Feasibility Study for a Curriculum Comparison in Vocational Education and Training

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Feasibility Study for a Curriculum Comparison in Vocational Education and Training Intermediary Report I: The 20 Top Performers

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Feasibility Study for a Curriculum-Comparison in Vocational Education and Training

Intermediary Report I
The 20 Top-performing Countries

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Executive Summary

Despite improved access to all educational levels, many countries around the world struggle with integrating young people into the labor market. The 2007 economic crisis exacerbated the problem, but not all countries were affected in the same way. This led to a vivid debate about how education and employment systems can and should be linked. Countries with well-developed vocational education and training (VET) systems seem to be better off in terms of their youth labor market situations. This raises the question of how countries should organize and design their VET curricula so that their youth make a smooth transition from education to employment.

The Center on International Education Benchmarking (CIEB) has set the goal to analyze the world's most successful education systems. The objective is to compare the top-performing countries' instructional systems and identify their different approaches to education. Against this backdrop, the CIEB is supporting a comparative study of VET curricula, which are one fundamental component of any education system. However, such an international comparison of VET curricula faces many challenges, resulting mainly from the large variation in how national education systems train vocational and technical qualifications. In addition, VET curricula are not fully comparable due to different national political, economic, cultural, and institutional frameworks. Consequently, the CIEB mandated the KOF Swiss Economic Institute at the ETH Zurich to conduct a Feasibility Study that first defines a common strategy for tackling these challenges. Hence, this Feasibility Study aims to reduce the comparability problem to the furthest possible extent.

The feasibility study consists of three phases, of which this intermediary report is the product of the first. This first phase addresses the following question: "*Which countries can be identified as top-performing countries that should be included in the VET curricula comparison?*" This report presents our findings on four main topics essential for achieving the goal of a feasibility study for the comparison of VET curricula. The first section explains our *theoretical and conceptual approaches* to the problem. These form the foundation of our strategy for *identifying 20 top-performing countries with regard to VET*, which is addressed in the second section. The third section *presents the selected top-performing countries in brief portraits*, which highlight not only their performance but also provide background information on VET governance. Finally, we *compare and discuss these top-performing countries* with re-

gard to our performance criteria. Finally, this intermediary report concludes with the important findings for the second phase of the project.

Conceptual Approach for the Identification of Top-performing Countries[1]

A comparison of curricula in the field of VET requires a theoretical foundation that is free from social constructs and concepts. Therefore, we refer to three theoretical approaches to comparing VET curricula so that cultural and social biases can be avoided as much as possible. *Human Capital Theory* (Becker, 1964) explains the macroeconomic impact of education. Becker postulates that technological change is the most important driver for economic growth. However, realizing the associated increase in labor productivity often requires improvements in human capital through education and training. Hence, we first need to place VET curricula in this context. Next, we consider *Curriculum Theory* (Kelly, 2009; Frey, 1995; Tylor, 1949), which deals with the justification of purposes of education, the exploration of effects, the generative quality of teaching-learning treatments, and the organization of education and assessments. However, Curriculum Theory barely deals with the specific needs of VET, notably addressing the interface between the education and employment systems. Importantly, VET curricula have to consider the informational couplings between these two systems. Thus far, little generalizable theoretical knowledge exists on how this interface should be treated. Therefore, we add a third perspective to shed light on this specific interface. *Systems Theory* (Luhmann, 1994; Eichmann, 1989) provides an approach for the investigation of coordination and control problems between the education and employment systems.

In order to tackle the interface between the education and employment systems, we develop an analytical concept that builds on the important phases in the value chain from educational planning to the labor market, which we call the *Curriculum Value Chain*. This concept will help to identify features where the informational couplings between the two systems are relevant and observable. These features will provide the basis for the determination of dimensions for the comparison of VET curricula. In addition, the steps in the curriculum value chain will form part of the framework within which a curriculum comparison allows other nations to learn from those with top-performing VET systems. We thereby hypothesize that

[1] In the following, we use the term country in a generic way, referring to either a country, a region or a city. This is due to the specific list of top-performers of the CIEB.

the stronger the coupling between the education and employment system is, the better the outcome on the youth labor market will be.

As *Figure 1* illustrates, the Curriculum Value Chain, together with the theoretical approaches already introduced, provides the background for us to define the measurement of outcomes. We measure the curriculum outcome by the situation of young people on the labor market (KOF Youth Labour Market Index, KOF YLMI). We measure learning outcomes through international assessment of skills and knowledge (Programme for International Student Assessment, PISA). We use these outcome measurements to identify the top-performing countries with regard to VET.

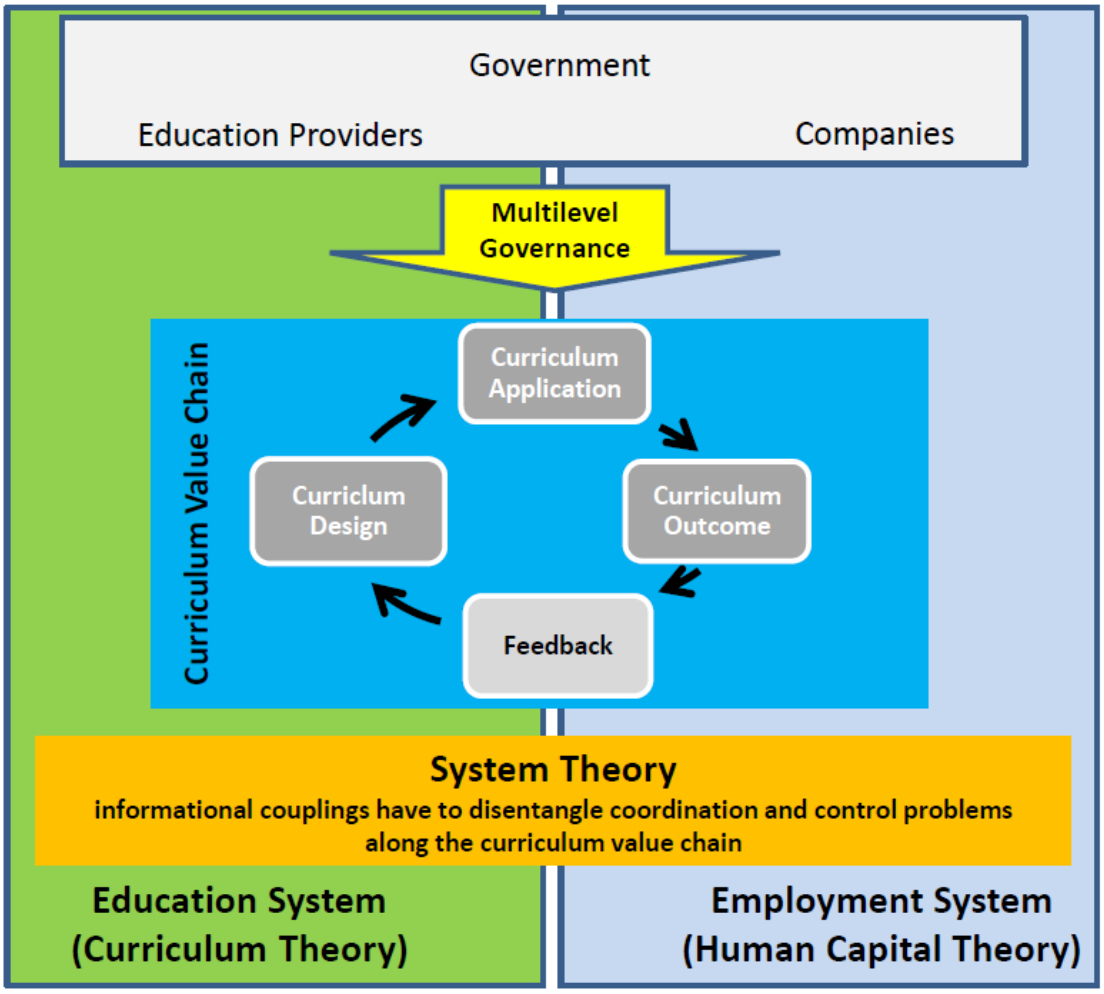


Figure 1: *Theoretical and conceptual framework of this feasibility study for a curriculum comparison in VET*

Identification of Top performing Countries in the Field of VET

Following our conceptual approach and hypothesis, the identification of top-performing countries builds on the above-mentioned internationally comparable measurements, which

focus on students entering or completing post-compulsory education. We choose post-compulsory education as it is the level where VET usually takes place. Identification of the top performers follows two metrics:

– First, we select countries whose performance on PISA is among the best. The students in these countries have a high probability of progressing to post-compulsory education, which represents a necessary condition to succeed in a labor market characterized by technologically advanced job characteristics. The 10 countries selected according to their high performance on PISA are: Shanghai (CN), Singapore (SG), Hong Kong (HK), Korea (KR), Japan (JP), Taiwan (TW), Finland (FI), Estonia (EE), Canada (CA), and Poland (PL).
– Second, we select the countries with the best performance on the youth labor market. This includes countries whose students have a high likelihood of entering the job market after the completion of post-compulsory education. The 10 countries selected according to their high performance on the youth labor market are: Switzerland (CH), the Netherlands (NL), Denmark (DK), Norway (NO), Germany (DE), Austria (AT), Luxembourg (LU), Lithuania (LT), Slovenia (SI), and Iceland (IS).

Preliminary correlations show that, for the selected countries, there is a relationship between the two outcome measurements of PISA and KOF YLMI scores. Hence, we suspect that some kind of general education plays an important role in the VET curricula of top-performing countries and has to be analyzed in our further investigations. Therefore, both groups of countries have important features in their VET curricula that help them to be among the top-performing countries. It seems that countries succeeding in the KOF YLMI without being among the highest in PISA overcome the tradeoff between investing more in labor market oriented education than in general education better than countries investing more in general education: They are able to balance the linkages between the education and employment systems and achieve a comparative advantage in the public financing of the whole education system due to the high investment by the business sector in education and training. We assume that this is where the strength of VET lies.

Description and Comparison of Top-performing Countries

Subsequently, we briefly present the selected 20 top-performing countries and information on their education systems, key figures, PISA scores, and KOF YLMI values. In addition, the

corresponding fact sheets for each country contain a first judgement on potential or upcoming issues for future VET curriculum comparison.

In the following comparison, we show that these top-performing countries demonstrate quite different developments over time with regard to the KOF YLMI as well as PISA scores. Even the countries that perform best overall on the labor market have experienced different time trends in their youth labor market situations and also differ on many aspects of their integration of young people into the labor market. After the economic crisis in 2007, for example, different trends can be observed: while Denmark and Hong Kong experienced a significantly negative trend in their KOF YLMI following the crisis, the trend is quite stable in other countries like Switzerland, the Netherlands, and Canada. Moreover, Singapore was able to maintain its trend of improvement from 2005 onward. This resilience might be one of the reasons why the NCEE considers Singapore as one of the top countries with regard to VET (Tucker, 2012).

The next phase of the feasibility study lays the ground for identifying the relevant features of VET curricula along the Curriculum Value Chain. These features are characterized by addressing the informational couplings between the education and employment systems.

Content

1. Background and Objectives of the Feasibility Study

The Center on International Education Benchmarking (CIEB) is analyzing the world's most successful education systems. The center compares top-performing countries' instructional systems and identifies their different approaches to education. As part of this effort, the CIEB is supporting a comparative study of vocational education and training (VET) curricula. In contrast to general education, VET is designed for and directly leads to a particular occupation or type of occupation. Therefore, it equips people with vocational and technical qualifications. VET usually combines practical training at either workplace or school with learning of occupation-specific theory and some degree of general skills. However, this definition of VET unavoidably leaves some blurred edges due to the high variation of education and training methods for vocational and technical qualifications in different countries. There are a variety of broadly different VET systems around the world: while some countries basically provide school-based vocational education (e.g. USA, Singapore), firms in other countries completely take over the teaching of vocational and technical skills through on-the-job training. A third approach is the dual-track VET system, in which apprenticeships in a company are combined with vocational education at schools (e.g. Switzerland, Germany). Closely connected to these different institutional settings are the various means of embedding VET in the education system as a whole, as well as the design of VET competency objectives at the conceptual level. This high variation leads to challenges for international comparisons of VET curricula as one fundamental component of the education process.

National VET systems come with commonalities as well as dissimilarities[2], but analyzing and comparing specific VET curricula in different countries requires a common basis in terms of comparable institutional frameworks, concepts of VET, the skill level of education and training, occupational profiles, and the meaning of language used in VET curricula. Hence, conducting a *Feasibility Study* is a critical first step that defines the common basis for tackling these challenges. Due to widely varying national frameworks, VET curricula cannot be fully comparable. Nevertheless, this Feasibility Study aims at reducing the comparability problem to the furthest possible extent.

[2] *In addition, some nations even show variation in VET systems within the country.*

Thus, the main objectives of the Feasibility Study are to *provide a common basis for the international comparison of VET curricula and to develop the theoretical and methodological tools for carrying out this comparison*. This objective can be achieved in two steps:

1) In the first step, the Feasibility Study will *identify comparable countries and occupations.* This sheds light on the common features and approaches of top-performing countries in terms of their VET curricula.
2) In the second step, the Feasibility Study will provide an instrument for carrying out the curriculum comparison. Development of this instrument will specifically involve the definition of the *relevant comparative dimensions (features)* as well as the challenges, limitations, and expected outcomes of such a comparison.

In the end, the Feasibility Study will define *the framework for nations to learn from high performing systems through the use of curriculum comparison,* despite their unique cultures, values, political histories, and institutional structures.

