquired new technology over the last two years that either substantially changed the way the main products and/or services are produced or allowed the production of new products and/or services?
IC2_a	If Yes, how has your company acquired this new technology - Embodied in new machinery or equipment?
IC2_b	If Yes, how has your company acquired this new technology - By hiring key personnel?
IC2_c	If Yes, how has your company acquired this new technology - Licensing from international sources?
IC2_d	If Yes, how has your company acquired this new technology - Licensing from domestic sources?
IC2_e	If Yes, how has your company acquired this new technology - Developed or adapted within the company?
IC2_f	If Yes, how has your company acquired this new technology - Transferred from parent company?
IC2_g	If Yes, how has your company acquired this new technology - Developed with university partners?
IC2_h	If Yes, how has your company acquired this new technology - Developed through a joint venture with other companies?
IC3_a	Please indicate the effects of introduction of this new technology - New jobs created?
IC3_b	Please indicate the effects of introduction of this new technology - Increase in local sales?
IC3_c	Please indicate the effects of introduction of this new technology - Increase in exports?

IC3_d	Please indicate the effects of introduction of this new technology - Increase in productivity?
IC3_e	Please indicate the effects of introduction of this new technology - Decrease in costs of energy and/or materials?
IC3_f	Please indicate the effects of introduction of this new technology - Increase in competitiveness based on increase in value added of products and services?
IC4_a	What share of your core plant machinery and/or equipment is - less than 5 years old?
IC4_b	What share of your core plant machinery and/or equipment is - 5-10 years old?
IC4_c	What share of your core plant machinery and/or equipment is - 10-20 years old?
IC4_d	What share of your core plant machinery and/or equipment is - above 20 years old?
IC5	In your industry, to what extent do companies have the capacity to innovate?
IC6	How would you assess the quality of institutions in Jordan that conduct research related to your industry?
IC7	In your industry, to what extent do business and universities collaborate on research and development for innovation purposes (R&D)?
IC8	Only CT: To what extent does your sector have a sufficient number of engineers and scientists who can generate new technical innovations?
IC9	Does your firm have a unit or human resource dedicated to innovation?
CN1	To what extent are the right support services available for your industry, such as research and qualified consultants?
CN2	In your industry, to what extent are good quality supporting services provided by business associations and other organizations?
CN3	Are there services you are missing, that you believe are central to your competitiveness and growth?
CN3_specify	If Yes, specify which
CN4	To what extent are you engaged in strategic cooperation with firms within the cluster?
CN5	If the answer to the previous question more than 5 - what contributed to the creation of this cooperation?
CN6	To which degree do the supporting knowledge institutions facilitate strategic cooperation between businesses in the cluster?
CN7	In the past year, has the number of business relationships between your firm and other domestic firms increased, decreased, or has there been no change. (For examples, with suppliers, customer, service providers and contractors)?
CN8	In the past year, has the number of business relationships between your firm and foreign firms increased, decreased, or has there been no change (For example, with suppliers, customers, contractors)?
CN9	To what extent you are aware of the availability of a clear and unified strategy for the growth of your industry as whole?
CN10	If the answer to the previous question more than 5 - do you believe that this strategy is helping the growth of your industry?
CN11	Only CT: In your industry, to what extent are potential investor of Clean Tech and customers aware of the benefits, technologies and basic information about Clean Tech?



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