Policy Insights

Kazakhstan: Monitoring Skills Development through Occupational Standards

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Foreword

In 2012-2015, the OECD carried out the Kazakhstan Regional Competitiveness Project (RCP) - Phase I in the framework of the OECD Eurasia Competitiveness Programme. The OECD worked with sub-national administrations and regional stakeholders to design and implement reforms in pilot sectors to improve the business climate, strengthen small and medium-sized enterprise (SME) capacities, and attract foreign direct investment. On the basis of this work, the OECD prepared a Peer Review Note with recommendations on improving skills in the petrochemistry and chemistry sector entitled "Strengthening Kazakhstan's Skills in Petrochemistry and Chemistry through Occupational Standards".

The Peer Review Note was presented at the OECD Eurasia Competitiveness Roundtable in November 2015 and endorsed by Ms. Aida Kurmangaliyeva, then Executive Secretary of the Ministry of Healthcare and Social Development of Kazakhstan (now the Ministry of Labour and Social Protection of the Population). The final version of the Note was presented in March 2016 in Astana, Kazakhstan.

This Monitoring Report assesses the implementation of the recommendations formulated in the Peer Review Note. It was developed within the framework of the Kazakhstan Regional Competitiveness Project - Phase II, which started in January 2018. The assessment is based on secondary research, questionnaires and interviews with various stakeholders in the government, the private sector, education institutions and international organisations.

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and Social Development Canada; and Ms. Misug Jin, Senior Research Fellow, Korea Research Institute for Vocational Education and Training.

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Acronyms and abbreviations

ACS	Association of Caribbean States
BEEPS	Business Environment and Enterprise Performance Survey
ETF	European Training Foundation
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Society for International Co-operation)
ILO	International Labour Organisation
IT	Information Technologies
KWPF	Korea-World Bank Partnership Facility
LMI	Labour Market Information
NCE	National Chamber of Entrepreneurs
NOCTI	National Occupational Competency Testing Institute
NOS	National Occupational Standards
NQF	National Qualification Framework
OECD	Organisation for Economic Co-operation and Development
ONET	US National Occupational Database
OS	Occupational Standards
ROI	Return on Investment
SQF	Sector Qualification Framework
SSC	Sector Skills Council
TVEM	Technical and Vocational Education Modernisation

TVET	Technical and Vocational Education and Training
UKCES	UK Commission for Employment and Skills
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNEVOC	International Centre for Technical and Vocational Education and Training
USD	US Dollars
VET	Vocational Education and Training
WECD	Warwick Economics & Development

Definitions

Term	Definition
Assessment of qualifications	Testing of knowledge and performance of a student to award a certification of qualifications.
Assessment standard	"Assessment standards" may specify the object of assessment, performance criteria, assessment methods, and the composition of the jury entitled to award the qualification. Assessment standards answer the question "How will we know what the student has learned and is able to do in employment?".
Certification of qualifications	Recognition that a student has achieved a certain level of knowledge and performance by conferring a qualification.
Competence/competency	The ability, encompassing knowledge, skills and attitudes of an individual to perform adequately in a job.
Curriculum	An organised programme of both theoretical and practical studies, the successful completion of which is considered necessary to achieve specified educational goals corresponding to different levels of knowledge and qualification.
Dual education/training	Education or training combining periods in an educational institution or training centre and in the workplace.
Education/training standard	This standard may define the expected outcomes of the learning process, leading to the award of a qualification; the curriculum in terms of content, learning objectives and timetable; as well as teaching methods and learning settings, such as in-company or school-based learning. An education/training standard answers the question "What does the student need to learn to be effective in employment?"
Labour Market Information	Quantitative or qualitative data and analysis related to employment and the workforce.
Occupational Standards	The needs of employment: standards of performance that people are expected to achieve in their work, and the knowledge and skills they need to perform effectively for a given occupation at a given level.
Outcome-based curricula	Curricula that focus on outcomes (what a student has learned to do).

Qualification	The level of an individual's preparation to carry out concrete work functions well. A qualification is achieved when a competent body determines that an individual has obtained the knowledge, skills and/or wider competences to specific standards. A qualification confers an official recognition of skills value in the labour market and in further education and training.
Qualification framework	A qualification framework is a way to structure qualifications by level based on learning outcomes (what the learner must learn or be able to do), indicating their comparability and a way to progress from one to the other. Typically qualification frameworks cover both vocational and academic qualifications, but they have a particular importance for VET systems given that they can place a very diverse set of vocational qualifications in a common framework. National and Sector Qualification Frameworks are usually harmonised with Occupational Standards.
Qualification system	A qualification system includes all aspects of a country's activity that result in the recognition of learning.
Quality assurance	Refers to systematic, structured and continuous attention to quality.
Quality control	A formal external procedure used to assure quality of teaching, learning and training in private and public institutions providing VET.
Trusteeship boards	Trusteeship boards monitor the transparency of education institutions, participate in the improvement of the education process, the quality of education, and school facilities.
Upskilling	Short-term targeted training typically provided following initial education or training and aimed at supplementing, improving or updating knowledge, skills and/ or competences acquired during previous training.
Vocational Education and Training	Vocational Education and Training includes education and training programmes designed for, and typically leading to, a particular job or type of job.

Sources: developed by the OECD, drawing also on: (ETF, 2013[1]), (OECD, 2010[2]), (CEDEFOP, 2009[3]), (Fretwell, Lewis and Deij, 2001[4]), (TengriNews, 2012[5]); (UNESCO UNEVOC,(n.d.)[6]), (LMI Institute, n.d.[7]).

Key indicators: Kazakhstan

Table 1. Key indicators: Kazakhstan

Key economic indicators	
Population, as of 1 April 2018	18.2 million
GDP, current USD, 2016	137 278.3 million
GDP per capita, current USD, 2016	7 714.7
Unemployment rate, as of April 2018	4.9%
Key education indicators	
Public spending on education in Kazakhstan, % of GDP, as of 2013	3.8%
Public spending on education, OECD average, % of GDP, as of 2011	5.6%
Public spending on education in Kazakhstan, % of total public expenditure, as of 2013	20.5%
Public spending on education, OECD average, % of total public expenditure, as of 2011	12.9%
Public expenditure on education per student as % of GDP per capita, Kazakhstan, 2013	16%
Public expenditure on education per student as % of GDP per capita, OECD average, 2011	27%
Literacy rates for men, 2017	99.8%
Literacy rates for women, 2017	99.7%
VET indicators	
VET spending, % of GDP, 2015	0.2%
Number of students enrolled, for the 2017/18 year	489.3 thousand
Number of graduates, in 2017	146.6 thousand
Number of employed graduates, in 2017 (share of total)	90.1 thousand (61.5%)
Number of graduates continuing education in higher education institutes and colleges, in 2017 (share of total)	14.2 thousand (9.7%)

Source: (Statistical Committee of Kazakhstan,(n.d.)[8]), (OECD, 2015[9]), (ETF, 2017[10]).

Executive summary

Despite improvements in educational attainment and labour market participation, Kazakhstan faces challenges with respect to skill relevance and availability, especially among large and middle-sized companies. Sound Vocational Education and Training (VET) policies can help the country address these challenges in key labour market segments. Strengthening VET is critical, because skilled manual workers, with medium and high qualifications, represent 40% of the total forecast workforce need.

Occupational Standards (OS) are one important tool for enhancing VET. They help align stakeholders around a common terminology, promote public-private dialogue, and provide additional benefits for education institutions and private companies. A recent UK study finds that using OS as a basis for training programmes in two UK chemical companies yielded returns on investment (ROI) of 830% and 850%. The Government of Kazakhstan recognises OS as an important tool for ensuring that the VET system provides the skills that employers need and aims to develop 550 OS by 2020.

In 2015, the OECD made recommendations to Kazakhstan on the development and implementation of OS, with a focus on petrochemistry and chemistry as a pilot sector. The review's recommendations focused on three issues: the institutional framework; the link between OS and VET curricula and assessment; and awareness of OS among firms, officials, VET institutions and other relevant stakeholders. This note reviews the progress made since then and identifies further steps to strengthen the role of OS in the VET framework.

The institutional framework has improved, but more can be done to strengthen public-private dialogue and national expertise.

Kazakhstan has improved its institutional framework by assigning OS approval to the National Chamber of Entrepreneurs (NCE) and by giving a leading role in OS development to industry representatives via sector associations, except for a few public-sector occupations. The government has taken further actions to develop public-private dialogue and involve employers in the VET system. To ensure that the NCE can perform its tasks effectively, it will benefit from a re-evaluation of its staffing and financial needs. However, this approach will not work in all situations: the government needs to consider alternative arrangements for OS development in fields where sector associations are weak or missing. The oil and gas association "KazEnergy" is setting a good example of how this might be done, by planning to develop 4-5 OS in petrochemistry, a related sector not currently represented by a sector association.

There is now greater institutional capacity to conduct skills forecasting and gather Labour Market Information (LMI). The Centre for Workforce Development in the Ministry of Labour and Social Protection of the Population conducts short-term and medium-term analysis and plans to develop a skills forecasting roadmap. The centre will benefit from a better understanding of NCE needs in skills forecasting information, in order to deliver

analysis that can better feed into OS development. Going forward, longer-term skills needs analysis would also be useful for preparing OS for in-demand occupations.

The NCE is training and registering OS experts, and produced 100 such experts in 2018. The authorities should build on these initiatives by providing further training and qualification guidelines for OS experts. One critical task will be ensuring that these improvements endure: an overall process to ensure institutional knowledge, involving both regular needs assessment and training, would help sustain improvements beyond the ongoing projects on skills development, which are being conducted with international partners.

The government must do more to ensure that OS are used as the basis for curriculum design and assessments.