To achieve this objective, the Feasibility Study will answer the following research questions:

1) Which countries can be identified as top-performing countries and should thus be included in the VET curriculum comparison?
2) To what extent can the VET curricula of different top-performing countries and occupations be compared?
3) Which features of VET curricula should be compared, and which theoretical concepts should be used to identify the key similarities and differences among VET curricula?

These questions will build the foundation for three consecutive phases in the research process. The subsequent *Figure 2* gives an overview on the research questions of the Feasibility Study and their links to the planned comparative analysis of VET curricula (main study):

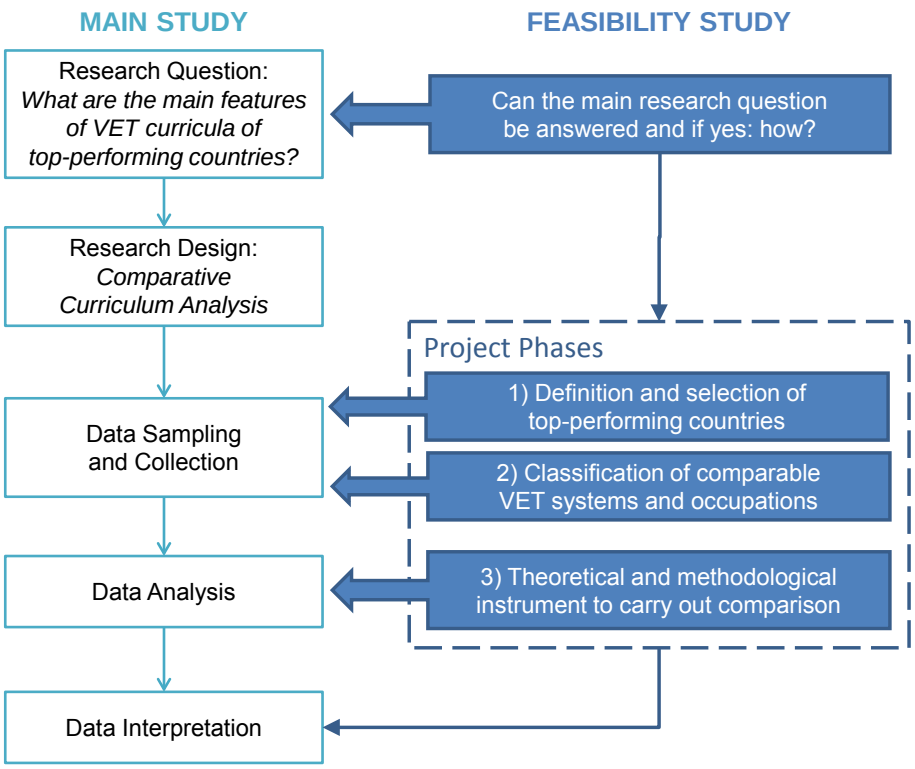


Figure 2: *Overview on the project phases of the feasibility study (own graph)*

This intermediary report summarizes the results of the first project phase on the *definition and identification of top-performing countries*. The following chapter outlines the terminology and conceptual basis of this first project phase (chapter 2). Next, we present our approach for the identification of the 20 top-performing countries (chapter 3) before describing the selected countries individually (chapter 4). Chapter 5 compares the top-performing countries, and in chapter 6 we draw our conclusions for the next project phases.

2. Conceptual Approach for the Identification of Top-performing Countries

2.1. Terminology

The aim of this study is to show under which conditions a comparison of VET curricula is feasible. Furthermore, we explain how the upcoming challenges related to the issue will be addressed. Therefore, it should be clear first what a VET curriculum in this context means, and second how it is related to the context of education and employment systems. This section is a short introduction to the terminology and the underpinning theory we use in this report.

Systems in society

Society can be seen as a complex and dynamic structure with different parts working together to secure solidarity and stability. These smaller parts are called systems, and include the education, economic, political, scientific, and religious systems among others. Each system fulfils a primary system-specific function. For example, one function of the economic system is to satisfy material needs through a program called market, characterized by supply and demand. Similarly, a pivotal function of the education system is providing human resources in qualitative and quantitative terms through educational programs (Klieme et al., 2006). Systems not only fulfil primary functions but also provide services to other systems; in the case of delivering VET, the education system is linked to the employment system which itself is a subsystem of the economic system. This means that all systems are related to each other. They have an open part that relates to the environment (interdependency), but also a closed part which constitutes their specific identity (independency). The latter is called the autopoietic part which means that the system reproduces itself (Luhmann, 1994; Eichmann, 1989).

This functional differentiation of the society has far-reaching consequences. For our purposes, it helps to identify key parts of the education and employment systems and their interaction. On one hand, processes of education and employment are subject to problem-specific and self-regulatory structures which fulfil a self-control function. On the other hand, they are open and related to other systems. If actors in these systems do not care about the interfaces to other systems or subsystems, coordination and control problems will arise with regard to specific performance outcomes.

The unity of the system lies in its function-specific encoding and programming, hence each system has an encoding (closed) and a programming (open) level of behavioral control, as il-

lustrated in Table 1 (p. 6) for the education system and in Table 2 (p. 8) for the economic system. This duality is represented in the various operations (actions), which are examined for the education and employment systems in the following two sections. The key to understanding how coordination and control problems between the two systems of education an employment result in undesirable outcomes (e.g. youth unemployment) lies in their interdependencies. Informational couplings and how actors can manage them will be in the focus of our analysis.

Education system

Based on the Systems Theory of Niklas Luhmann (1994), we see the education system as a complex and regulated structure that is constituted of its own communication codes and programming.

The second column of Table 1 illustrates the *encoding* (closed part) of the unit "education system". For this unit, encoding means selection for career and is expressed by a binary code where values indicate passing or failing after completing a program. Structured education programs end with some pass or fail of a course/test/exam/assignment, which represents a milestone and crossroads in the educational career of an individual. Consider the receipt or failure to attain a high school diploma as an example. With these pass/fail signals, education programs address their coding function of assigning values to outcomes. These in turn encode the social selection into careers. This implies that the allocation of positions inside and outside the system is controlled by the system's specific code. Thus, just as educational qualifications impact individual labor market outcomes, the system can exert influence on its environment. Therefore, programs controlling selection have to address the needs of the environment.

Regardless of the different purposes of education subsystems—subsystems include compulsory school, VET, or universities—the communication code of the education system remains the same. However, not all of these subsystems have the same references to the environment. Subsystems with the function of preparing students for entry into the labor market have to manage the interface to the employment system. A career, in that context, is the timeline of an individual's inclusion and moving through the education and subsequently employment systems.

Programming is the environmentally open part of the system (see third column of Table 1), which is connected to other systems like psychological systems (human beings), the scientific system, or the economic system. Each system operates with its own communication codes. Therefore, if we analyze and compare the curricula that prepare young people for labor market entry, we have to consider the corresponding communication codes as well as the programming of the labor market. The labor market is part of the employment system, which is itself part of the economic system. This will be described later (see p. 7).

Table 1 illustrates that the structuring of the operations within an education system is done through a specific program, called curriculum. It leads to education as the representative result of the unit education system. Hence, the education which an individual is coded as having received is always a result of a program called curriculum. Curriculum encompasses a variety of processes and may be "hidden," "planned," "intended," "enacted," "experienced," "formal," or "informal" (Kelly, 2009; Billett, 2006).

	Encoding («Kodierung»)	**Programming («Programmierung»)**
Reflection of unit	Career («Karriere»)	Education («Bildung»)
Structuring of operations	Pass / Fail («positiv / negativ»)	Curriculum («Lehr- und Lernpläne»)

Table 1: *Encoding and programming of the education system; table has been adapted from Niklas Luhmann (1994 p. 196); terms parenthesized in German stem from the original*

Systems Theory interfaces with Curriculum Theory with respect to the term "curriculum." We digress on this topic briefly to consider what should be accounted for when comparing VET curricula at the interface between education and employment systems. Defining what a curriculum is remains a complex topic in itself (see Kelly, 2009; Jackson, 1992; Schubert, 1986). Tyler's (1949 p. 1) "four fundamental questions which must be answered in developing any curriculum and plan of instructions" give a first simple idea about what a curriculum could be:

"1. What educational purposes should the school seek to attain?
2. What educational experiences can be provided that are likely to attain these purposes?
3. How can these educational experiences be effectively organized?

4. How can we determine whether these purposes are being attained?"

Kelly (2009) criticizes this linear approach for its simplicity. He argues that modern approaches would focus more on processes, and emphasizes the organization of educational experiences:

> "Any definition of curriculum, if it is to be practically effective and productive, must offer much more than a statement about the knowledge-content or merely the subjects which schooling is to 'teach' or 'transmit' or 'deliver.' It must go far beyond this to an explanation, and indeed a justification, of the purposes of such transmission and an exploration of the effects that exposure to such knowledge and such subjects is likely to have, or is intended to have, on its recipient – indeed it is from these deeper concerns, (…) that any curriculum planning worthy of the name must start" (Kelly, 2009 p. 9).

This interpretation of curriculum contains many generic aspects which are relevant for our investigation. "Justification of purposes" and "exploration of effects" are only two very important elements to which we will soon return.

Frey (1995 p. 25) argues: "The only way to determine education is to examine the origin of the education—or more precisely: the ways and means, how it gets to what you could call an educational event or an educational end. Or, as a formula: the quality of how of intended teaching and learning situations are developed[3]". In this sense, education should be defined based on the quality of the development process for the intended teaching-learning treatments. This emphasizes that curriculum comparison in the field of VET must go beyond a comparison of content and skills. Moreover, the comparison should focus on development process quality in treatments specific to VET systems throughout the whole educational process. This may include not only decisions on the four questions of Tyler (1949) or aspects in the definition of Kelly (1995), but also the assessment of what good or bad quality mean. Therefore, empirical evidence will be important to indicate the process development quality of specific teaching-learning treatments. This empirical evidence could, for example, examine the extent to which learning environments in the workplace are a constitutional element of successful VET. Alternatively, it might explore what constitutes good practice for employer engagement in curriculum development teams.

[3] This quotation has been translated from the original German: "Der einzige Weg, über den Bildung bestimmt werden könnte, ist die Entstehung der Bildung – genauer: die Art und Weise, wie es zu dem kommt, was man Bildungsveranstaltung oder an deren Ende Bildung nennen könnte. Oder als Formel: Die Qualität der Generierung von beabsichtigten Lehr- und Lernsitutionen."

Economic system – employment system

As explained, the main function of the economic system is to satisfy material needs. Its communication code is based on encoding payment or non-payment (Eichmann, 1989; Luhmann, 1988). Market-linked operations are the dominant structuring principles in the economic system. The employment system is one subsystem of the economic system, among others. Table 2 shows the encoding and programming schemes for the economic system, with the employment system in parentheses:

	Encoding	**Programming**
Reflection of unit	Price (wage)	Market (labor market)
Structuring of operations	Payment / Non-payment	Supply and demand

Table 2: *Encoding and programming of the economic (and employment) system; own depiction*

For each economic system and its subsystems, the closed self-referential part of the system deals with prices and payment or non-payment (*encoding*). On the capital market, the price is the interest. In the employment system, wages are the price for work. The system's programming is the environmentally open part of the economic system. The structure of its operations is based on market principles, namely supply and demand. Subsystems of the open part of the system, such as the capital or labor markets, are connected to other systems and interact with them. For example, in many countries the labor market is linked with the social security system. And, of course, the labor market is also related to the education system. Actors in the labor market are not simply workers demanding jobs, but also firms searching for qualified or skilled workers.

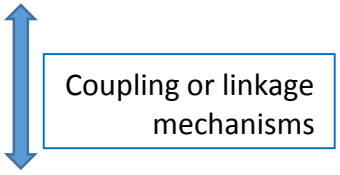
The reciprocal factors of the education and employment systems are related to the couplings of professional careers between systems (*programming*). In other words, professional careers refer to the relationship between skills supply and demand in the labor market. The education system uses information on qualifications demanded by the employment system to determine what students must learn. Hence, determining which qualifications are required for a certain career path follows the logic of Kelly's (2009) "justifying the purpose" and "exploring effects," which are key tasks in the planning of VET curricula.

VET System and VET Curriculum

These intersystem couplings lead us to the concept of the vocational education and training system (VET System). In this study, the term VET system refers to a generic concept related to the Systems Theory approach. We assume that there are specific observable mechanisms that enable coupling of the programming for the education and employment systems. Clarifying the relevant linkages between the programming features in the education system (VET curriculum) and employment system (skills supply and demand of labor) can help us bypass the investigated countries' heterogeneous context conditions, social construction of concepts, and requirements for skills and competences. The relevant encoding and programming schemes are illustrated in Table 3 and Table 4.

	Encoding	**Programming**
Reflection of unit	Professional Career	Education
Structuring of operations	Pass / Fail	**VET Curriculum**

Table 3: *VET system code and programming (own depiction)*



	Encoding	**Programming**
Reflection of unit	Wage	Labor Market
Structuring of operations	Payment / Non-payment	**Skills supply and demand for labor**

Table 4: *Employment system code and programming (own depiction)*

Tables 3 and 4 illustrate the specific role of VET systems coupled to labor markets through their programming. The purpose of the career path is not only self-referential—within the education system like selection for progression to further education—but the VET system also prepares students for entering the labor market. Hence, the social selection of this specific program is about whether an individual is an *insider* who finds an appropriate job corresponding to their educated skill set, or an *outsider* who cannot find a job.