The government is committed to basing VET curricula on OS, which is critical to ensuring their impact on actual labour-market outcomes. Some government programmes and regulations, and the World Bank's "Skills and Jobs" project intend to link curricula to OS, with 115 new OS-based curricula expected by 2020, including 30 draft VET curricula that were awaiting official approval as of mid-2018. Moreover, the government administered a questionnaire to some education institutions to gauge their use of OS in curricula. Yet, education institutions are not basing curricula on OS outside the World Bank project. Within the framework of the project, curricula are sometimes created at the same time as OS, making it difficult to link one with the other. To facilitate the link between OS and curriculum design, a clearer process to translate OS into curricula, as well as realistic implementation timelines for the "Skills and Jobs" project, should be provided. The recently developed handbook on using OS for curricula could be a useful step in this regard.

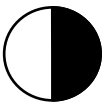
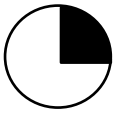
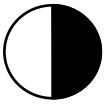
In a positive development, the NCE is setting up assessment centres for the certification of graduates. Twenty such centres are already established, and 715 graduates underwent certification in 2017. Kazakhstan's General Education Standards state that the assessment centres should have links with OS. Nevertheless, the assessments of the existing centres are not currently based on OS. To improve the assessment mechanisms, Kazakhstan should set out a clear process for taking OS into account in assessments of qualifications of graduates.

Overall monitoring of the linkage between OS, curricula and assessments should be encouraged. It will help to ensure the coherence of the VET system and to make adjustments when needed.

The authorities are working to raise awareness of OS and their role in the national qualification system, but much remains to be done.

Kazakhstan disseminates information about OS and their application through various events, including seminars at national and regional level organised by the NCE and collegiums at the Ministry of Education and Science. The NCE has put 150 draft OS and 27 approved OS on line. To maximise their reach and to further increase stakeholder awareness, Kazakhstan should consider additional awareness-raising initiatives, such as targeted communication for employers and for education professionals, as well as communication aimed at a wider audience.

Summary of the monitoring assessment

Overall 2015 recommendation	Detailed 2015 recommendations	2018 monitoring assessment	
		Progress status	Way forward
Put in place a domestic institutional structure to enable OS to support a well-functioning VET system	• Increase capacity of the domestic institution for creating and updating standards. • Develop mechanisms for public-private dialogue. • Foster national expertise in developing OS.		• Assess the resources of the NCE for OS approval. • Facilitate the use of skills forecasting and LMI in OS development. • Devise support measures for OS development by sector associations that have few resources or for sectors that are not represented by a sector association. • Put in place qualification guidelines for OS experts. • Formalise experience and recommendations to secure institutional knowledge on OS development and use.
Incentivise stakeholders to develop education programmes, assessments and certifications based on OS	• Put in place education standards and curricula based on OS. • Base assessments and certifications on OS. • Put in place a monitoring and enforcement mechanism to ensure that OS, education programmes, assessments and certifications are aligned.		• Further encourage the use of OS in the development of curricula by setting out the process. • Further encourage the use of OS in assessments and certifications by setting out the process (such as standardised tests or data banks of assessments). • Monitor the way that OS are reflected in curricula and assessment mechanisms, such as through feedback-gathering or audit visits.
Raise awareness about the value, process and application of OS to support a well-functioning VET system	• Regularly conduct training and seminars on the concepts, methodology and the role of all involved stakeholders.		• Adopt targeted communication strategies with dedicated channels for employers (e.g. sector associations) and education professionals (e.g. teacher training). • Put online all OS, and information on the value, process and application of OS. • Undertake additional awareness-raising initiatives such as high-level panels and speeches.

Legend	 Completed	 Close to completion	 Being implemented	 Initiated	 Not started

Introduction

Kazakhstan has high employment rates but faces skills shortages and mismatches

Overall educational attainment in Kazakhstan has been increasing, and its labour participation rates are some of the highest among upper middle-income countries (World Bank Group, 2016[11]). Mean years of schooling stood at 11.7 in 2015, placing Kazakhstan in the high human capital development range (UNDP, n.d.[12]). In 2017, the labour force participation rate was 71%, compared to an average of 60% in OECD member countries (World Bank, 2017[13]). Yet a large share of the labour pool remains low-skilled, and available skills in many cases do not meet employer needs. New workers often lack fundamental competences even after receiving a formal education (World Bank Group, 2016[11]). Skills are notably inadequate in many areas the government sees as important for economic diversification, such as agribusiness, petrochemistry, IT and business services. Skills shortages are especially prominent at technical level, highlighting the need to strengthen the VET system (OECD, 2017[14]). In the Business Environment and Enterprise Performance Survey (BEEPS) for 2013-14, 13.1 percent of firms identified lack of skills as a major constraint on growth (EBRD, 2017[15]). The perception is the strongest among large (over 100 employees) and medium-sized (20-99 employees) firms (OECD, 2017[16]). The 2013 World Bank Enterprise Survey also showed that exporting firms were 2.5 times more likely than non-exporting companies to identify skills shortage as a major constraint (World Bank Group, 2016[11]).

Better vocational education and training (VET) is critical to addressing these skills challenges, as the most pronounced gaps occur in those segments of the labour market that are typically served by VET-qualified workers. In 2013, large and medium-sized companies forecast that manual workers with medium and high qualifications would be the most needed workers, making up approximately 40% of the required workforce. The second most demanded group of workers would be highly qualified, mostly technical, specialists at almost 20% of the required workforce (ILO, 2015[17]). According to Kazakhstan's Centre for Workforce Development, there is a medium-term need for technical and mid-level professionals. Based on a questionnaire that the Centre has administered to around 10 000 enterprises, 191 000 such new workers will be needed in 2018. It identified the most in-demand professions for 2017-2021 as middle-school teachers (45 000), providers of individual services (40 500)1, catering workers (25 000), drivers (12 100) and mid-level health professionals (11 400). Such workers should ideally be available locally as they are less likely to be attracted from abroad.

[1] Hairdressers, make-up artists, aestheticians, servants, dry cleaners and painters, laundry employees, tailors, shoemakers, workers in clothing repair, home improvement workers, furniture repair workers, workers repairing electronic equipment, television and radio equipment, studio photographers etc.

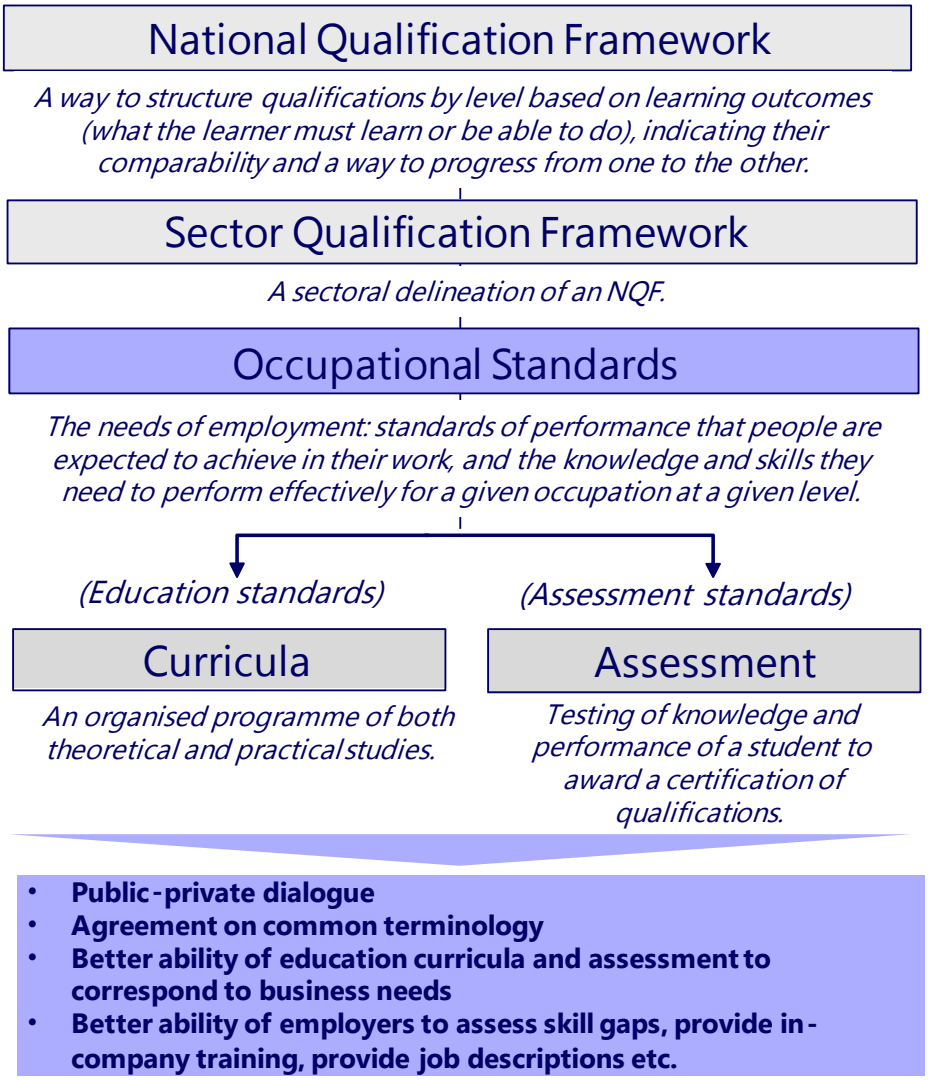
Strong VET programmes can also benefit individuals' employment prospects. The unemployment rate of workers with basic secondary education or less is double the average of those with specialised vocational or tertiary education (World Bank Group, 2016[11]).

Although it is not as highly prioritised as higher education in many countries, VET is critical to a well-functioning labour market, as it helps to avoid skills gaps and mismatches and to reduce unemployment (CEDEFOP, 2011[18]). VET typically teaches practical occupational skills over a relatively short period, not only to young students to enable them to enter the labour market more effectively, but also to adults engaged in lifelong learning to ensure their skills remain up-to-date or to reskill them. VET policies can thus help reduce skill gaps by training and re-training skills needed in specific labour market segments that require more than basic secondary education but less than a tertiary degree.

OS help align different stakeholders and ensure that education and training programmes generate the skills that labour markets need

One of the key characteristics of excellent VET training is the ability to provide skills that workers need and employers require. To achieve this, OECD (2014[19]) recommends full involvement of labour market actors in the design, update and delivery of qualifications provided by VET systems. In an effort to better align learning outcomes with labour market needs, many OECD economies are using tools such as qualification frameworks and OS, with an emphasis on employers' involvement in the process. OS are a key component of an effective skills framework. They align the various public and private stakeholders of an industry around common definitions of tasks and expectations of required skills. They thus enable education institutions to better understand skills needs in labour markets and to frame their curricula accordingly. OS offer additional benefits for the private sector and for education institutions. They help employers to identify employee competence gaps to improve in-company training, develop job descriptions, recognise competences and qualifications, transfer foreign technologies and organise work processes (CEDEFOP, 2009[3]). Educational institutions and employers use OS for developing standard-based qualifications and curricula, and skills assessment and certification instruments. OS are particularly relevant for VET programmes, which are typically oriented towards shorter-term, industry-focused training, and prepare students for very specific jobs. Experience from developing countries also shows that OS can assist in such policy areas as assessment and recognition of prior learning (World Bank, 2011[20]). To ensure that OS do not impede flexibility in the VET system, it is important to ensure that they are updated at regular intervals, that the right stakeholders are involved in OS development, and that the guidelines for transforming OS into curricula and assessments leave enough room for education institutions and the private sector to develop certification and assessment instruments while taking into account local conditions and capabilities.

Figure 1. OS promote alignment among skills system stakeholders, and improve the correspondence of curricula and assessments to business needs



Source: OECD analysis.

There is so far little existing research that quantifies the benefits of National Qualification Frameworks (NQF) and OS, even though evidence does exist. The International Labour Organisation (ILO) has noted that NQFs have potential to produce positive outcomes, such as improving our understanding of the education system, promoting lifelong learning and increasing mobility, but that there is a lack of monitoring and evaluation of their impact (ILO,(n.d.)[21]). One existing study examined two UK companies, William Blythe Limited and Pentagon Chemicals, which used Cogent's Gold Standard to design training programmes, and showed that the companies yielded a high return on investment (ROI) as a result.

Box 1. WECD Study on ROI of using Cogent's Gold Standard

The ROI calculation compared the benefits of adopting Cogent's Gold Standard to the costs of doing so. The Gold Standard is a recognised industry framework for essential skills for specific job roles. William Blythe, a knowledge-based specialty chemical producer, used the Gold Standard framework to develop a five-year strategy to upskill its entire operational team in 2009. For the cost/benefit assessment, the study used detailed records of the training costs of introducing the Gold Standard. It estimated that the value of sales rose by 48% between 2009 and 2013, and that the training contributed approximately 20% to the increased sales. It calculated the ROI to be approximately 830%. Pentagon Chemicals, a leading UK based chemical manufacturer of organic intermediates for life science, petrochemical and specialty chemical markets, used the Cogent Gold Standard to upskill its entire workforce, from senior managers to maintenance staff. The study concluded that the use of the Cogent Gold Standard led to savings of about GBP 1.2 mln and an ROI of about 850%. It was based on an analysis of savings by the company attributed to the adoption of the Gold Standard and the costs associated with Gold Standard training. However, to establish a more definitive link between the introduction of the Gold Standard and the estimated ROI, a larger sample size will be helpful, as well as a methodology to account for the ROI while taking into account the impact of other business practices on sales and savings.

Source: (WECD, 2014[22]).

Kazakhstan is pursuing VET policy reforms including OS development

Educational reforms are a cornerstone of Kazakhstan's plan to become one of the top 30 most competitive economies by 2050. The "100 Steps" programme adopted in May 2015 includes the improvement of the quality of human capital (steps 76-79). The more recent Strategy-2025 foresees reforms in increasing the quality of training, implementing the lifelong learning concept, and supporting labour mobility. Kazakhstan's State Programme for Education Development for 2011-2020, which has recently been updated for 2016-2019, sets ambitious targets and goals for the development of skills (OECD, 2017[23]). The Employment Roadmap 2020 aims to bolster VET of the unemployed population in an effort to help them find stable employment. Kazakhstan is about to undertake an OECD Skills Strategy Review during 2018-2019, which aims to provide a strategic and comprehensive approach to assessing its skills challenges and building a more effective skills system.

Kazakhstan has been working to reform its VET system, and in particular increase private sector participation. Education institutions have been given greater independence in designing curricula (ETF, 2017[10]). The government has adopted a Dual Training Roadmap to promote dual education, which combines theoretical and practical training, and has a new "Free Vocational Education for All" project which aims to provide free VET to more than 720 000 people during 2017 – 2021 (Official website of the Prime Minister of Kazakhstan, 2017[24]), (Open College, n.d.[25]). Through the project, the government will offer stipends to high school graduates to study in several priority fields, as well as short dual training courses to youth under 29 and the unemployed. Recent changes also include the engagement of non-state actors in the system of vocational education through the establishment of the Boards of Trustees, even though their roles are still to be clarified (ETF, 2017[10]).

Like many OECD countries, Kazakhstan is establishing its national qualification system. In the framework of a World Bank "Skills and Jobs" project that lasts during 2015-2020,

Kazakhstan aims to develop, revise and review its OS; develop curricula based on OS for VET, for higher education and for postgraduate education; and to support the development of pilot testing centres for recognising informal and formal education. Finally, it plans to devise a concept and a roadmap for a national qualification body, as well as a roadmap for legislative changes necessary for an efficient NQF. Kazakhstan has an eight-level NQF, which was updated in 2016 by a tripartite commission, and is currently being finalised by the government together with the NCE. Kazakhstan is the first Central Asian state to have joined the Bologna Process in 2010, which aims to promote the comparability of its higher education with European programmes. It also has some Sector Qualification Frameworks (SQF), more than 33 of which have been updated since 2016 by government agencies. In 2018, Kazakhstan has proceeded to reviewing 38 additional SQF in 22 economic sectors. The government and the NCE are continuing work on methodological recommendations for developing and adopting SQF. As of August 2018, Kazakhstan had developed 104 OS for 18 priority economic sectors, including 70 draft OS in the framework of the World Bank "Skills and Jobs" project for all levels of education. It plans to put in place 550 OS in all economic sectors by 2020, and reported that it made a decision in 2018 to review or develop an additional 480. The Government Programme for the Development of Education and Science for 2016-2019 mentions OS revision as one of its goals. There is a currently a requirement to update OS once every three years. In June-July 2018, Kazakhstan worked with experts from Cambridge University and the Scottish Qualification Authority (SQA) to review the effectiveness of its current national qualification system, with the goal of developing a roadmap on its improvement.

OECD support to the development of OS in Kazakhstan: overview of the 2015 recommendations

In 2015, the OECD made recommendations to Kazakhstan in a Peer Review Note on "Strengthening Kazakhstan's Skills in Petrochemistry and Chemistry through OS" (OECD, 2015[26]). It identified OS as a key factor for improving VET. The 2015 recommendations identified three key challenges to the development of OS:

- A weak institutional framework for co-ordinating OS development, including a limited capacity to create and update OS on a regular basis, insufficient public-private dialogue, and inadequate domestic expertise.
- A lack of application of OS in competency-based education curricula, assessments or certifications.
- Limited awareness of OS and their application in the VET system, including the concepts, government work on the subject and the roles of different participants in the process.

The review concluded that Kazakhstan could improve its capabilities to develop OS by pursuing three main actions to address the identified key challenges:

- Put in place a domestic institutional structure to enable OS to support a well-functioning VET system.
- Incentivise stakeholders to develop curricula, assessments and certifications based on OS.
- Raise awareness about the value, process and application of OS to support a well-functioning VET system.

Recommendation 1: Put in place a domestic institutional structure to enable OS to support a well-functioning VET system

At the time of the 2015 review, sector ministries led the work on OS development and employers reviewed the draft OS, while the Ministry of Healthcare and Social Development co-ordinated the process. Representatives of the private sector were not involved early enough at the development stage, and in some instances, sectoral representatives were not even involved at the review stage, at times due to the absence of identified relevant counterparts – i.e., the weakness or lack of sectoral associations and similar bodies. In addition, the development of OS was mostly carried out within the framework of a World Bank project on Technical and Vocational Education Modernisation (TVEM); local expertise was insufficient to ensure the sustainability of this approach without such external support.

Consequently, OECD (2015[26]) made a recommendation to Kazakhstan to strengthen its permanent domestic structure for creating, monitoring and updating OS. Specifically, it advised Kazakhstan to: 1) strengthen the institution responsible for creating and updating OS, ensuring sufficient, qualified staff and appropriate financing; 2) develop mechanisms for public-private dialogue, such as giving employers a leading role in developing OS through public-private working sessions, ensuring well-structured and strong sector associations, and promoting strong links between the industry and the VET system; and 3) foster domestic expertise in developing OS.

Recommendation 2: Incentivise stakeholders to develop curricula, assessments and certifications based on OS

One of the main applications of OS is to form a basis for curricula and for the assessment of qualifications. OECD (2015[26]) concluded that Kazakhstan did not translate OS into VET curricula and into assessments and certifications of qualifications. It proposed three actions to establish a link between OS and VET education in Kazakhstan: 1) put in place education standards and curricula based on OS; 2) base assessments and certifications on OS; and 3) put in place a monitoring and enforcement mechanism.

Recommendation 3: Raise awareness about the value, process and application of OS to support a well-functioning VET system

OECD countries that use OS, such as the United Kingdom, develop communication strategies and activities to disseminate the standards and to encourage their effective use. OECD (2015[26]) identified a lack of awareness of OS among various stakeholders, especially the private sector and regional actors, which led to a lack of co-ordination of initiatives on OS. Although the novelty of the standards could partially explain this situation, OECD (2015[26]) found that the Government of Kazakhstan could take a more pro-active approach to increasing the visibility and understanding of OS and their benefits among stakeholders. It therefore recommended regular training and seminars on the concept of OS, the methodology and the roles of all stakeholders.