If coordination problems between education and employment systems occur, it is most probably that interfaces are not well managed. In that case, imbalances on the labor market can result either from incorrect prices or a lack of highly qualified workers. The discussion on

youth unemployment, skills mismatch, or over- and under-qualification are examples of such imbalances. We assume that these imbalances often result from the absence of linkage mechanisms between the education and employment systems. Without coordination and control processes between the two systems, the risk is high that both systems will not fulfill their functions or will perform poorly. The "youth paradox"[4] is an example of the symptoms of malfunctioning coordination and control processes between the education and employment systems. Over-qualification, under-employment, and mismatch of qualifications can also be analyzed as coordination and control problems (Eichmann, 1989 p. 113). The main challenge for analysis is identifying the procedures and observable features that characterize the coupling mechanisms between the two systems.

Actions and reactions to specific education programs could be treated as information on how future operations can be improved. "Exploration of the effects that exposure to such knowledge and such subject is likely to have" (Kelly 2009 p. 9) is a duty of curriculum planning. If youth unemployment is high and young people have to work in bad conditions, the education system should search for essential information from the labor market to improve its VET curricula. To paraphrase Karl Frey (1995): The quality of the generation of the intended teaching-learning-treatment is essential. Therefore, during our investigation, we will focus on relevant steps and procedures along the whole process from curriculum planning to outcome effects, and will determine the extent to which quality differences among countries can be ranked.

2.2. The Curriculum Value Chain

The coordination and control processes between the education system and the employment system are not fully covered by typical programming tools such as curriculum planning. Holistically speaking, these processes include much more that simply determining what and how students should learn; governance, implementation and outcome measurements all play a role. Therefore, we need a more fine-grained conceptual approach to explaining where these two systems' coordination and control mechanisms should be observable along the whole education process.

[4] *The "youth paradox" is a phenomenon in developed countries where access to education has reached unprecedented levels but problems with the integration of youth into the labor market are still observable.*

We could approach this challenge of analyzing the coordination and control processes between the education and employment systems in at least two ways: inductively and deductively. In the *inductive approach*, we would collect VET curricula for one occupation and compare the goals, skills, and competence levels in these curricula to determine whether the designer of those curricula had been exploring "the effects that exposure to such knowledge and such subject is likely to have" (Kelly, 2009 p. 9). However, this approach would not lead to a result useful for identifying top-performing countries because it provides no information on the achievements and outcomes of graduates. In addition, context conditions around VET are too heterogeneous for this method to be feasible, as are the social constructions of terms (Brockmann et al., 2008). Furthermore, there is great variation in important features like the length and breadth of VET programs or curriculum design processes. Hence, this approach offers no benefit for a comparative study of the top-performing countries' VET curricula.

A *deductive approach* promises better results, even if we will still be confronted challenges. Deductive approaches are usually based on hypotheses derived from theory. In our case, Human Capital Theory (Becker, 1964) and Curriculum Theory (see Kelly, 2009; Pinar, 2004; Jackson 1992; Tyler, 1949) provide the theoretical basis for understanding the preparation of young people for the labor market. According to Becker's Human Capital Theory, education is a prerequisite for economic growth. Hence, an important function of an education system is to prepare well-educated people, which are in turn necessary for prosperity and social development. VET programs can play a major role for fulfilling this function, as they are designed to prepare adolescents for entrance into the labor market. Curriculum Theory is concerned with elements of educational change, legitimizing education policy, and debating about the curricula of the future. While this theory will be an important source for developing a curriculum comparison method, it has major limits. Traditional Curriculum Theory does not cover many of the challenges specific to the VET curriculum process, such as learning beyond schools and anticipating the needs of the labor market. Despite the wide literature on workplace learning and workplace curriculum (see e.g. Winch, 2010; Brockmann et al., 2008; Billett, 2006), there is a lack of Curriculum Theory for VET. We hope that we can contribute with this study to curriculum theorizing in the field of VET. Finally, as we saw in the previous section of this study, Systems Theory provides a framework for understanding the coupling of the education and employment systems. This theory is particularly important for linking

Human Capital Theory with Curriculum Theory because both theories do not have the power to explain coordination and control problems. Human Capital Theory is based on completely open systems—it is a reduction of complexity, which does not account for the constitutive features of a functionally differentiated society (Eichmann, 1989 p. 29). By combining Human Capital Theory, Curriculum Theory, and Systems Theory, we have a complete theoretical framework.

Before we deduce our hypothesis from these theories, we illustrate our conceptual framework in Figure 3. The process from curriculum design through curriculum application to curriculum outcome is our main analytical framework, called the *Curriculum Value Chain* (CVC; for more details see Renold/Rageth, forthcoming). We start from the assumption that VET curriculum begins with the design phase (curriculum design). The curriculum design phase contains several steps, such as the incorporation of innovation or feedback from different sources into the new curriculum, consulting with relevant actors, enactment, continuing education for all professionals involved, and tasks around preparing curriculum for application upon the next cohort of students. Once it is developed, the curriculum will be implemented in a particular learning environment (curriculum application). This second phase of the CVC is of major importance due to the fact that learning environments differ dramatically between countries. As we know from empirical research, workplaces as learning environment have a comparative advantage with regard to the acquisition of particular competences (Bolli/Renold, 2015; Billett, 2006). Therefore, the coupling factors between the education system and the employment system should be observable in this phase. In addition, we argue that the intended effects of the curriculum should be visible on the youth labor market (curriculum outcomes) because the overall purpose of VET is preparing young people for entrance into the labor market. Finally, the figure indicates that we are focusing on the target group of young people leaving compulsory education and entering post-compulsory education. Therefore, the competences at the end of compulsory education (as measured by PISA) could be an important input factor.

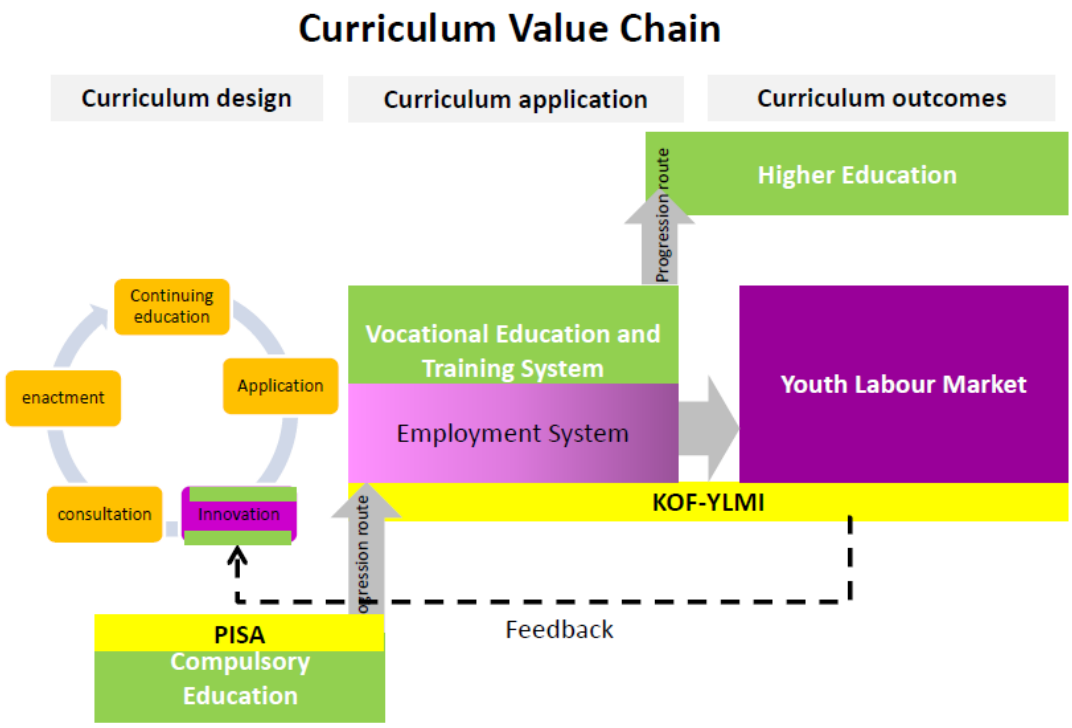


Figure 3: *The Curriculum Value Chain, with "design," "application," and "outcome" phases (own graph by Renold/Rageth, 2015)*

The CVC can be considered as generic concept for all educational processes. Performance indicators, however, are specific to the purpose of each educational process. For example, compulsory education exists to ensure that pupils can shape their own biographies, their relationships to their environment, and their lives in the community. The aim of this educational level is therefore to lay the groundwork for the individual control and autonomy (Baethge et al., 2006; Klieme et al., 2006). Math, science, and reading competences are considered prerequisites for these purposes. However, VET processes have a different function. They prepare pupils for the labor market while improving individual control even further. Accordingly, the PISA concept of assessing ability by measuring competences in math, reading, and science for 15-year old adolescents is not necessarily an appropriate measurement for learning in VET despite its high level of acceptance as an outcome measurement for learning and schooling in general. The skills and competences relevant for VET vary greatly according to demand from the labor market in different countries and at different points in time. The feasibility of using PISA to assess VET is limited by the difficulty of conceptualizing a valid and reliable measure or instrument for VET learning outcomes (see Baethge et al., 2006). Therefore, we bypass the heterogeneous context conditions and different skills and competences requirements of countries involved in our investigation by using the Systems

Theory approach as shown at the beginning of this chapter. The guiding principle is the identification of coordination and control mechanisms along the CVC, and how pronounced they are in different countries.

The CVC for VET is a theoretical framework which allows analysis of an end-to-end approach to designing, applying, and monitoring educational processes in the field of VET. The challenge in the field of VET—compared to traditional education processes—lies in the fact that young people have to be prepared for the world of work; a vocation, occupation, or simply a job. This means that curriculum designers have to anticipate the labor market needs with regard to skills and competences—or in the words of Kelly (2009), exploration of effects. Furthermore, appropriate workplace learning environments, the specific role of professionals and support agencies, and assessments and exams in the workplace that deal with authentic situations are all enablers for high-performance VET systems. In the words of Winch, a philosopher, this means:

> "One of the key features of any professional or vocational education worthy of the name is, not merely to enable individuals to attain a threshold level of competence that would allow us to say that they know how to do [a certain task] F, but also to introduce students of a craft, occupation or profession to the standards of excellence that obtain in that activity and to develop in them a desire to attain to those standards. We cannot do that if we do not have available to us the conceptual framework for talking about excellence or, more generally, the difference between a novice and an expert in the particular area of activity with which we are concerned" (Winch, 2010 p. 566).

This quote brings the issue of a VET curriculum comparison to a point: when we assess curricula, we are looking for comparable "standards of excellence" for a craft, occupation or profession. Close linkages between the employment system—where "experts" work—and the education system—where "novices" come from—are essential for developing such "standards of excellence." Identifying relevant and observable features which highlight linkages over the span of the whole CVC will be an important key to decrypting the black box between PISA scores and the KOF YLMI.

2.3. Our Hypotheses

VET on the upper secondary education level (ISCED 3/4) is the first level of post-compulsory education, so math, reading, and science competences are relevant as well as labor market outcomes. Thanks to PISA, measurements of these competences are available for a range of countries and make it possible to compare learning outcome levels after compulsory education. We hypothesize that *good performance on PISA at the end of compulsory education*—and thus at the entry to post-compulsory education—*is a necessary but not sufficient condition for the smooth transition of youth from education to employment*.

At the end of the CVC, we assume a similar premise. High performance on the youth labor market is a prerequisite for economic growth (Becker, 1964) and can be the result of a high-performing VET system. Other factors such as employment regulation or social insurance systems may also influence youth labor market performance, as the employment system is environmentally open to other systems. However, it is not enough to measure and explain the situation of young people on the labor market, nor are PISA scores sufficient to predict a smooth transition process. The "black box" between those two measurement points—the end of compulsory education and the entrance into the labor market—must be decrypted. We need to understand how young people leaving compulsory education are being prepared for labor market entry, and what differences and similarities can be observed among countries, states and regions. We know from CVC that close connection along the curriculum development process between education and employment are critical to developing effective curriculum. Therefore, we hypothesize that *stronger linkages between the education and the employment system are associated with better results on the youth labor market*. The curriculum design phase for a VET pathway itself is one aspect where such linkages can be identified. Other aspects are related to governance or application. Identifying a meaningful set of such linkages will be the topic of the forthcoming reports.

3. Identification of Top-performing Countries

This chapter identifies the top performing countries that could be analyzed more deeply in the following phases of our investigation. In line with our analytical framework, we consider two different groups of top-performing countries. First, we identify countries whose performance in PISA is among the best. These are the countries whose students have a high probability of being positively selected after compulsory education and thus prepared for the next progression route on the post-compulsory level. Second, we select countries with the best performance on the youth labor market. These countries' students have a high likelihood of being integrated in the job market after post-compulsory education. As mentioned, the curriculum outcome—the achieved outcome compared to the intended outcome—measures the performance of the education system. We combine measurements of the curriculum outcome with the situation of young people on the labor market and learning outcomes with regard to skills and knowledge. The situation of young people on the labor market focuses on the outcome of post-compulsory education, as some programs are designed specifically to improve the youth labor situation and post-compulsory education typically leads directly to a particular occupation or type of occupation (OECD, 2004). It is not yet possible to measure learning outcomes specific to VET—there is no PISA for VET (Baethge et al., 2006)—but learning outcomes from compulsory education can be used to measure overall performance and can be regarded as a relevant input or access factor for VET programs. We use as measures PISA scores and the KOF Youth Labor Market Index—described below—as both are internationally comparable instruments and thus of interest when comparing VET curricula and identifying the top-performing countries.

3.1. Youth Labor Market Measurement

According to Human Capital Theory, education systems function to prepare young people for entrance into the labor market. Hence, education systems are responsible for the qualification and provision of human capital as one resource of the society (Baethge et al., 2006; Klieme et al., 2006; Becker, 1964). Human capital is defined as all skills that are useful to firms, so education and training represent investments in future productivity. This is important for the employment system and its programming, the labor market. On this basis, we define the intended outcome of labor market-oriented education like VET as the *successful integration of young people into the labor market.* This Feasibility Study will consider the

10 countries with the best youth labor market situations as examples of top performers in VET.