Findings of the 2018 Monitoring Assessment

The Government of Kazakhstan has made progress in implementing recommendations set out in OECD (2015[26]). In particular, it has improved its institutional structure for the development of OS, not least by giving employers a leading role in the process, and putting in place training and awareness-raising activities. However, the link between OS and the rest of the VET system needs to be strengthened through a clear mechanism for basing curricula and assessments on OS.

Monitoring of Recommendation 1: The institutional framework has improved, but more can be done to strengthen public-private dialogue and national expertise.

Recommendation 1: Put in place a domestic institutional structure to enable OS to support a well-functioning VET system.

Kazakhstan has improved its institutional framework and given the private sector a leading role in the OS development process but should allocate more resources to OS approval and undertake measures to compensate for the weakness, or even lack, of sector associations in some industries

In line with the OECD (2015[26]) recommendation, the government transferred the role of secretariat for OS from the Ministry of Labour and Social Development to the NCE, an organisation outside of the government and close to the private sector. The updated Employment Code of Kazakhstan gives the NCE the authority to approve OS as of 2016. In addition, the Chamber maintains lists of OS and of national experts on the topic, publishes OS online, conducts training and is setting up assessments centres (Figure 2). The NCE adopted rules for updating OS in late 2015 and placed them online. According to the Ministry of Labour and Social Protection, the NCE updated methodological documents for NQF and OS development as well.

The private sector is now formally leading the process of developing OS, in line with widespread OECD practice. Sector associations are in charge of developing, implementing, updating and reviewing OS based on SQF (Government of Kazakhstan, 2018[27]). As of August 2018, Kazakhstan had devised 104 OS for 18 economic sectors since 2016. Among them, 70 draft OS had been developed in the framework of the Wold Bank "Skills and Jobs" project. Some sectors covered are information-communication technologies; agriculture; transport and logistics; mining and smelting; geological exploration; chemical industry; construction; oil and gas; metalwork; machine building; energy production; light industry; furniture manufacturing; the food industry; healthcare; the social and labour sphere; and education.

State agencies are now responsible for OS only for government occupations in sectors such as the space industry, the national archive, internal affairs and emergency response services. They have developed several OS so far such as for the conservation of the national archive fund, civil defence and fire safety.

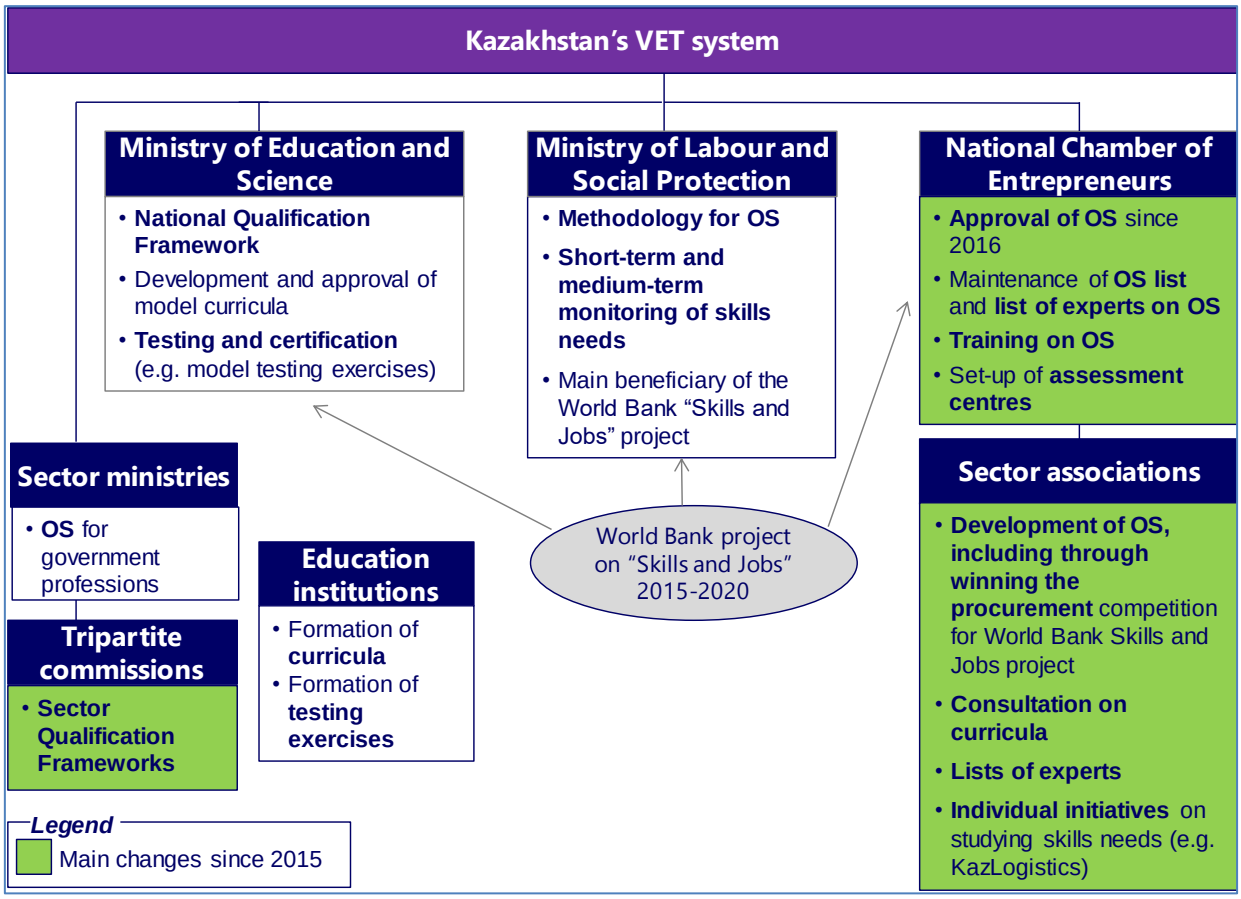
The government has taken further actions to develop public-private dialogue and involve employers in the VET system. Sector-specific tripartite commissions composed of government, education and private sector representatives now work under the aegis of line ministries to approve SQF developed by designated sector organisations, which provide the overarching framework for OS. The government also plans to introduce basic principles of dual training in technological, technical and agricultural fields in 80% of colleges by 2019, up from 60% in 2015 (ETF, 2017[10]).

However, there is reason to fear that the resources allocated to the work on OS might be insufficient. In particular, the staffing and financing needs of the NCE could be re-evaluated to ensure that the organisation has the capacity to conduct its work. Currently, there are eight people working in the department for human resource development and two dedicated to OS for all economic sectors. In the UK, the Cogent Skills Council, responsible for OS development in science-based industries, had 90 employees in 2015 (OECD, 2015[26]).2 A World Bank report has advised that core staff working on OS development should comprise about 8-10 people for developing countries (World Bank, 2011[20]).

The cost of developing one OS in Kazakhstan is currently estimated at USD 5 840 - 8 756 (KZT 2-3 mln). As a comparison, the price range of NOS in the UK during 2012-2013 was USD 32 993–46 192 per NOS (UKCES, 2013[28]). Turkey and Romania, on the other hand, have estimated the cost of the overall development process for OS at USD 2 mln over 3-5 years, comprising pilot testing procedures, the development of about 250-300 standards, and related administrative infrastructure (World Bank, 2011[20]).

[2] Its mandate was larger, as it also provided LMI for the sector and designed apprenticeship frameworks, but it focused only on life sciences, industrial and nuclear sciences rather than all economic sectors.

Figure 2. Institutional changes in Kazakhstan's skills system give a prominent role to the private sector in OS development



Source: OECD analysis based on secondary research and interviews.

The weakness or the absence of sector associations, notably in industries that are not very developed, still needs to be addressed. There are wide disparities among sector associations in charge of the development of OS: while some are well established and have adequate capabilities (e.g., energy, logistics and mining), others have very few resources, and, in certain cases, are non-existent, as in petrochemistry.

The petrochemical sector foresees large skills demand in view of two projects implemented by the United Chemical Company on deep processing of gas, leading to polypropylene production of 500 000 tonnes per year, and to polyethylene production of 800 000 tonnes per year. This is expected to generate about 6 000 jobs during the construction phase, and should create a need for more than 300 highly qualified engineers and 700 technical specialists during the production phase. While the Ministry of Energy is currently leading the development of an SQF for petrochemistry, no work has been done on OS for the sector. The delay is largely due to the fact that there are very few petrochemical plants that can participate in this task and no sector association as such.

There is no adequate measure to engage employers from the private sector when sector associations are below capacity or non-existent, which weakens the OS development process in those sectors. Private consulting companies often develop OS in these sectors by winning tenders under the World Bank "Skills and Jobs" project, but this solution is a

stopgap and cannot ensure stakeholders' engagement and buy-in. In cases where sector associations are non-existent or not well established, better measures could include *ad hoc* structures for OS development under the aegis of the NCE. Some better-established sector associations could help with related industries. For example, the oil and gas association KazEnergy plans to develop 4-5 OS for the petrochemical industry. Alternatively, OS from other countries could be adapted to Kazakhstan's context while seeking input from employer representatives, as is currently being successfully done in Azerbaijan.

Kazakhstan conducts skills forecasting and labour-market analysis, but needs to feed them better into the OS development process

Since 2016, the Centre for Workforce Development in the Ministry of Labour and Social Protection of the Population, previously known as the Informational-Analytical Centre for Employment Issues, conducts short-term forecasting for one year, based on a questionnaire sent out to employers, and medium-term forecasting for five years, at the request of the Ministry of Labour and Social Protection of the Population. It has recently conducted a forecast of labour demand for different occupations until 2020, based on a survey of 6 153 employers in regards to their size of the workforce, expected changes in short term, skills needs and forecast of in-demand occupations. A macroeconomic forecast of the labour demand in different occupations from the Agency of Statistics of Kazakhstan supplemented this analysis (OECD, 2017[16]). A methodology for forecasting workforce needs was adopted in June 2016. Moreover, the Centre plans to develop a skills forecasting roadmap in the framework of the World Bank "Skills and Jobs" project. Yet, the skills forecasting infrastructure in Kazakhstan is nascent. The survey of employers suffers from non-responses. Moreover, macro series are available only for short time periods and a limited number of occupations (OECD, 2017[16]). In addition to forecasting undertaken by the Centre, some sector associations do their own sector analysis and forecasting, such as KazEnergy and KazLogistics.

The Ministry of Labour and Social Protection of the Population and some education institutions use this information, but currently skills forecasts are not feeding the OS development process. The NCE does not use the available labour market and skills information generated by the Centre for Workforce Development. The use of such information for the purposes of OS planning should be encouraged. The Centre for Workforce Development should communicate with the NCE to better understand its information needs for skills forecasting for use in OS development. The Centre's analysis could also undertake longer-term forecasting, extending up to 10 years. Canada, for example, is doing this to identify trends in occupations. The staffing and financing of the Centre should be assessed to ensure that it has enough resources to do so. Box 2 outlines good practices in skills forecasting, including LMI.

Box 2. Good practices of skills forecasting including LMI

The design and revision of OS is the main use of skills forecasting in employment policy in OECD economies (OECD, 2016[29]). In Australia, Belgium and New Zealand, skills forecasting information is used to quickly develop OS for new occupations or for occupations with changing skill requirements. Countries use a variety of approaches and exercises in their forecasting, as each one has its own strengths and weaknesses (OECD, 2016[29]). For example, they can use a current skills needs analysis together with a medium-term forecast, with most exercises relying on more than one method/data source (OECD, 2016[29]).

Most forecasts in Europe are done by independent research institutes or university centres that specialise in econometric research. Statistical offices, such as under the ministries of economy and labour, play an important role. LMI is usually commissioned by public institutions, e.g. ministries of economy, labour, education, and social partners or semi-private institutions (ETF, 2017[30]).

Most skills forecasts comprise macroeconomic projections of the likely changes in industrial employment, projections of the occupational structure of employment within each sector/industry using population census data and labour force surveys, and a calculation of the labour supply based on demographic trends and projections (ETF, 2017[30]).

The quality of predictions could be affected by several factors, including poor statistical infrastructure, wrong or changing assumptions, and unforeseen changes or severe disruptions in trends. Reliable data is essential for good skills forecasting, including national accounts, population census, labour force surveys and establishment census. A lack of human resources with relevant knowledge and expertise is reported as the most important obstacle to developing skills assessment and anticipation exercises in OECD countries (OECD, 2016[29]).

"Best practice" forecasts usually comprise quantitative and qualitative methods. It is useful to review and improve the existing model continuously. It is also essential to develop a network of producers, stakeholders and users of the forecast results to follow up on data collection and to ensure that data is really used in policy-making (ETF, 2017[30]). Aligning skills forecasting goals with targeted policy uses is recommended, unless the goal is to use the findings for wider purposes. End-users should have input into the design and development of forecasts. In Norway, for instance, both the employment and the education authorities participate in designing and developing forecasts undertaken by Statistics Norway (OECD, 2016[29]). Ministries of Labour and Education, statistical offices, employer organisations, universities, trade unions and public employment services are involved in the development of skills assessment and anticipation exercises in more than half of the OECD countries (OECD, 2016[29]). It is helpful to co-ordinate ministries and other stakeholders. Finally, electronic access to the databases should also be ensured (ETF, 2017[30]).

Source: (ETF, 2017[30]), (OECD, 2016[29]).

Kazakhstan is training a pool of national experts, but should further assess the outcomes of training programmes and establish sustainable institutional expertise on OS

Kazakhstan is undertaking a concerted effort to develop national experts on OS via dedicated training programmes. According to the Ministry of Labour and Social Protection of the Population, the private consultancy Ernst & Young has trained a pool of experts on developing OS based on its own methodology. 320 experts were trained in 2018, including 100 on OS, 70 on education programmes and 90 on SQF. In addition, the Ministry plans to develop industry-specific experts on OS. Some sector associations undertake their own training initiatives, such as the oil and gas association KazEnergy, which plans to share its own list of OS developers with the NCE.

However, the number of experts and their levels of expertise do not meet current needs. Stakeholders interviewed by the OECD expressed a concern that the training provided to local experts was not sufficient, and that the number of experts was still very low compared to actual needs. Currently, there are no guidelines in place for assessing whether someone qualifies as an expert, and there are no procedures in place for ensuring that an individual's expertise remains up-to-date. Qualification guidelines should be in place for approving newly registered experts, with ongoing refresher courses and knowledge checks.

The government should also make sure to learn from the process of developing OS and ensure the sustainability of national expertise on OS. Some of the OS prepared as part of the previous World Bank project on TVEM in 2010-2015 have already become obsolete and are being replaced within the framework of the new 2016-2020 World Bank "Skills and Jobs" project. Over the longer run, though, it is critical that the process becomes self-sustaining without continued external support. As long as a third party is leading the work, there is a risk of losing the competencies at the end of the project. For example, the methodology for developing OS established during the first World Bank project and revised should ideally be continuously updated according to recent experience. Some countries publish and regularly update quality and review guidelines that formalise their experience with developing OS and applying them. For example, the UK introduced quality requirements for its National Occupational Standards (NOS) in 2010. Quality assurance is placed within the Sector Skills Councils (SSCs) and other standard-setting organisations. Each standard-setting organisation is expected to gather information on how NOS are used, to record feedback, and to evaluate the impact of NOS. These guidelines are reviewed regularly in view of the changing circumstances and user experience. The UK has also created an interface for gathering feedback on NOS and competence qualification structures (UK Commission for Employment and Skills and the Alliance of Sector Skills Councils, 2011[31]), (CogentLearn, n.d.[32]).

Monitoring of Recommendation 2: To put the link between OS and the rest of the VET system into practice, the government must do more to ensure that OS are used as the basis for curriculum design and assessments.

Recommendation 2: Incentivise stakeholders to develop education programmes, assessments and certifications based on OS

While there are plans to base education programmes on OS, this link still needs to be formally established

Kazakhstan clearly states its intent to use OS as a basis for VET programmes in various policy documents and regulations. Kazakhstan's Programme for the Development of Education and Science for 2016-2019 stipulates that VET curricula should be revised according to OS and that the share of VET curricula based on OS should reach 58% by 2020. The Government General Education Standards, which serve as the basis for curricula, state that VET curricula must seek to achieve "levels of qualification based on OS" (Government of Kazakhstan, 2012[33]). The document also states that professional competences must be developed for each specialty of higher education on the basis of OS while taking into account the requirements of employers and society (Government of Kazakhstan, 2012[33]). According to the Ministry of Labour and Social Protection, GDSI Limited has developed a handbook on developing curricula in the context of the National Qualification Framework while taking into account labour market needs. The handbook has been approved by the Ministry of Education. This could be a good starting point for setting out clear procedures for translating OS into curricula.

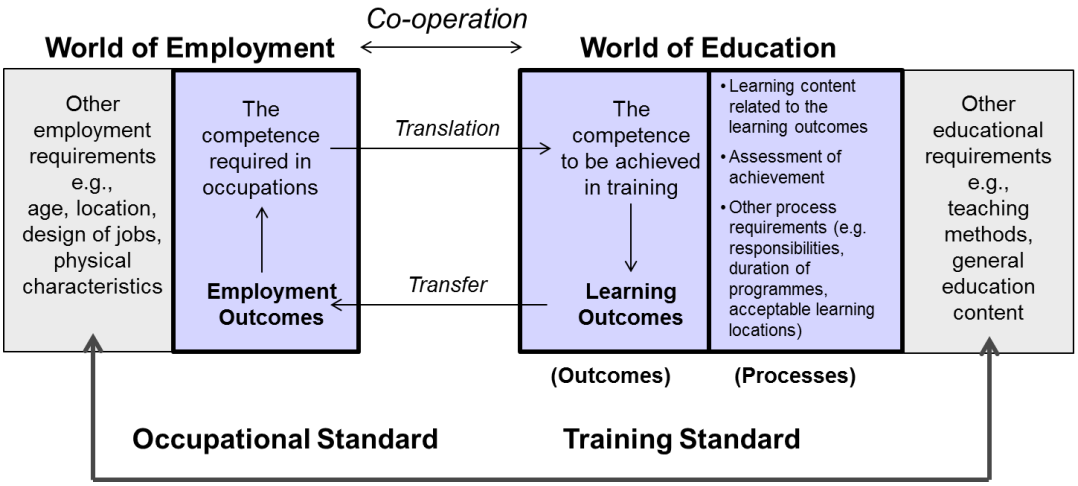
According to the Ministry of Labour 115 pilot curricula based on OS are expected by the end of 2020. 70 have been developed so far: 40 for higher and postgraduate education, and 30 for seven study areas in VET: i) education; ii) radio electronics and communications; iii) telecommunications; iv) IT; v) construction; vi) chemical technology and production and vii) energy. These curricula are currently undergoing approval from the Republican Educational and Methodological Council of the Ministry of Education and Science. The Ministry has also identified 45 priority curricula (15 for VET and 30 for higher and postsecondary education) to be developed next.

In practice, the link between OS and new educational content is not effective, because the translation process has not been clearly established. There is, at this stage, no formal mechanism to translate OS into educational curricula and standards. The 2007 Government General Education Standards do not provide any detail on how to base curricula on OS. Education institutions are not currently using OS to develop their curricula. In addition, according to feedback received during OECD interviews, some curricula developed in the framework of the current World Bank project fail to integrate OS due to short project timeframes. OS are often being developed at the same time as curricula, making it impossible to link one with the other. The Ministry of Labour and Social Protection of the Population has a methodology for developing curricula based on labour market demand, developed in 2017 in the framework of the World Bank project and approved by the Ministry of Education and Science, but its link with OS is not clear. While it is understandable that some OS are not translated into VET programmes because they have not yet been developed, the government should have a clear, formal mechanism in place, with realistic implementation timeframes. This process should be easily accessible to developers of education programmes.