Comparisons of the situation of young people on the labor market are usually based on youth unemployment rates. However, simply looking at unemployment rates does not provide a comprehensive overview of the national situation of young people on the labor market. A more in-depth evaluation can be conducted using a system of indicators covering a broader range of characteristics (Dewan/Peek, 2007; O'Higgins, 2003; Freeman/Wise, 1982). Accordingly, a growing body of literature provides possible sets of indicators for extensively describing labor market situations (for an overview see Renold et al., 2014). However, these authors do not combine their indicators into an instrument that allows for a comparison of youth labor market situations over time and/or between countries. Only the OECD (2010) and Puerto et al. (2011) display their selected indicators in a scoreboard. However, these instruments offers only limited comparability between countries and a restricted number of observations with respect to both time and countries.

Renold et al. (2014) developed the *KOF Youth Labor Market Index* (KOF YLMI) to multi-dimensionally measure and compare the situation of adolescents aged 15 to 24 across countries. The KOF YLMI is a useful outcome measure for the CVC in post-secondary education, and based on that framework it covers not only post-compulsory education but also the tertiary education level. This is because the youth cohort in the age range of 15 to 24 is either in education and training, active in the labor market, or neither in education and training nor in the labor market. Thus, the KOF YLMI identifies high-performing countries with regard to the situation of young people on the labor market.

The KOF YLMI involves indicators for labor market integration (quantitative outcomes) as well as indicators for job quality (qualitative outcomes). Furthermore, the index includes an educational dimension. The final multi-dimensional index includes four dimensions covering different categories of indicators of the labor market situation for young people aged 15-24:

– *Activity State* gives insight into the labor market participation of young people. It includes unemployment rate, relaxed unemployment rate—which cover unemployed and discouraged workers—and the rate of young people not in employment or education and training (NEET rate).

– *Working Conditions* focuses on differences in job stability and job quality within the employed group. This dimension accounts for different working conditions including temporary working contracts, involuntary part-time work, atypical working hours, those working at risk of poverty, and vulnerable employment.
– *Education* describes the role of education with two indicators: the involvement of youth in further education or training and skills mismatch—a measure for the relevance of said education for labor market requirements.
– *Transition Smoothness* reflects the level of difficulty for youth in their transition from school to the workplace. Its indicators are relative unemployment and long-term unemployment, which are both also related to the *Activity State* dimension.

Renold et al. (2014) chose the twelve indicators that describe these dimensions based on specific criteria: each indicator must to be an outcome variable of the labor market without influencing it, and each one must be able to be ranked to allow for comparison. Importantly, data must be available to quantitatively describe these indicators.

Table 5 provides an overview of the 10 countries selected according to their high performance on the youth labor market in 2012 as described by the KOF YLMI.[5] In order to ensure comparability, we only consider countries with at least eight indicators in the KOF YLMI.

Rank	Country	Index score	Number of available indicators
1	Switzerland	5.67	11
2	Netherlands	5.57	12
3	Denmark	5.48	12
4	Norway	5.37	12
5	Germany	5.36	12
6	Austria	5.33	12
7	Luxembourg	5.21	12
8	Lithuania	5.11	10
9	Slovenia	5.05	12
10	Iceland	5.03	11

Table 5: *10 top-performing countries in 2012 according to the KOF YLMI. Note that only countries with at least 8 indicators are included in this ranking. Source: KOF; internal calculation based on revised values from the first release of the KOF YLMI.*

[5] *See http://www.kof.ethz.ch/en/indicators/ylm-index/*

3.2. Programme for International Student Assessment (PISA)

As part of its role in building human capital, education is responsible for transmitting knowledge and skills. We measure educational achievement outcomes with regard to curricula based on the *knowledge and skills demonstrated* by 15-year-old young people, which we consider not only an outcome variable of compulsory education, but also an important input factor or access criteria for VET programs. On this basis, we again identify 10 top-performing countries with regard to their performance on PISA. That assessment was developed by the OECD in order to provide a comparable profile of knowledge and skills levels among students at the end of compulsory schooling (see http://www.oecd.org/pisa/). PISA has been testing students worldwide since 2000 in the following key subjects (see also OECD, 2005):

– *Reading*: "Reading literacy is understanding, using, reflecting on and engaging with written texts, in order to achieve one's goals, develop one's knowledge and potential, and participate in society" (OECD, 2013 p. 61).
– *Mathematics*: "Mathematical literacy is an individual's capacity to formulate, employ, and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena. It assists individuals to recognize the role that mathematics plays in the world and to make the well-founded judgments and decisions needed by constructive, engaged and reflective citizens" (OECD, 2013 p. 25).
– *Science*: "Scientific literacy refers to an individual's: scientific knowledge and use of that knowledge to identify questions, acquire new knowledge, explain scientific phenomena and draw evidence-based conclusions about science-related issues; understanding of the characteristic features of science as a form of human knowledge and enquiry; awareness of how science and technology shape our material, intellectual and cultural environments; willingness to engage in science-related issues, and with the ideas of science, as a reflective citizen" (OECD, 2013 p. 100).

On this basis, the CIEB defines the top performing countries as "those countries whose students rank, on average, in the top ten on reading, mathematics and science scores on the OECD's PISA assessment in the most recent year that the assessment was administered" (see http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries).

PISA achievement is used to identify countries with successful education systems overall, which helps integrate young people into the labor market. The following Table 6 provides an overview of the 10 countries selected according to their high performance of PISA. Currently, the CIEB's list of "Top Performers" is based on the 2012 PISA results[6]. In comparison to the 2009 list, this list contains Taiwan, Estonia, and Poland; while Australia, New Zealand, and the Netherlands have been excluded. These three countries do, however, still rank above the OECD average. Finally note that Liechtenstein, despite its extremely high PISA scores, was not considered due to the small population size.[7]

Rank	Country	PISA score (average of three subjects)
1	Shanghai	587
2	Singapore	556
3	Hong Kong	554
4	Korea	542
5	Japan	540
6	Taiwan	535
7	Finland	529
8	Estonia	526
9	Canada	522
10	Poland	521

Table 6: *10 top-performing countries in 2012 by PISA score. Note that Liechtenstein was excluded due to limited relevance.*

3.3. Correlation between PISA scores and the KOF YLMI

Figure 4 shows the correlation between the two measuring instruments for the 20 top-performing countries identified based on our selection criteria. Countries are grouped with respect to their selection criteria: PISA top-10 performers are represented in dark orange and the KOF YLMI top-10 performers are in blue. In addition, we include the United States as a reference country due to the high interest of our readers in that country. PISA scores are displayed on the vertical axis and are highly comparable between countries. For the KOF YLMI values on the horizontal axis, the size of the bubble and the number inside it indicate the number of available indicators in the KOF YLMI. Smaller bubbles indicate more restricted

[6] *For further detail see http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/*

[7] *Liechtenstein's population of 37,009 individuals restricts useful comparisons with other countries.*

sets of indicators, so interpretations of these should be more cautious. While we have nearly full information of the 10 best-performing countries on the KOF YLMI in 2012, information about the 10 best-performing countries on PISA is scarce. Therefore, it might be the case that countries not ranked in the top 10 according to the KOF YLMI—in which we only consider countries with at least eight indicators—have a better value in Figure 4 than some of the countries selected based on their high performance on the youth labor market. However, these values have to be interpreted with caution. Our approach to gathering additional data for the PISA group of countries will be described in-depth in chapter 4.1. Detailed information on the data sources and availability are displayed in appendix A-3 of this report.

The most favorable situation on the youth labor marked represented by the KOF YLMI group of countries selected based on their youth labor market performance is associated relatively low scores on PISA. On the other hand, high PISA scores are, for the majority of the high-scoring PISA group, associated with relatively low performance on the youth labor market. Only Singapore, Hong Kong and Shanghai (represented by China) seem to escape from this logic. Overall, there is a positive correlation between the KOF YLMI and PISA scores, which validates our choice of instruments. The restricted set of available indicators, however, prevents further comment.

Figure 4 includes an overall trend line in black as well as separate trend lines for each group (orange and blue). The correlation between the two outcomes is now clearly less significant. This suggests that there exists some strong group-specific relationship.

The limitation of comparable indicators in the KOF YLMI for some countries (CA, CN, HK, JP, KR, SG, TW) may distort the relationship. Therefore, to check the relationship with comparable indicators, we computed the correlation between the PISA scores and a reduced version of the KOF YLMI that only considers the six commonly shared indicators. Figure 14 in the appendix A-1 displays the graphical representation of these results. With the reduced version of the KOF YLMI, all countries improve their positions with respect to labor market out comes. The improvement for the KOF YLMI top performers is, however, clearly higher. This suggests that these countries are, in the full or extended version, disadvantaged by the later-excluded indicators. In terms of correlation, the PISA top performers have similar patterns in the reduced version to those in *Figure 4*. The PISA-KOF YLMI correlation among the KOF YLMI top performers appears less strong.

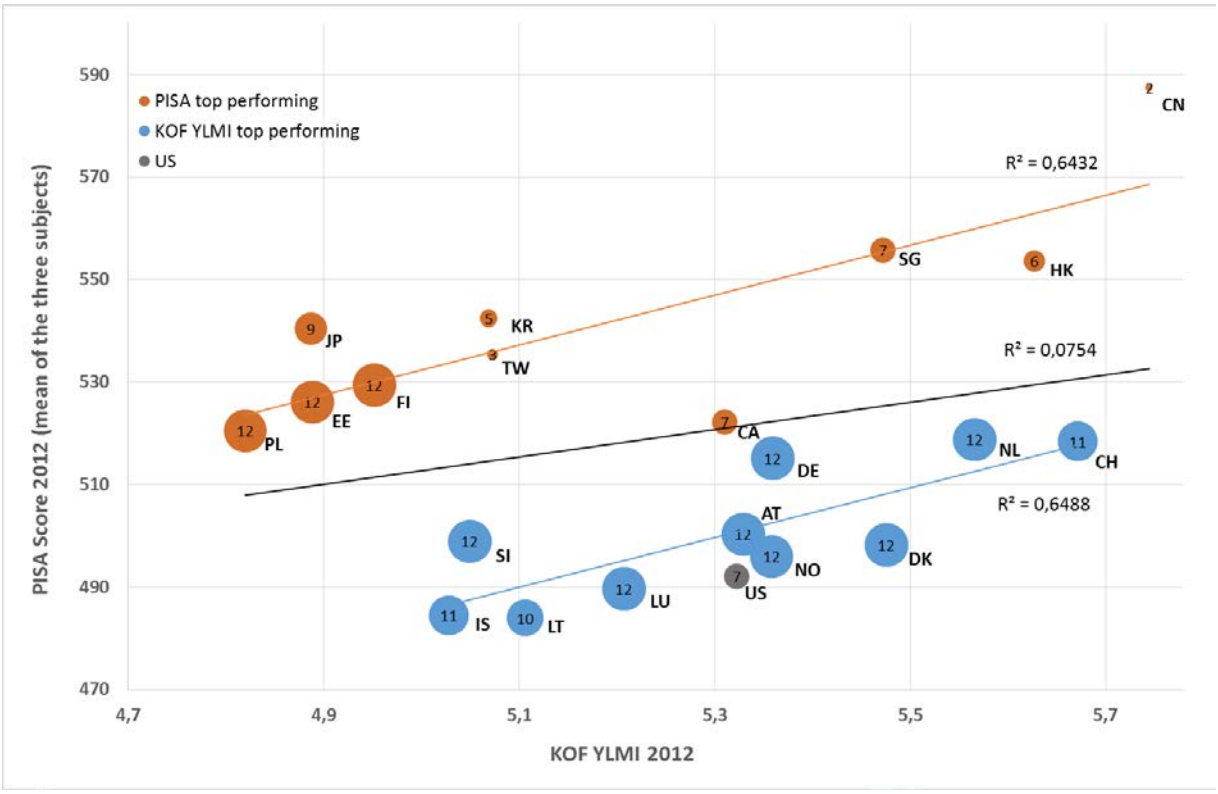


Figure 4: *Group-specific (orange and blue lines) and overall (black line) correlations between the KOF YLMI and PISA scores for the 20 top-performing countries; the size of the dots indicates the available number of indicators; China is used as a proxy for Shanghai because of missing data for the KOF YLMI*

The positive correlation between the PISA and KOF YLMI scores within each country group suggests that countries which have a successful compulsory education system also have a successful upper secondary education system. While examining the sources of these country-specific strengths goes beyond this research project, such high achievement might arise from, for example, generally high education expenditures or successful governance mechanisms that enable efficient interfaces between the labor market and education.

However, Figure 4 also shows that some countries deviate substantially from the average correlation. This is particularly true for the country group of KOF YLMI top performers. Denmark, for example, displays better labor market performance than its PISA scores would suggest. Conversely, the PISA scores of Slovenia and Germany suggest higher KOF YLMI scores than are observed in reality. In the country group with high PISA scores, the deviations are much smaller with the exceptions of Canada and Hong Kong, for which the labor market performance is above expectations. Japan is also an exception with unexpectedly low KOF YLMI scores.

These deviations suggest that countries differ in their relative strengths regarding compulsory and upper secondary education. We hypothesize that these deviations arise because countries differ regarding the involvement of the employment sector in education and training in the upper secondary education, where employees play a key role in defining the skills and knowledge demanded by the labor market. Furthermore, countries able to balance the linkages between the education and employment systems—those who consider VET as "education beyond schools"—achieve a comparative advantage in the public financing of the whole education system due to the high investment by the business sector in education and training (for Switzerland see Egg/Renold, 2015).

The next chapter presents detailed information on the 20 selected countries in terms of youth labor market situation and PISA achievement. In the end, we provide descriptive comparisons of all countries on these curriculum outcome measures.

4. Descriptions of the 20 Top-performing Countries

4.1. Outline

As mentioned in the previous chapter, we select countries with respect to two measurements, the situation of young people on the labor market and educational achievement. The former is represented by the KOF YLMI and the latter by PISA scores. This chapter presents a compact profile of each country for both dimensions. The aim is to provide information about their evolution over time as well as detailed values for the year 2012.

PISA scores

We use PISA data for all waves until the present, specifically 2000, 2003, 2006, 2009 and 2012. PISA assessments cover the following three subjects: *Reading, Mathematics,* and *Science*. In each of these subjects, scores range over a 1,000-point scale (see OECD, 2013). Because of relatively low dispersion, we simply present the mean of all three subjects in the following country-specific fact sheets. In addition, we provide some details on the outcome dimensions in Chapter 3.

Composition of the KOF-Youth Labor Market Index

The KOF YLMI offers a multidimensional estimation of curriculum outcomes. It portrays the multifaceted situation of young people (15-24 years old) on the labor market. The index is composed of 12 indicators subdivided into four categories (see chapter 3.1). The value of each indicator is standardized on a scale ranging between 1 and 7, where higher is better. As a result, scores in each category and for the whole index also range between 1 and 7. The KOF YLMI is a weighted sum of all indicators for each country in a given year. Each of the four categories accounts for a quarter of the index value. The indicators within each category receive equal weight. Note that different categories have different numbers of indicators, so it is the four categories rather than the 12 indicators that are equally weighted. Furthermore, data availability may also change the number of indicators. In this case, we simply subdivide the category among the available indicators to maintain equally weighted categories. For further details on the construction of the KOF YLMI and the weighting process, see Renold et al. (2014).

Data Availability

Data availability differs by dataset. While the set of PISA scores is almost complete: all countries analyzed here took part in the 2009 and 2012 assessments, and the vast majority participated in 2000, 2003, and 2006. Unfortunately, this does not apply for the KOF YLMI, for which data availability is partially limited. We already have full information of the 10 best-performing countries on the KOF YLMI in 2012[8], but information about the 10 best-performing countries on PISA is scarce. First, the KOF YLMI dataset does not include values for Shanghai as PISA does. In addition, the available values for other countries are mostly restricted to few common indicators (unemployment rate, vulnerable employment rate, relative unemployment ratio, and long-term unemployment rate). Our approach to gathering additional data for this second group of countries is as follows: we start by looking for data provided by international organizations that was not considered in the first release of the KOF YLMI. Second, we look for data on identical or similar indicators[9] at the national level from national statistical offices. This approach increased the number of indicators for this set of countries by, on average, two indicators. Even though the set of indicators still remains incomplete for some countries, we consider the available information sufficient for this first evaluation. Detailed information on the data sources and availability are displayed in appendix A-3 of this report.

Finally, data availability for all countries becomes scarce far in the past. The best comparability is available in 2012.

[8] *The only exceptions are Switzerland and Iceland that each have 11 indicators out of 12, and Lithuania that has 10 indicators out of 12.*

[9] *For example: involuntary part-time in Hong Kong and Singapore is defined by a threshold of 35 hours per week, while in the KOF YLMI it was set at 30.*

How to Read a Country Fact Sheet

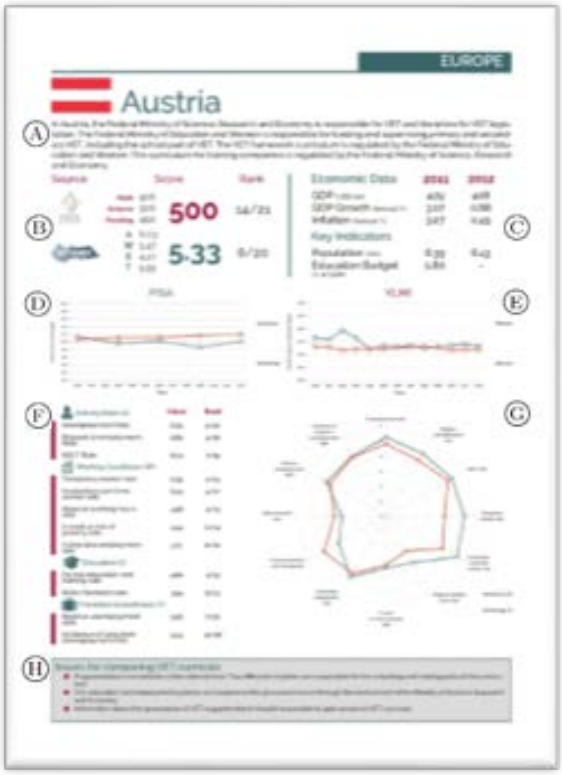


Figure 5: *Depiction of a country fact sheet with description marks A to H*

Ⓐ Basic information on the education system

Fact sheets contain information about the control of VET and its curriculum. The most relevant information for curriculum comparison is the level of government and the responsible authorities, as well as the curriculum-setting agency. This information will be examined in more detail in the next project phases. The short description shows how heterogeneous control of VET is in these countries at a glance. All references used can be found in appendix A-2.

Ⓑ Main PISA and KOF YLMI scores and ranks

This section summarizes the country's performance with respect to educational achievement (PISA scores) and the youth labor market situation (KOF YLMI). All values refer to the year 2012. Beyond the overall scores, we report the subcategory scores as well as the country's position among the countries covered here (rank). For the KOF YLMI, these rankings need to be interpreted with caution as the index is based on different numbers of indicators, especially for the countries selected according to their high performance in PISA. Shanghai, for example, ranks first in the KOF YLMI but has not been included in the top-performing

countries with high performance on the youth labor market (see chapter 3.1), as we considered only countries with at least eight indicators on the KOF YLMI in 2012.

© Key figures

The following information on each country's economic data and key indicators completes the basic context (sources for data and definitions provided in parentheses):

– *GDP (World Bank*[10]*): "*GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used."

– *GDP Growth* (World Bank): "Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources."

– *Inflation (*World Bank*)*: "Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used."

– *Population (*World Bank*):* "Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin. The values shown are midyear estimates."

[10] *See http://data.worldbank.org/data-catalog/world-development-indicators*

– *Education Budget* (UNESCO[11]): General government expenditure on education (current, capital, and transfers) is expressed as a percentage of GDP and includes expenditure funded by transfers from international sources to government. General government usually refers to local, regional and central governments.

Ⓓ PISA scores over time

The chart displays the evolution of the PISA scores over time using the average of the three subjects. The red line plots the average of all 20 countries.

Ⓔ KOF YLMI over time

The chart displays the evolution of the KOF YLMI scores over time. The red line plots the average of all 20 countries. To accentuate the interpretation problem that arises if a country has less than eight indicators, we differentiate the type of line in the graph: dashed lines indicate index values resulting from fewer than eight indicators, otherwise the line is solid.

Ⓕ Scoreboard of KOF YLMI

This column reports detailed values for the 12 indicators that compose the KOF YLMI. Again, all numbers refer to the year 2012. In addition, each indicator's specific ranking is displayed. Note that the total number of countries with available data may be different across indicators.

Ⓖ KOF YLMI Spider web

The chart provides a multidimensional presentation of each indicator's values in 2012 as reported in the scoreboard. The values are on a scale ranging from 1 to 7. Again, the red line plots the average of the whole set of countries with available data.

Ⓗ Issues for comparing VET curricula

The box provides preliminary information about challenges that we will face with regard to a VET curriculum comparison. These might include fragmentation of governance or difficulties in accessing relevant curricula. All references used can be found in appendix A-2.

[11] *See http://data.uis.unesco.org/index.aspx?queryid=181&lang=en*

4.2. The 10 countries with the World's Best Situation on the Youth Labor Market

As explained in chapter 3, we select the first batch of top-performing countries based on the KOF YLMI. In doing so, we suggest that the situation of young people on the labor market measures one outcome of VET and thus the efficiency of the system. The 10 countries selected according to their high performance on the youth labor market as described by the KOF YLMI are: Switzerland (CH), the Netherlands (NL), Denmark (DK), Norway (NO), Germany (DE), Austria (AT), Luxembourg (LU), Lithuania (LT), Slovenia (SI), and Iceland (IS).

Country-specific Fact Sheets

For each country, this chapter presents a fact sheet on the national youth labor market situation based on the KOF YLMI and on the PISA scores.

EUROPE

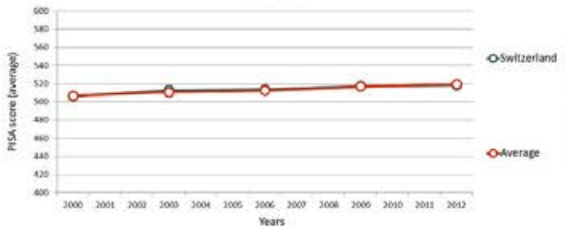
Switzerland

In Switzerland, Vocational and Professional Education and Training (VPET) is under the Ministry of Economy, Education and Research. The State Secretariat for Education, Research and Innovation (SERI) issues education ordinances for each VET program. VET ordinances shall be issued at the request of professional organizations (Article 19 VPETA).

Source		Score	Rank
OECD PISA	Math 531 Science 515 Reading 509	518	12/20
KOF YLM INDEX	A 5.96 W 5.55 E 5.62 T 5.56	5.67	2/20

Economic Data	2011	2012
GDP (US$, bn)	696.3	666.1
GDP Growth (Annual %)	1.8	1.11
Inflation (Annual %)	0.23	-0.67
Key Indicators		
Population (mn)	7.91	8.00
Education Budget (% of GDP)	5.27	-

PISA



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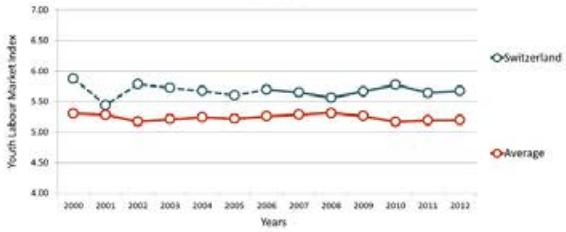
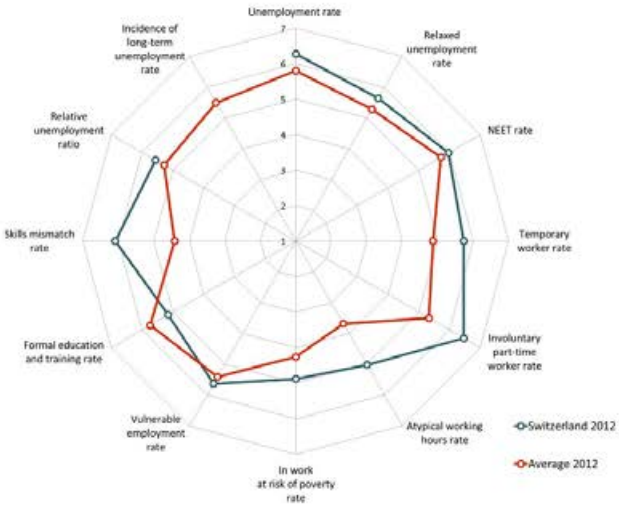


	Score	Rank
Activity State (A)		
Unemployment Rate	6.27	3/20
Relaxed Unemployment Rate	5.64	5/15
NEET Rate	5.96	10/18
Working Conditions (W)		
Temporary worker rate	5.73	5/13
Involuntary part time worker rate	6.46	3/16
Atypical working hours rate	5.02	1/13
In work at risk of poverty rate	4.88	9/14
Vulnerable employment rate	5.63	10/19
Education (E)		
Formal education and training rate	5.15	12/13
Skills mismatch rate	6.09	1/13
Transition Smoothness (T)		
Relative unemployment ratio	5.56	7/20
Incidence of long term Unemployment rate	-	-/-



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- The education and employment systems appear to be coupled. Social partners are included.
- It should be possible to access VET curricula through the Professional Organizations or the SERI.

EUROPE

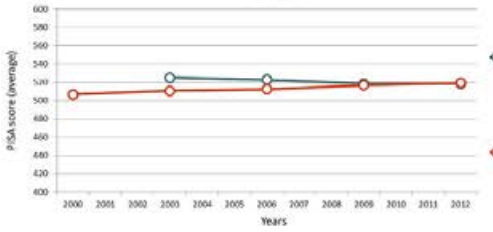
The Netherlands

In the Netherlands, the Ministry of Education, Culture and Science is responsible for all vocational education and training. Curriculum development and assessment is the responsibility of the individual schools. However, representatives of social partners and education develop the qualification profiles used to develop educational standards, which are in turn adopted by the Ministries of Education, Culture and Science and of Economy, Agriculture and Innovation. This development work is done by the 17 branch-specific Knowledge Centers for VET, Trade and Industry.