There are different ways of organising the link between OS and curricula. For example, in the Netherlands, there are OS for 237 occupations containing broad job descriptions, such as functional, technical tasks and core behaviours. They also include competences with regards to knowledge, skills and attitudes. Education standards are formulated as learning outcomes, and include competences described in OS. Education standards are then used to form curricula by training providers (CEDEFOP, 2009[3]). The Korea Research Institute of Vocational Education and Training (KRIVET) develops a modularised curriculum based on National Competency Standards (NCS), which are then used by training institutes, Meister high schools and vocational colleges (KWPF, 2016[34]). In Malaysia, a skills qualification must receive accreditation from the Department of Skills Development through the Malaysian Skills Certification System based on the National Occupational Skills Standard, in order for it to be included in the Malaysian Qualification Register (MQR) (ETF, 2012[35]). Its MQF initiative however concerns higher education. Figure 3 outlines how learning outcomes can be linked to employment outcomes.

In establishing the link between OS and certifications, it is important that Kazakhstan take appropriate measures to counter corruption in the process of conferring certifications (ACN, 2017[36]). In 2015, Kazakhstan adopted an Anti-corruption Strategy for 2015-2017 for the education sphere with the goal of implementing Kazakhstan's overall Anti-corruption Strategy for 2015-2025. Yet, according to the head of the Agency for Civil Service Affairs and Anti-Corruption's statement in November 2016 and the data from the National Anti-Corruption Report from April 2017, corruption remains high in Kazakhstan's education system (ACN, 2017[36]).

Figure 3. The process for linking OS with education standards



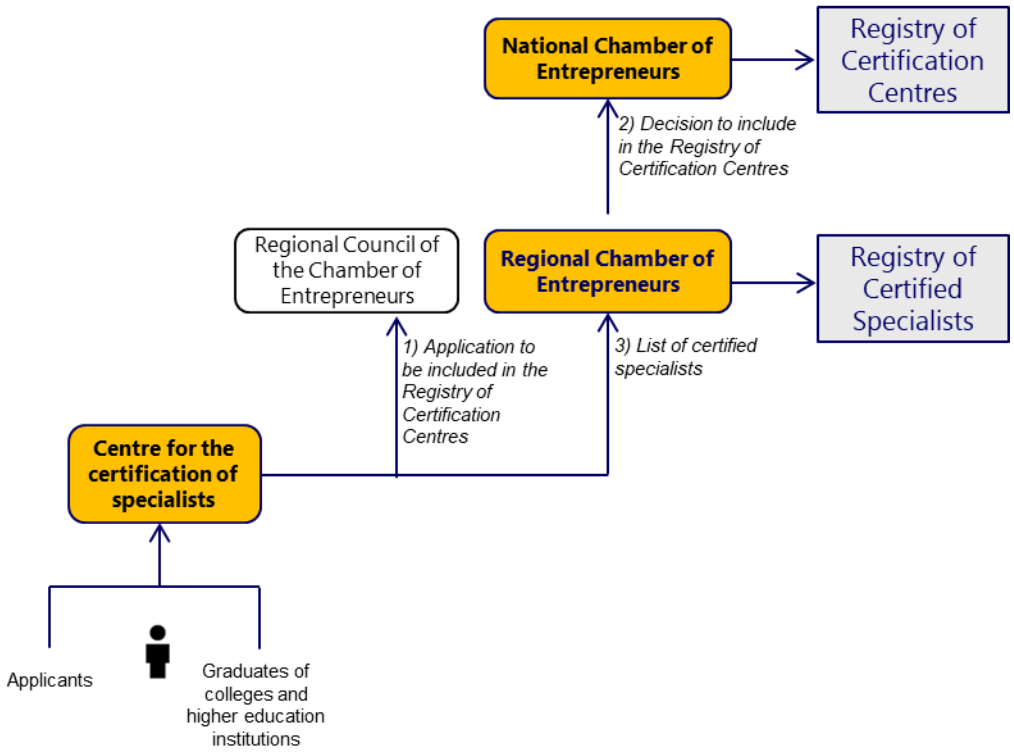
Source: (Fretwell, Lewis and Deij, 2001[4]).

The link between OS and assessments remains to be established in practice

Kazakhstan is developing new assessment centres. Following the closure of the four pilot independent assessment centres operated by sector associations at the time of the 2015 review, the NCE plans to develop new independent assessment centres, in line with its mandate to provide certifications for specialists (Government of Kazakhstan, 2018[37]). A regulation adopted in December 2016 sets out the system for creating a registry of certification centres at national level and a registry of certified specialists at regional level. The centres are supposed to assess the match between acquired skills and market labour

needs (NCE, 2016[38]). They need to meet three criteria to be included on the list: i) operation and professional experience in the area of the qualification to be certified and in the given sector; ii) presence of organisational documents; iii) presence of up-to-date monitoring and testing material that has been approved by employers. According to the Ministry of Education and Science, there are currently 20 certification centres on the list, and 715 graduates underwent certification in 2017. Figure 4 describes the organisation of the system. Organisations apply to the regional branches of the NCE to be included in the national registry, and regional councils of the NCE make the final decision. After that, the regional chamber forwards the information to be included in the national registry by the NCE.

Figure 4. The NCE Registry of Certification Centres and the Registry of Certified Specialists



Source: (NCE, 2016[38]).

Yet, just as for curricula, clear mechanisms to link student assessment and OS are lacking. The newly developed assessment centres do not seem to rely on OS. The 2016 regulation on forming and maintaining a registry of centres of certification of specialists does not specifically mention OS. The Ministry of Education and Science does not use OS for the development of model tests, possibly because OS do not figure in its mandate. Kazakhstan's General Education Standards state that the main goal of attestation of the knowledge of graduates includes the evaluation of theoretical knowledge, professional competences, preparedness to carry out professional tasks, and the correspondence of preparation to the demands of the education programme and professional (occupational) standards (Government of Kazakhstan, 2012[33]). However, the document fails to specify the process for reaching these objectives.

OECD countries use a variety of approaches to link OS with assessment and certification processes. The standardised test approach is widely used, wherein assessment institutions rely on standardised performance and knowledge assessments developed on the basis of OS. Another option is to have a data bank of performance and knowledge assessment items based on OS. The data is accessible to stakeholders, including training institutions and employers, who use it to develop their own assessments.

The National Occupational Testing Institute (NOCTI) in the United States, which links assessments to OS, is an example of such a data bank. It provides assessments and standardised tests for students who are in career and technical programmes in high school or technical colleges. NOCTI assessments are based on job and task analysis, and input from experts from various regions of the country, business and industry. They are updated regularly and are aligned with the National Occupational Database (ONET), national academic standards, and business and industry standards. Some assessments are linked with industry certification programmes (Choose Your Future,(n.d.)[39]). Korea and New Zealand also use such data banks (World Bank, 2011[20]).

It could be useful for the OS-development institution to also have input into assessment instruments. For example, in Mexico, Competence Management Committees of employers and workers develop competence standards for economic sectors, discuss relevant assessment and certification solutions, and develop and update assessment instruments (ACS, 2015[40]).

Finally, assessments should meet requirements for validity (correspondence of the assessment to the OS selected) and for reliability (when it conducts assessment in a standard way) (Fretwell, Lewis and Deij, 2001[4]). Mechanisms for the accreditation of assessors must also be in place (UNEVOC, 2013[41]).

Kazakhstan should establish a monitoring and enforcement system to ensure coherence between OS, curricula and assessments

Although some action has been taken in this regard, there is currently no consistent monitoring of the correspondence of OS, curricula and assessments in Kazakhstan. In addition to clear formal linkage mechanisms, a monitoring and enforcement system should be put in place to ensure the coherence of the system, identify and resolve potential problems, and improve the overall approach when relevant. Tools that can be used for the monitoring include collection of feedback from various stakeholders involved and audit visits to organisations, such as education institutions and companies (UNEVOC, 2006[42]).

Examples of such mechanisms exist in other countries. In Denmark, sectoral organisations communicate with education providers informally to check if they are using existing OS. Trade committees conduct monitoring of how they are used, and this information is taken into account when revising qualification standards every four years (CEDEFOP, 2009[3]). In the UK, the Quality Guidelines for NOS include guidelines for evaluating the standards. Each standard-setting organisation is responsible for recording feedback about who is using NOS and for which purposes, evaluating the depth of NOS penetration (percentage of organisations that are using NOS for NOS-based qualifications/products/services) and the breadth of penetration (how widely they are using NOS and for which range of staff) (UK Commission for Employment and Skills and the Alliance of Sector Skills Councils, 2011[43]).

Kazakhstan's Ministry of Labour and Social Protection recently sent out a questionnaire in 2016 to graduate institutions and VET institutions, in order to assess new curricula

developed on the basis of OS. The findings showed that as of September 2016, 33 VET institutions adopted 29 curricula, and that 30 graduate schools out of 49 adopted 253 curricula based on OS. The Ministry reported that 13 777 students were enrolled in programmes developed on the basis of OS, including 163 at Masters' level, 1 650 at undergraduate level, and 11 964 at VET level. This is a positive step towards ensuring the uptake of OS by education institutions.

Monitoring of Recommendation 3: The authorities are working to raise awareness of OS and their role in the national qualification system, but much remains to be done.

Recommendation 3: Raise awareness about the value, process and application of OS to support a well-functioning VET system

Some awareness-raising actions take place, but the visibility and understanding of OS and their benefits could be improved through both targeted and wide communication initiatives

Kazakhstan has been undertaking various awareness-raising initiatives about the national qualification system, and in particular, OS. The Ministry of Education and Science organises a forum (a collegium) with representatives of universities and VET institutions once per quarter, where OS and their use in curricula regularly figure on the agenda. The ministry also undertakes some outreach activities aimed at the regions. The NCE organises meetings with employers where it discusses topics such as the NQF and OS, some of them with the participation of the management unit of the World Bank "Skills and Jobs" project. Regional branches of the NCE provide similar sessions. The NCE also organises videoconferences and uses social media platforms.