Source	Score		Rank
OECD PISA	Math 523 Science 522 Reading 511	**519**	11/20
KOF YLM INDEX	A 6.04 W 5.38 E 5.14 T 5.71	**5.57**	4/20

Economic Data	2011	2012
GDP (US$, bn)	893.8	823.1
GDP Growth (Annual %)	1.66	-1.59
Inflation (Annual %)	2.34	2.45
Key Indicators		
Population (mn)	16.69	16.75
Education Budget (% of GDP)	5.93	-

PISA



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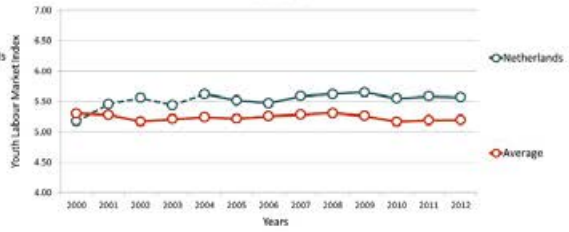
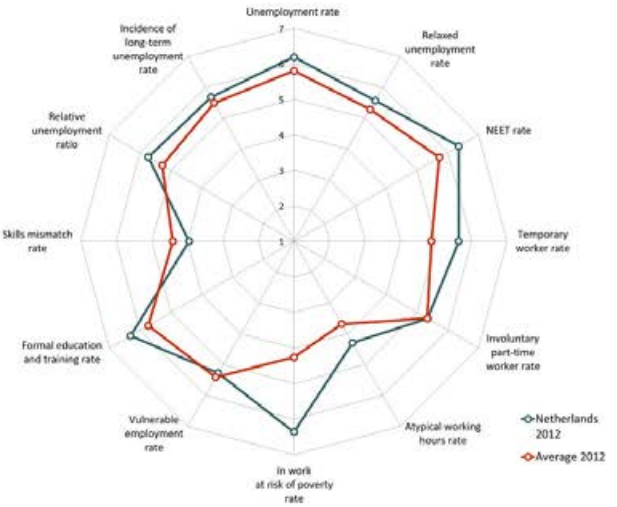


Activity State (A)	Score	Rank
Unemployment Rate	6.19	8/20
Relaxed Unemployment Rate	5.57	7/15
NEET Rate	6.35	2/18
Working Conditions (W)		
Temporary worker rate	5.64	6/13
Involuntary part time worker rate	5.34	10/16
Atypical working hours rate	4.29	6/13
In work at risk of poverty rate	6.36	1/14
Vulnerable employment rate	5.28	14/19
Education (E)		
Formal education and training rate	6.32	3/13
Skills mismatch rate	3.96	7/13
Transition Smoothness (T)		
Relative unemployment ratio	5.74	3/20
Incidence of long term Unemployment rate	5.68	9/17



Issues for comparing VET curricula

- Fragmentation is remarkable at the national level. One Ministry is responsible for VET, but curriculum development and assessment are the responsibility of individual schools.
- The education and employment systems appear to be coupled. Social partners are included.
- It will be difficult to access the relevant VET curricula, and they may not be comparable within the country.

EUROPE

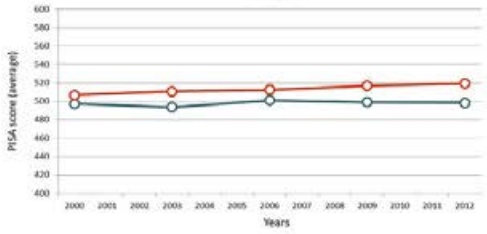
Denmark

In Denmark, decision making, oversight and implementation are centralized in the Ministries of Education and of Children and Education. The provision of VET is decentralized among many providers. The parliament sets out the overall framework for initial vocational upper secondary education and training (IVET), which is administered by the Ministry of Children and Education. Within the IVET legislative framework, curricula and methodologies are adapted to meet the needs of students and the labor market by stakeholders, social partners, colleges and enterprises.

Source		Score	Rank
OECD PISA	Math 500 Science 498 Reading 496	498	16/20
KOF YLM INDEX	A 5.63 W 4.86 E 5.56 T 5.86	5.48	5/20

Economic Data	2011	2012
GDP (US$, bn)	341	322
GDP Growth (Annual %)	1.15	-0.66
Inflation (Annual %)	2.76	2.41
Key Indicators		
Population (mn)	5.57	5.59
Education Budget (% of GDP)	8.75	-

PISA



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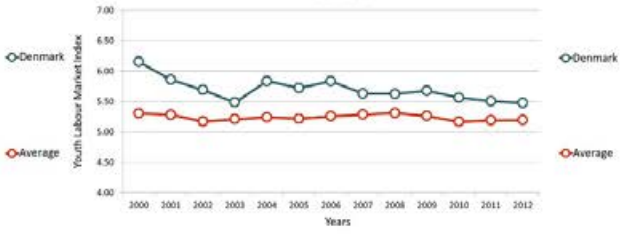
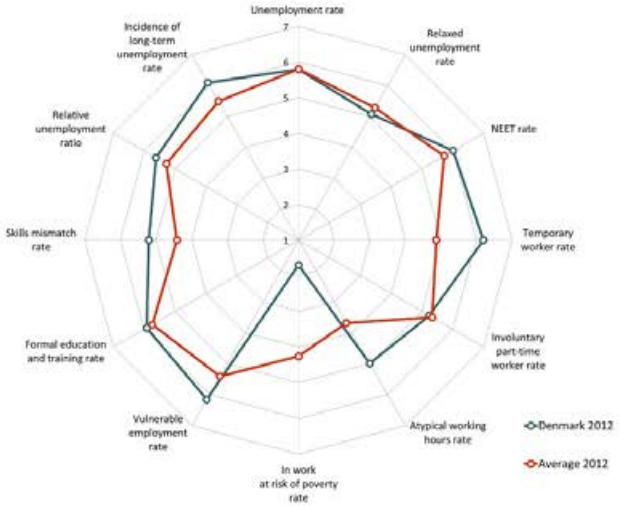


Activity State (A)	Score	Rank
Unemployment Rate	5.79	13/20
Relaxed Unemployment Rate	5.08	10/15
NEET Rate	6.01	8/18
Working Conditions (W)		
Temporary worker rate	6.19	3/13
Involuntary part time worker rate	5.23	11/16
Atypical working hours rate	4.99	2/13
In work at risk of poverty rate	1.70	13/14
Vulnerable employment rate	6.16	3/19
Education (E)		
Formal education and training rate	5.92	5/13
Skills mismatch rate	5.20	3/13
Transition Smoothness (T)		
Relative unemployment ratio	5.62	5/20
Incidence of long term Unemployment rate	6.10	7/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- The education and employment systems appear to be coupled. Social partners are involved.
- It will be difficult to access the relevant VET curricula, and they may not be comparable within the country.

EUROPE

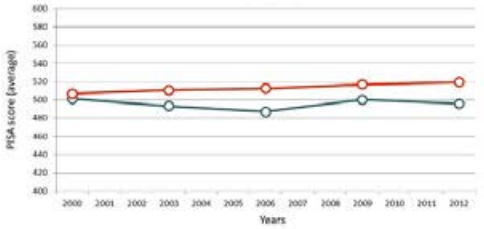
Norway

In Norway, the Ministry of Education and Research assumes overall responsibility for national policy development and the administration of education and training at all levels, from kindergarten to higher education including adult education. The Norwegian directorate for education and training is responsible for continuous curriculum development. For this purpose, it makes extensive use of nine Vocational Training Councils and expert groups from both schools and companies that provide upper secondary education.

Source		Score	Rank
OECD PISA	Math 489 Science 495 Reading 504	496	17/20
KOF YLM INDEX	A 5.99 W 5.01 E 4.74 T 5.75	5.37	7/20

Economic Data	2011	2012
GDP (US$, bn)	490.8	500.0
GDP Growth (Annual %)	1.34	2.90
Inflation (Annual %)	1.30	0.71
Key Indicators		
Population (mn)	4.95	5.02
Education Budget (% of GDP)	5.93	-

PISA



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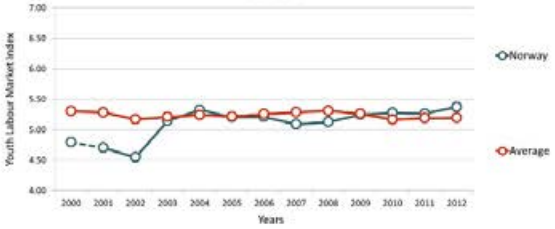
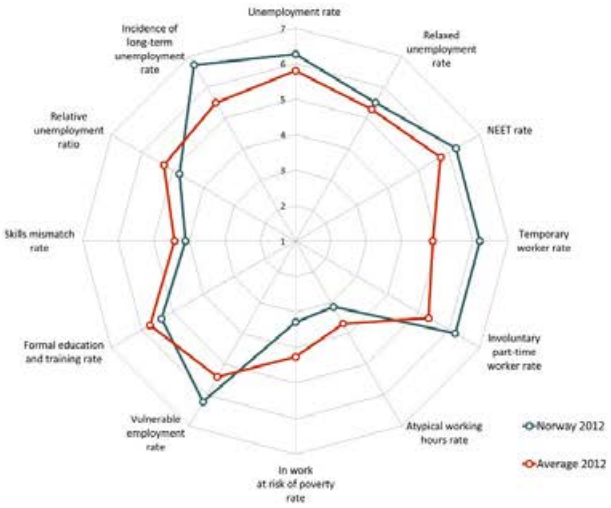


Activity State (A)	Score	Rank
Unemployment Rate	6.26	4/20
Relaxed Unemployment Rate	5.50	8/15
NEET Rate	6.22	3/18
Working Conditions (W)		
Temporary worker rate	6.20	1/13
Involuntary part time worker rate	6.20	5/16
Atypical working hours rate	3.14	9/13
In work at risk of poverty rate	3.28	12/14
Vulnerable employment rate	6.22	2/19
Education (E)		
Formal education and training rate	5.37	10/13
Skills mismatch rate	4.11	6/13
Transition Smoothness (T)		
Relative unemployment ratio	4.78	18/20
Incidence of long term Unemployment rate	6.73	3/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- The education and employment systems appear to be coupled. Social partners are included.
- It should be possible to access VET curricula through the Ministry of Education and Research.

EUROPE

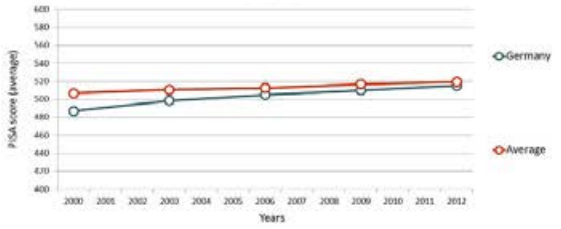
Germany

In Germany, the Federal Ministry of Education and Research is responsible for general policy issues of the schooling element of VET. The Federal-State Coordination Committee for VET regulations and framework curricula approves the new vocational training regulations and associated framework curricula. Individual training regulations are adopted by the relevant ministries (usually the Federal Ministry of Economy) in agreement with the Federal Ministry of Education and Research.

Source		Score	Rank
OECD PISA	Math 514 Science 524 Reading 508	515	13/20
KOF YLM INDEX	A 6.11 W 5.38 E 4.57 T 5.36	5.36	8/20

Economic Data	2011	2012
GDP (US$, bn)	3752.1	3533.2
GDP Growth (Annual %)	3.59	0.38
Inflation (Annual %)	2.08	2.01
Key Indicators		
Population (mn)	81.80	80.43
Education Budget (% of GDP)	8.75	-

PISA



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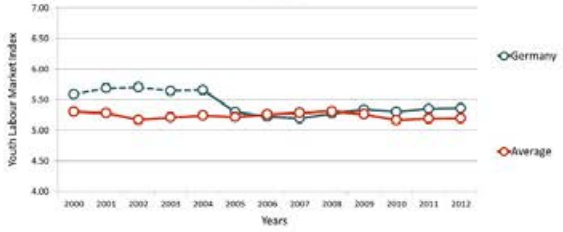
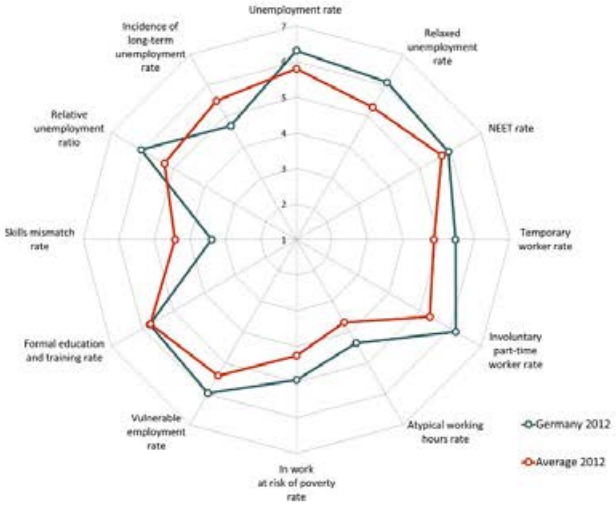


Activity State (A)	Score	Rank
Unemployment Rate	6.31	2/20
Relaxed Unemployment Rate	6.10	2/15
NEET Rate	5.94	11/18
Working Conditions (W)		
Temporary worker rate	5.47	7/13
Involuntary part time worker rate	6.18	6/16
Atypical working hours rate	4.35	5/13
In work at risk of poverty rate	4.94	7/14
Vulnerable employment rate	5.98	5/19
Education (E)		
Formal education and training rate	5.76	7/13
Skills mismatch rate	3.38	13/13
Transition Smoothness (T)		
Relative unemployment ratio	6.04	1/20
Incidence of long term Unemployment rate	4.69	12/17



Issues for comparing VET curricula

- Fragmentation is remarkable at the national level. Two different ministries are responsible for the schooling and training parts of the curriculum.
- The education and employment systems are coupled on the governance level through the involvement of the Ministry of Economy.
- Information about the governance of VET suggests that it should be possible to gain access to VET curricula.