Kazakhstan has increased the online visibility of its OS framework and contents. Much of the material developed within the World Bank "Skills and Jobs" project such as OS is online. The NCE has placed 150 draft OS (in services, education, maritime transport, industry, information-communication technologies, ecology, electrical energy industry, medicine, construction) and 27 approved OS (in education, theatre, sport, services, construction, information-communication technologies) on the Internet. Some of these OS also include information on their developer (NCE, 2018[44]). According to the Ministry of Labour and Social Protection of the Population, several additional OS developed for public-sector professions are maintained by the Ministry of Justice but are not available publicly. The availability of this information online is a positive step, and it is advisable that the NCE continues to upload additional OS once they are approved.

The lack of awareness of OS, and in particular of their benefits, persists among the private sector and education institutions. They should be better informed of the benefits of the interlinkage between OS, education/training standards, curricula and assessments. Some of this communication should be tailored to specific audiences: while employers are mostly interested in outcomes, education institutions are largely interested in inputs (syllabus, subject), process (teaching/learning methods) and assessments (Fretwell, Lewis and Deij, 2001[4]). It is helpful if the information campaign takes as a benchmark whether OS could be meaningful and understood by an average HR director or manager working in a sector (UKCES, 2013[28]). Sector associations could be given a bigger role in the dissemination of OS and of information on their benefits to the private sector. KazEnergy is an example of an association that takes a proactive approach in training its members. It organised three workshops and one seminar in 2017 on approaches and methodology for developing OS.

A two-day seminar held on 8-9 February 2018 included information on what an OS is, international experience on skills improvement in oil and gas, NQF in Kazakhstan, the importance of OS development, its role and purpose, methodology, the roles of different stakeholders and a practical exercise on OS development.

Education institutions could be better informed of the benefits of using OS in curricula, and be solicited to provide their feedback on potential and existing challenges. For example, only one out of 19 participants in the KazEnergy workshops was an education institution, and two were scientific institutes. In addition, any training provided to education and VET professionals could include information on OS and their application in curricula. In Kosovo, Regional Boards of Education and local authorities are responsible for communication on the NQF to schools (ETF, 2012[35]).

Some of the awareness-raising initiatives should be designed to reach a wider audience. Online tools can be better used for reaching stakeholders located outside of the capital, including placing information online and sending out e-newsletters (World Bank, 2011[20]). The repository of NOS in the United Kingdom is a user-friendly platform that provides a good example of an engaging dissemination tool (Box 3). Online training tools or programmes can facilitate the building of expertise remotely. Other awareness-raising initiatives could also be envisaged including events with high-level political presence on topics such as OS, public launch events on sector-specific OS, as well as the mentioning of OS and their application in high-level, official speeches. For example, in Turkey, which has progressed on its NQF (although the system is not yet been fully established), information on the national qualification system is often presented at press events with the participation of government representatives (ETF, 2012[35]). Good media coverage of such events could contribute to greater visibility and better understanding of these topics.

Box 3. Information on National Occupational Standards (NOS) in the United Kingdom

The UK national online platform on NOS is comprehensive and easy to use.

It describes what the NOS are on the main page. A search engine allows to search for NOS and to filter them by developers, by the suite of occupations, by occupation and by the modification date. On the last page, each NOS lists the developer, the approval date, the indicative review date and the validity period.

The government also has a webpage with guidance on NOS including the NOS Strategy for 2010-2020, quality criteria for NOS, and a guide for NOS developers.

It moreover has documents on the importance of OS, for example, a flyer on "Improving the Lives of Young People through NOS" and on "Using NOS to Survive a Recession and Keep on Top of the Markets".

In addition, according to the NOS Strategy for 2010-2020, the UK plans to have a strategy to ensure that NOS are used effectively by everyone who plans to benefit from them by increasing depth of penetration (the percentage of companies that use NOS) and the breadth of penetration (range of purposes for which NOS are used). It will consist of a nation-wide promotional strategy and sector/occupation-wide promotion strategies.

Source: (UK Standards,(n.d.)[45]); (UK Commission for Employment and Skills, 2011[46]).

The Way Forward

The government should consider re-evaluating the needs of the NCE and of institutions engaged in the development of OS in general, to ensure that resources are sufficient. In particular, the number of staff working on OS at the NCE could be increased.

Public-private dialogue could be improved, particularly in industries that do not have well-established sector associations. Ad hoc structures could be set up to work on OS. Some better-established sector associations could take on OS development for related industries. Alternatively, OS could be adapted from other countries while seeking input from employer representatives.

The government could facilitate NCE's use of the information produced by the Centre for Workforce Development on skills forecasting and LMI. The Centre could develop longer-term forecasting for up to 10 years to identify occupational trends. It could also better communicate with the NCE to find out about its specific needs for skills forecasting for OS development.

The government should take additional measures to foster its national expertise on OS. It could develop qualification guidelines to assess the level of trained experts, ensure that their knowledge is up-to-date and offer complementary training such as refresher courses when appropriate. It should also make sure to establish solid and sustainable institutional knowledge from the current process of OS development undertaken in the framework of the World Bank "Skills and Jobs" project by formalising experience and recommendations.

Formal processes and guidelines to base VET curricula, assessments and certifications on OS still need to be established. Processes and guidelines should specify the mechanism through which OS can be used to define learning outcomes and how curricula should be developed to achieve these learning outcomes. A realistic implementation timeline is also needed to enable study content to be developed once the relevant OS are available. Similarly, the government should make sure that mechanisms to translate OS into assessment and certification tools for trained professionals are developed. A monitoring and enforcement mechanism would be necessary to ensure that OS are aligned with the different components of the VET system. For example, feedback collection initiatives and audits could be carried out.

Increasing the visibility and the understanding of OS and their application in the VET system remains a challenge, and further communication initiatives need to be undertaken. The government should tailor its awareness-raising activities to the needs of the private sector on the one hand, and to education institutions on the other hand. Sector associations could do more promotional activity with their members. Online tools could be harnessed further to reach large and remote audiences, including by sharing available OS, promoting their benefits and encouraging their use. High-level events and speeches can also be powerful tools for spreading awareness.

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Annex

Draft Occupational Standard "Software Testing"

Translation from Russian

1. General provisions

1. The Occupational Standard "Software Testing" is intended for the formation of educational programmes, including training of personnel at factories, certification of employees and graduates of educational institutions, completion of a wide range of personnel management tasks.

On the basis of this Occupational Standard, entities may develop corporate Occupational Standards for internal use for employees, specifying the level of professional education, the list of employment functions, knowledge, skills and abilities with account of specific characteristics of the organization of production, labor and management, their responsibility.

2. The following terms and definitions are used in this Occupational Standard:

1) *qualification* means the degree of an employee's readiness to perform particular employment functions in a quality manner;

2) *qualification level* means a total of requirements for the level of an employee's training and competence differentiated according to the parameters of difficulty, non-standard nature of employment actions, responsibility and independence;

3) *employment function* means a set of interrelated actions intended to complete one or several tasks of the work process;

4) *professional subgroup* means a total of professions formed by a comprehensive set of employment functions and required to perform their competencies;

5) *Occupational Standard* means a standard defining requirements in a particular area of professional activity for the qualification and competence level, content, quality and conditions of work;

6) *professional group* means a total of professional subgroups with a common integration basis (similar or close purposes, objects, technologies, including instruments of labor) and implying a similar set of employment functions and competences for their performance;

7) *profession* means the primary occupation of a person's employment activity, which requires particular knowledge, abilities and practical skills acquired as a result of special training and confirmed with relevant educational documents;

8) *Sector Qualification Framework* means a structured description of qualification levels recognised in the industry;

9) *national qualification system* means a total of mechanisms of regulatory and institutional management of demand and supply of specialist qualifications in the job market;

10) N*ational Qualification Framework* means a structured description of qualification levels recognised in the job market.

3. The following abbreviations are used in this Occupational Standard:

1) SQF – Sector Qualification Framework;

2) OS – Occupational Standard;

3) QC – qualification catalogue of positions of managers, specialists and other officers;

4) SW – software;

5) OS – operating system;

6) IS – information security;
7) DB – database.

2. Occupational Standard certificate

4. OS title: "Software Testing".

5. Purpose of OS development: a systematic and structured description of employment functions, relevant requirements for knowledge, skills, abilities and personal competences of employees.

6. Brief description of the OS: SW development, debugging, functional test, upgrade.

7. Main group: Information and communications technologies.
Professional group: SW development.
Professional subgroup: SW testing.

3. Occupation cards

8. List of occupations:
1) Software testing specialist, qualification level 4 according to the SQF;
2) Software testing specialist, qualification level 5 according to the SQF;
3) Software testing specialist, qualification level 6 according to the SQF.
Occupation cards are contained in the Annex to this Occupational Standard.

Annex
to the Occupational Standard "Software Testing"

OCCUPATION CARD SOFTWARE TESTING SPECIALIST	
Profession code:	-
Profession title:	Software testing specialist
Qualification level according to the SQF:	4. Technical and professional education, without practical experience
Qualification level according to the QC:	-
Employment functions	1) Performance of test procedures. 2) Checking the results and registering SW testing errors.
Employment function 1 Performance of test procedures	**Skills and abilities:** 1. Preparation of testing platforms. 2. Performance of test procedures using test data. 3. Analysis of received SW testing results. 4. Formation of reporting documentation according to the results of SW testing.
	Knowledge: 1. Regulatory, guidance materials on matters of SW trial and testing. 2. Basic operation of the main OS (Windows, Unix, Linux, Mac OS, etc.). 3. Fundamentals of the algorithm and automata theory. 4. Discrete mathematics fundamentals. 5. Programming principles. 6. Testing terminology. 7. One of the programming languages. 8. Basic theoretical knowledge of testing techniques, main test modes.
Employment function 2 Checking the results and registering SW testing errors	**Skills and abilities:** 1. Execution of SW testing algorithms without deviations. 2. Comparison of expected and actual results of SW testing. 3. Reproduction of SW testing errors. 4. Registration of errors in the error monitoring system. 5. Entering the results in the test management system. 6. Entering information about a defect in the defects monitoring system. 7. Observance of the company's IS policy. 8. Formation of reporting documentation according to the results of SW testing.
	Knowledge: 1. Regulatory, guidance materials on matters of SW trial and testing. 2. Basic operation of the main OS (Windows, Unix, Linux, Mac OS, etc.). 3. Understanding IS.

Requirements for personal competences	Self-discipline, proactivity, attentiveness, responsibility, discipline, can-do attitude, result-oriented performance, good learning ability, business communication skills, ability of teamwork.
Connection with other professions within the SQF	-
OCCUPATION CARD SOFTWARE TESTING SPECIALIST	
Profession code:	-
Profession title:	Software testing specialist
Qualification level according to the SQF:	5. Technical and professional education, with practical experience Higher education, additional professional education programmes, without practical experience
Qualification level according to the QC:	-
Employment functions	1) Creation of test scripts. 2) Development of tests for automated SW testing. 3) Performance of SW testing procedures. 4) Checking the results and registering SW testing errors.
Employment function 1 Creation of test scripts	**Skills and abilities:** 1. Preparation of test scripts for different SW modules. 2. Determination of characteristics of input and output data required for test scripting.
	Knowledge: 1. SW testing methods. 2. Methods of selection of input and output data values ensuring efficient SW testing. 3. Search methods for the SW testing process.
Employment function 2 Development of tests for automated SW testing	**Skills and abilities:** 1. Keeping automated tests updated. 2. Launching and analyzing the results of automated tests. 3. Development of programmes for automated SW testing. 4. Analysis of SW testing results. 5. Formation of reporting documentation according to the results of SW testing.
	Knowledge: 1. Classification of the kinds and types of SW testing. 2. Techniques of design and combinatory analysis of tests. 3. Systems of automated SW testing. 4. Programming languages. 5. SW testing processes. 6. SW life cycle. 7. IS principles.
Employment function 3 Performance of SW testing procedures	**Skills and abilities:** 1. Performance of necessary types of SW testing according to a SW testing plan. 2. Analysis of received results, if necessary, preparation of new test cases and retesting the SW.

	3. Formation of reporting documentation according to the results of SW testing. 4. Application of basic SW testing techniques. 5. Use of special SW for automated SW testing. 6. SW source code analysis. 7. Detection of malicious logic and undocumented capabilities. 8. Ability to program in one of the programming languages.
	Knowledge: 1. Architecture of the tested system. 2. Basic operation of the OS. 3. SW testing techniques, main SW testing modes. 4. Systems of automated SW testing. 5. Programming principles. 6. Programming languages.
Employment function 4 Checking the results and registering SW testing errors	**Skills and abilities:** 1. Analysis of expected and actual results of SW testing. 2. Reproduction of SW testing errors. 3. Registration of errors in the error monitoring system. 4. Entering the results in the test management system. 5. Entering information about a defect in the defects monitoring system.
	Knowledge: 1. SW testing tools. 2. Techniques of design and combinatory analysis of tests. 3. Types of defects, their classification and occurrence statistics. 4. Types and techniques of SW testing. 5. Environment of application of SW under development.
Requirements for personal competences	Self-discipline, proactivity, attentiveness, responsibility, discipline, can-do attitude, flexible thinking, critical analysis, result-oriented performance, good learning ability, business communication skills, teamwork.
Connection with other professions within the SQF	-
OCCUPATION CARD SOFTWARE TESTING SPECIALIST	
Profession code:	-
Profession title:	Software testing specialist
Qualification level according to the SQF:	6. Higher education, practical experience
Qualification level according to the QC:	-
Employment functions	1) Determination of test requirements 2) Creation of test scripts. 3) Assessment and analysis of SW testing risks. 4) Development of a SW testing strategy. 5) Determination of resources required for SW testing. 6) Development of a SW testing plan. 7) Test design development. 8) Development of tests for automated SW testing. 9) Performance of SW testing procedures.

	10) Checking the results and registering SW testing errors. 11) Evaluation and analysis of tests.
Employment function 1 Determination of test requirements	**Skills and abilities:** 1. Analysis of SW testing requirements. 2. Analysis of SW testing program documentation. 3. Determination of SW testing goals. 4. Development of SW testing requirements. 5. Selection and combination of SW testing techniques.
	Knowledge: 1. Types and methods of testing at various stages of SW development. 2. SW testing theory (testing models, testing planning, test case design, test design). 3. SW testing techniques. 4. System of management of SW testing process requirements.
Employment function 2 Creation of test scripts	**Skills and abilities:** 1. Determination of characteristics of input and output data required for test scripting. 2. Preparation of test scripts for different SW modules. 3. Determination of optimal test data groups. 4. Control of test script development time. 5. Testing the functional structure of SW security procedures. 6. Testing information security tools and SW Application Programming Interface (APIs).
	Knowledge: 1. Techniques of creation of SW test scripts. 2. Process of creation of SW test scripts. 3. Functional structure of SW security procedures. 4. Information security tools and SW APIs.
Employment function 3 Assessment and analysis of SW testing risks	**Skills and abilities:** 1. Determination of testing risks for the functions of SW modules under test. 2. Analysis of SW testing risks.
	Knowledge: 1. Methods of determination and assessment of product and process risks, evaluation of labor input in SW testing, including risks.
Employment function 4 Development of a SW testing strategy	**Skills and abilities:** 1. Determination of approaches to testing separate modules, including testing levels and criteria for input and output data values ensuring efficient SW testing. 2. Evaluation of deadlines for completion of testing of separate SW modules. 3. Evaluation of criteria for input and output data values ensuring efficient SW testing.
	Knowledge: 1. Place of testing in different SW development methodologies. 2. SW testing approaches based on project difficulty, time, subject domain, availability of resources. 3. SW processing and testing methods and instruments.

Employment function 5 Determination of resources required for SW testing	**Skills and abilities:** 1. Evaluation of labor input in SW module testing. 2. Selection of a necessary hardware and software complex required to test separate SW modules. 3. Determination of a necessary SW test environment.
	Knowledge: 1. Methods of allocation of roles in a SW testing team. 2. SW testing standards. 3. SW testing project management methodologies. 4. Fundamentals of administration and the hardware component of SW.
Employment function 6 Development of a SW testing plan	**Skills and abilities:** 1. Determination of the sequence of work intended to test separate SW modules. 2. Selection of SW testing types. 3. Preparation of sets of tests for functional areas according to the SW testing specification.
	Knowledge: 1. SW testing terminology. 2. SW testing engineering process. 3. Types of SW testing and approaches to their application.
Employment function 7 Test design development	**Skills and abilities:** 1. Determination of testing areas within the scope of separate SW modules. 2. Determination and description of test cases of SW testing. 3. Determining and structuring SW testing procedures. 4. Selection of test coverage criteria and test coverage evaluation.
	Knowledge: 1. SW testing theory (testing models, testing planning, test case design, test design). 2. SW testing techniques.
Employment function 8 Development of tests for automated SW testing	**Skills and abilities:** 1. Determination of the scope of code coverage of automated programs. 2. Creation of test programs for SW testing. 3. Creation of external data sets for SW testing. 4. Analysis of the results of execution of automated programs. 5. Design of the SW testing process.
	Knowledge: 1. SW development life cycle. 2. Defect life cycle. 3. IS methods and principles.
Employment function 9 Performance of SW testing procedures	**Skills and abilities:** 1. Performance of a necessary type of SW testing according to a SW testing plan. 2. Analysis of received results, if necessary, preparation of new test cases and retesting the SW. 3. Formation of reporting documentation according to the results of SW testing.

	4. Skills in operation of automated SW testing tools. 5. Evaluation of testing results and adaptation of testing procedures in the course of SW testing.	
	Knowledge: 1. Programming languages and their characteristics. 2. Types and modes of SW testing. 3. Specific types of SW testing (security testing, testing mobile devices, DB testing, testing web services, etc.).	
Employment function 10 Checking the results and registering SW testing errors	**Skills and abilities:** 1. Comparison of expected and actual results of SW testing. 2. Reproduction of SW testing errors. 3. Registration of errors in the error monitoring system. 4. Entering the results in the test management system. 5. Entering information about a defect in the defects monitoring system. 6. Selection of an optimal SW testing technique. 7. Formation of reporting documentation according to the results of SW testing.	
	8. Knowledge: 1. SW life cycle. 2. Defect life cycle. 3. SW testing techniques.	
Employment function 11 Evaluation and analysis of tests	**Skills and abilities:** 1. Analysis of defects. 2. Determination of criteria for completion and success of SW testing. 3. Selection of a SW testing technique.	
	Knowledge: 1. Types of test examples of SW testing. 2. Equivalence classes, testing number comparison operations, SW programme code coverage. 3. Thoroughness coverage measures for SW testing. 4. SW testing reliability growth models. 5. Life cycle of tests. 6. Types of defects, their classification and occurrence statistics.	
Requirements for personal competences	Self-discipline, proactivity, attentiveness, responsibility, discipline, can-do attitude, analytical thinking, planning, decision-making, critical analysis, result-oriented performance, commitment to professional development.	
Connection with other professions within the SQF	2131	System architect
	-	Business analyst
	213	Team lead
Technical characteristics of the Occupational Standard		
Developed by	JSC National ICT Holding Zerde	
Version number and publication year	Version 1, year 2015	
Approximate reconsideration date	2018	

Source: (Kazakhstan National Chamber of Entrepreneurs, 2015[47]).

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

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KAZAKHSTAN: MONITORING SKILLS DEVELOPMENT THROUGH OCCUPATIONAL STANDARDS

Sound Vocational Education and Training (VET) policies help address skill gaps. Occupational Standards (OS) are an important tool for developing VET. They help align stakeholders around a common terminology and promote public-private dialogue.

This Policy Insights report reviews Kazakhstan's progress in developing and implementing OS since the recommendations made in the 2015 OECD peer review note. It assesses Kazakhstan's achievements in improving the institutional setting and capacity for the development of OS. It also looks at work to implement OS in VET curricula, and the initiatives to promote their use. The report makes recommendations to increase institutional expertise concerning OS, and to create more effective implementation and monitoring mechanisms.

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