EUROPE

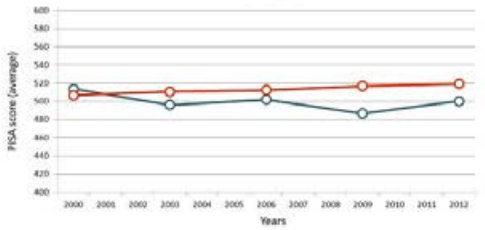
Austria

In Austria, the Federal Ministry of Science, Research and Economy is responsible for VET and therefore for VET legislation. The Federal Ministry of Education and Women is responsible for funding and supervising primary and secondary VET, including the school part of VET. The VET framework curriculum is regulated by the Federal Ministry of Education and Women. The curriculum for training companies is regulated by the Federal Ministry of Science, Research and Economy.

Source		Score	Rank
OECD PISA	Math 506 Science 506 Reading 490	500	14/20
KOF YLM INDEX	A 6.03 W 5.47 E 4.27 T 5.55	5.33	9/20

Economic Data	2011	2012
GDP (US$, bn)	429	408
GDP Growth (Annual %)	3.07	0.88
Inflation (Annual %)	3.27	2.49
Key Indicators		
Population (mn)	8.39	8.43
Education Budget (% of GDP)	5.80	-

PISA



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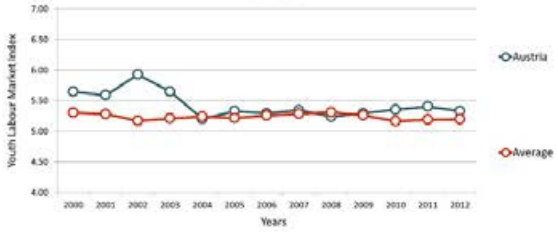
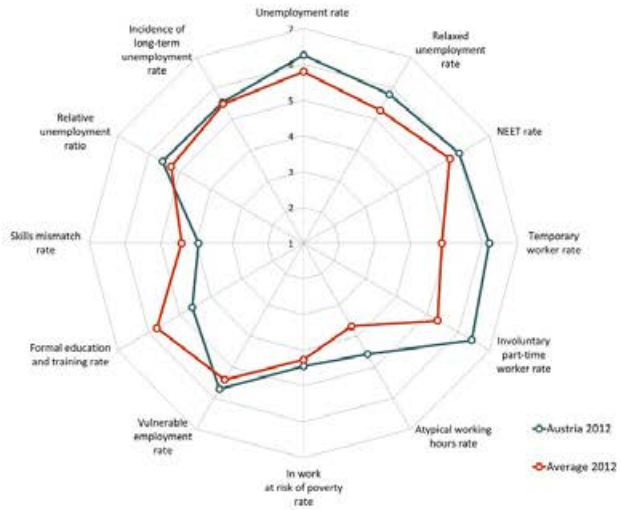


Activity State (A)	Score	Rank
Unemployment Rate	6.25	5/20
Relaxed Unemployment Rate	5.80	3/15
NEET Rate	6.03	7/18
Working Conditions (W)		
Temporary worker rate	6.19	2/13
Involuntary part time worker rate	6.43	4/16
Atypical working hours rate	4.58	4/13
In work at risk of poverty rate	4.44	11/14
Vulnerable employment rate	5.71	8/19
Education (E)		
Formal education and training rate	4.60	13/13
Skills mismatch rate	3.94	8/13
Transition Smoothness (T)		
Relative unemployment ratio	5.56	7/20
Incidence of long term Unemployment rate	5.54	10/17



Issues for comparing VET curricula

- Fragmentation is remarkable at the national level. Two different ministries are responsible for the schooling and training parts of the curriculum.
- The education and employment systems are coupled on the governance level through the involvement of the Ministry of Science, Research and Economy.
- Information about the governance of VET suggests that it should be possible to gain access to VET curricula.

EUROPE

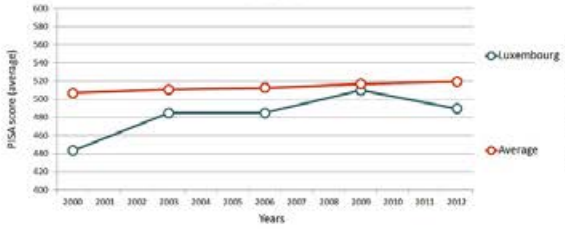
Luxembourg

In Luxembourg, the Ministry of National Education, Childhood and Youth (MENJE) is responsible for all education including vocational training, except for higher education. The MENJE and the Professional Chambers (status of public establishments) develop the standards for VET together, thereby building a direct and concrete link between the development of curricula based on labour market standards and the needs of the labor market.

Source		Score	Rank
OECD PISA	Math 490 Science 491 Reading 488	**490**	18/20
KOF YLM INDEX	A 5.23 W 5.38 E 5.53 T 4.69	**5.21**	11/20

Economic Data	2011	2012
GDP (US$, bn)	59.0	56.3
GDP Growth (Annual %)	2.61	-0.16
Inflation (Annual %)	3.41	2.66
Key Indicators		
Population (mn)	0.52	0.53
Education Budget (% of GDP)	5.17	-

PISA



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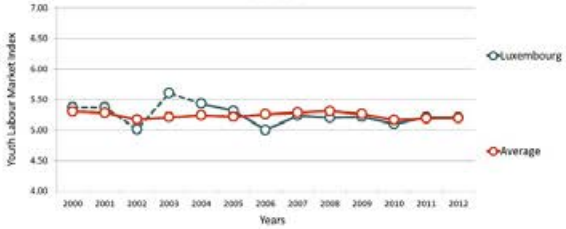
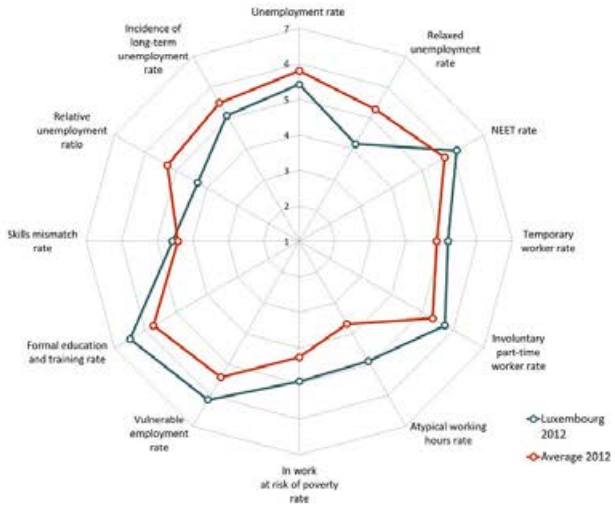


Activity State (A)	Score	Rank
Unemployment Rate	5.41	16/20
Relaxed Unemployment Rate	4.16	13/15
NEET Rate	6.11	4/18
Working Conditions (W)		
Temporary worker rate	5.18	8/13
Involuntary part time worker rate	5.73	9/16
Atypical working hours rate	4.89	3/13
In work at risk of poverty rate	4.94	7/14
Vulnerable employment rate	6.15	4/19
Education (E)		
Formal education and training rate	6.50	2/13
Skills mismatch rate	4.57	5/13
Transition Smoothness (T)		
Relative unemployment ratio	4.30	19/20
Incidence of long term Unemployment rate	5.08	11/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- The education and employment systems appear to be coupled. Social partners are included.
- It should be possible to access VET curricula through the Ministry of National Education, Childhood and Youth.

EUROPE

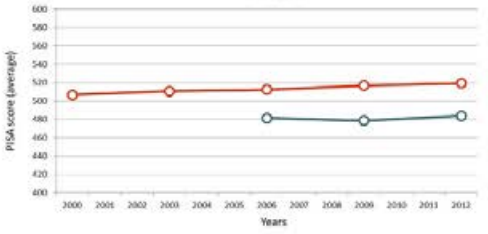
Lithuania

In Lithuania, responsibility for shaping and implementing VET policy is undertaken by the Ministry of Education and Science. A special role in developing human resources has been given to the Ministry of Economy. VET programs are developed by training providers in cooperation with representatives of employers. When developing programs, providers follow the VET standards and general requirements approved by the Minister for Education and Science.

Source		Score	Rank
OECD PISA	Math 479 Science 496 Reading 477	**484**	19/20
KOF YLM INDEX	A 5.04 W 5.47 E 4.86 T 5.05	**5.11**	12/20

Economic Data	2011	2012
GDP (US$, bn)	43.1	42.3
GDP Growth (Annual %)	6.00	3.70
Inflation (Annual %)	4.13	3.08
Key Indicators		
Population (mn)	3.03	2.99
Education Budget (% of GDP)	5.17	-

PISA



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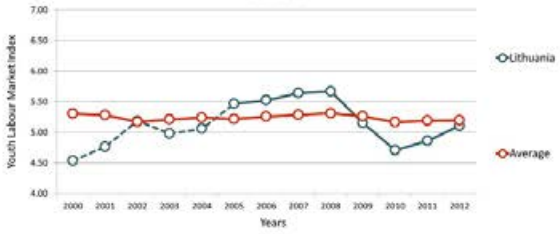
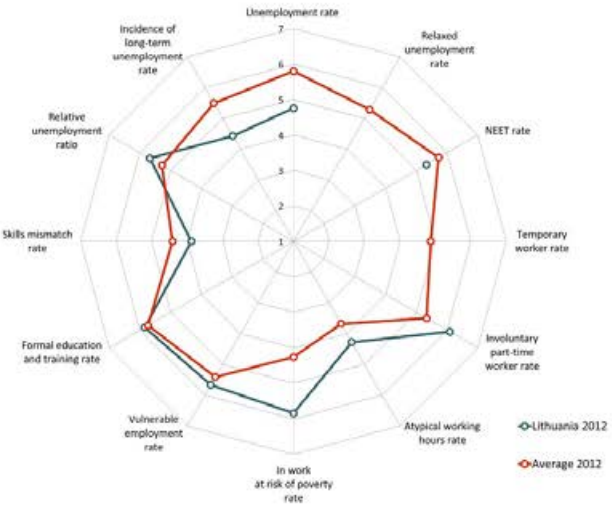


Activity State (A)	Score	Rank
Unemployment Rate	4.75	19/20
Relaxed Unemployment Rate	-	-/-
NEET Rate	5.32	14/18
Working Conditions (W)		
Temporary worker rate	-	-/-
Involuntary part time worker rate	6.09	7/16
Atypical working hours rate	4.28	7/13
In work at risk of poverty rate	5.84	2/14
Vulnerable employment rate	5.67	9/19
Education (E)		
Formal education and training rate	5.85	6/13
Skills mismatch rate	3.88	10/13
Transition Smoothness (T)		
Relative unemployment ratio	5.68	4/20
Incidence of long term Unemployment rate	4.43	14/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- The education and employment systems appear to be coupled. Social partners are included.
- It should be possible to access VET curricula through the Ministry of Education and Science.

EUROPE

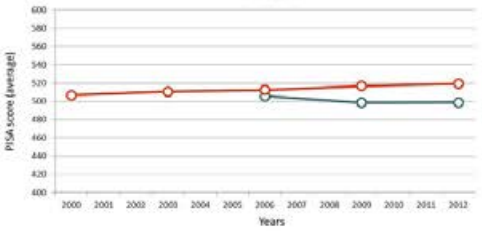
Slovenia

In Slovenia, the education system is under the supervision of the Ministry of Education and Sport (MOES). The MOES is also supported by three national agencies: the National Education Institute, the Institute for Vocational Education and Training (establishes in 1996), and the Slovenian Institute for Adult Education. Under the MOES, the Council of Experts for Technical and Vocational Education and Council of Experts for Adult Education deal with developing curricula for vocational education.

Source		Score	Rank
OECD PISA	Math 501 Science 514 Reading 481	499	15/20
KOF YLM INDEX	A 5.14 W 4.18 E 6.26 T 4.61	5.05	15/20

Economic Data	2011	2012
GDP (US$, bn)	51.2	46.3
GDP Growth (Annual %)	0.61	-2.64
Inflation (Annual %)	1.81	2.60
Key Indicators		
Population (mn)	2.05	2.06
Education Budget (% of GDP)	5.68	-

PISA



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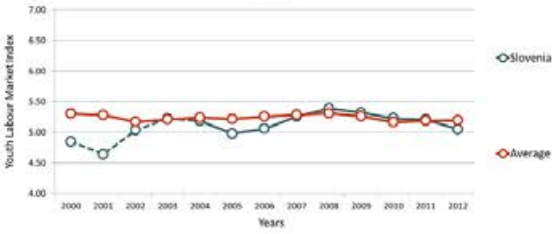
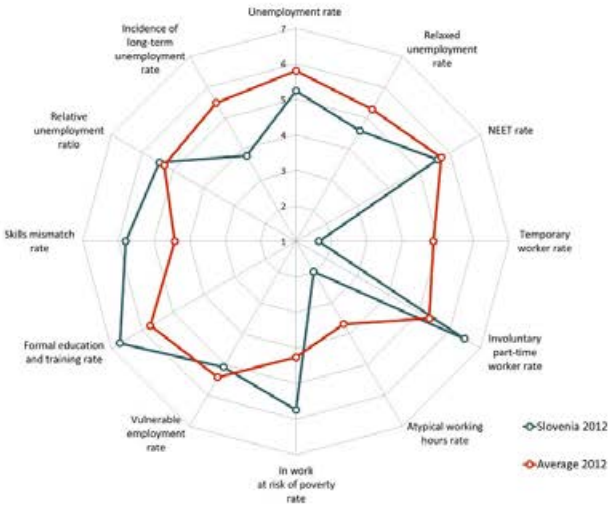


Activity State (A)	Score	Rank
Unemployment Rate	5.23	17/20
Relaxed Unemployment Rate	4.59	11/15
NEET Rate	5.60	13/18
Working Conditions (W)		
Temporary worker rate	1.64	13/13
Involuntary part time worker rate	6.48	2/16
Atypical working hours rate	1.99	12/13
In work at risk of poverty rate	5.74	3/14
Vulnerable employment rate	5.08	15/19
Education (E)		
Formal education and training rate	6.72	1/13
Skills mismatch rate	5.80	2/13
Transition Smoothness (T)		
Relative unemployment ratio	5.44	10/20
Incidence of long term Unemployment rate	3.78	17/17



Issues for comparing VET curricula

- Fragmentation is remarkable at the national level. One ministry and three national agencies are responsible for VET. Furthermore, two Councils of Experts are involved in curriculum development.
- The education and employment systems appear to be coupled. Social partners are included.
- Accessing VET curricula needs to be clarified. It should be possible through the Council of Experts for TVET.

EUROPE

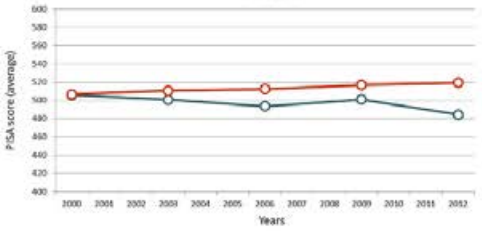
Iceland

In Iceland, the Ministry of Education, Science and Culture bears the overall responsibility for education and training for the labor market. Continuous vocational education and training of working people is the responsibility of this Ministry, as is governance of training. The Ministry of Education, Science and Culture validates the curricula for all upper secondary education and training. The curricula for certified trades are developed in cooperation with social partners in each profession through the Occupational Councils.

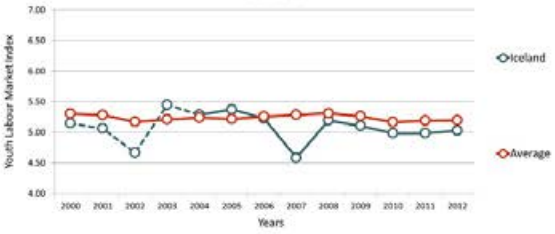
Source		Score	Rank
OECD PISA	Math 493 Science 478 Reading 483	484	19/20
KOF YLM INDEX	A 5.69 W 4.12 E 4.65 T 5.65	5.03	16/20

Economic Data	2011	2012
GDP (US$, bn)	14.7	14.2
GDP Growth (Annual %)	2.13	1.15
Inflation (Annual %)	3.99	5.20
Key Indicators		
Population (mn)	0.32	0.32
Education Budget (% of GDP)	7.36	-

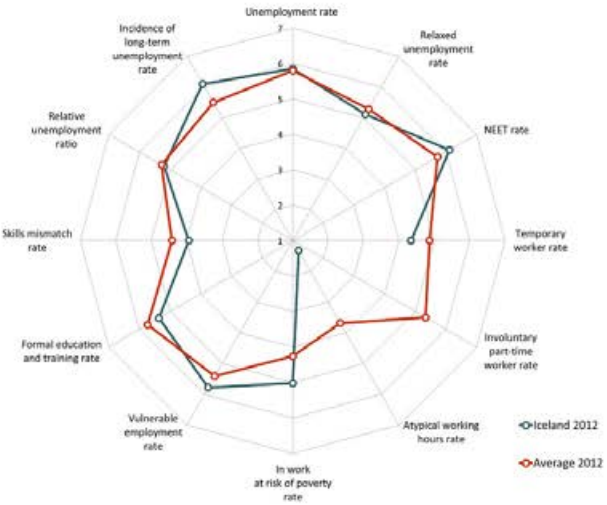
PISA



YLMI



Activity State (A)	Score	Rank
Unemployment Rate	5.85	12/20
Relaxed Unemployment Rate	5.11	9/15
NEET Rate	6.11	4/18
Working Conditions (W)		
Temporary worker rate	4.34	10/13
Involuntary part time worker rate	-	-/-
Atypical working hours rate	1.33	13/13
In work at risk of poverty rate	5.02	6/14
Vulnerable employment rate	5.78	7/19
Education (E)		
Formal education and training rate	5.37	10/13
Skills mismatch rate	3.94	8/13
Transition Smoothness (T)		
Relative unemployment ratio	5.20	13/20
Incidence of long term Unemployment rate	6.10	7/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- The education and employment systems appear to be coupled. Social partners are included.
- Accessing VET curricula should be possible as they are approved by the Ministry of Education, Science and Culture.

The leaders on the youth labor market: Switzerland, Denmark and the Netherlands

Figure 6 reports the evolution of the KOF YLMI over time for Switzerland, Denmark, and the Netherlands, which have the highest values of the KOF YLMI 2012. The red line provides additional information about the average of the 20 top-performing countries. The dashed lines indicate that the number of available indicators was less than eight. Interpretation of those time periods should be done with caution. Since 2006, the values are very similar.

One can easily observe that the three countries perform markedly better than average. A detailed look at the graph along this timeline tells an interesting story: the economic crisis or so-called Great Recession that started in 2008 might have affected the general condition on the labor market negatively (note the average decrease since 2008), but that situation is different across countries. While Denmark exhibits a negative trend, the Great Recession has no visible impact for Switzerland and there is even a small increase in Switzerland's KOF YLMI score over time. Finally, the Netherlands shows a relatively stable trend.

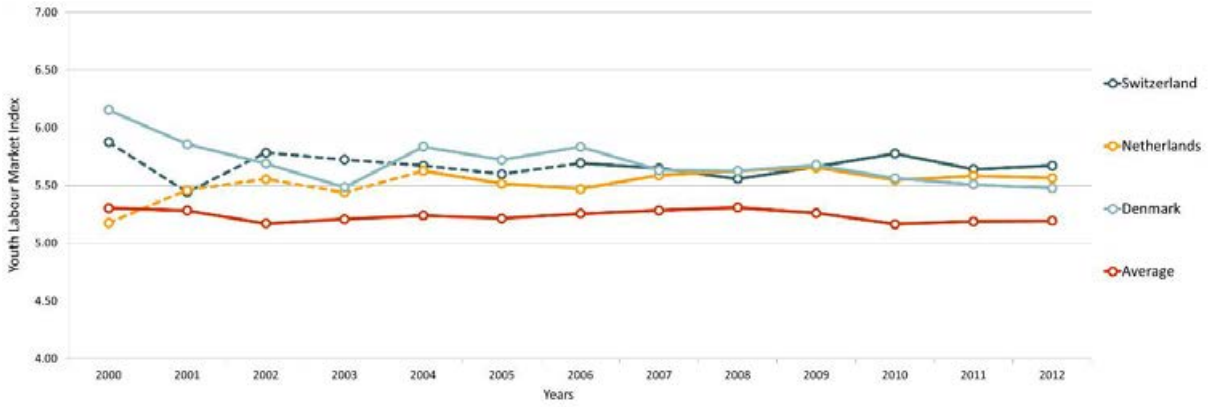


Figure 6: *Evolution over time of the KOF YLMI in Switzerland, Denmark, and the Netherlands and the average of 20 countries analyzed in this report*

Similar values at the aggregate level—the main KOF YLMI score—do not necessarily mean equal conditions on the labor market. Figure 7 shows the multidimensional representation of these three countries in 2012. We again provide the average of the 20 countries for benchmarking purposes.

At first glance, this spider web confirms our earlier observation: despite very close (and high) index scores, there remain substantial differences across countries for some indicators. For instance, while the indicators composing *Activity State* show similar above-average scores, this does not happen in the case of *Working Conditions*. Denmark's poor performance with respect to the share of youth in work at risk of poverty is noteworthy, especially in light of

the Netherlands' exceptionally high value for the same indicator. In the case of vulnerable employment, the Netherlands is the one performing below average. Finally, all three countries perform above average for temporary employment and atypical working hours.

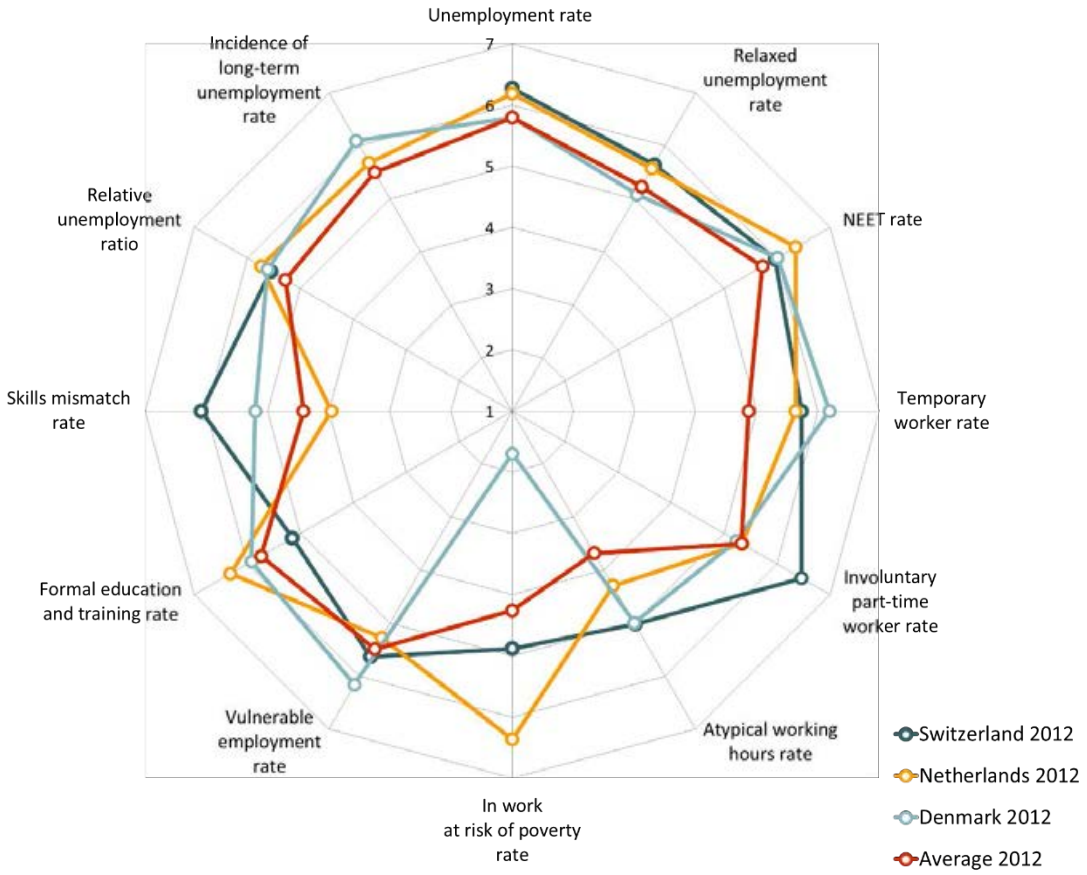


Figure 7: *KOF YLMI spider web for Switzerland, the Netherlands and Denmark in 2012 as well as for the average of 20 countries analyzed in this report*

With regard to the category *Education*, one can easily obverse a particular pattern: the Netherlands is the best performer on "Formal education and training rate," but scores below average on "Skills mismatch." Switzerland shows a mirror-inverted situation. Lastly, the scores in the category *Transition Smoothness*, which includes "Relative unemployment ratio" and "Long-term unemployment rate," lie above average for the Netherlands and Denmark[12].

[12] *Unfortunately we have no internationally comparable value for Switzerland for the long-term unemployment rate.*

4.3. The 10 countries with the World's Best-Performing Education Systems

As explained in chapter 3, we select the second batch of top-performing countries based on their PISA scores. In doing so, we identify countries with successful education systems overall, which is helpful for integrating young people into the labor market. The 10 countries selected according to their high performance in PISA are: Shanghai (CN), Singapore (SG), Hong Kong (HK), Korea (KR), Japan (JP), Taiwan (TW), Finland (FI), Estonia (EE), Canada (CA), and Poland (PL).

Country-specific Fact Sheets

For each of these countries, we present a fact sheet. As previously mentioned, for some of these countries data availability for the KOF YLMI may be limited. We extended the existing dataset from the first release of the KOF YLMI by looking at national level for comparable and reliable values. Appendix A-3 reports the exact source for each variable.

ASIA

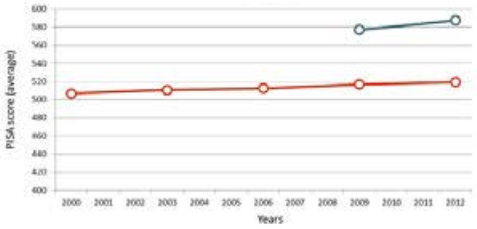
Shanghai, China

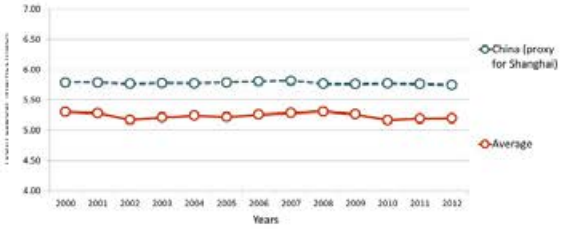
In Shanghai, according to the Chinese law, the Education Administration Department of the State Council is responsible for the overall planning, comprehensive coordination, and macro- level control of VET as overseen by the Ministry of Education of the People's Republic of China and the Ministry of Human Resources and Social Security. A National Inter-Ministry TVET Coordinating Committee organizes TVET. The Ministry of Education sets guidelines for the curriculum and implements the same on approval of the Shanghai Education Bureau.

Source		Score	Rank
OECD PISA	Math 613 Science 580 Reading 570	587	1/20
KOF YLM INDEX	A 6.17 W - E - T 5.32	5.74	1/20

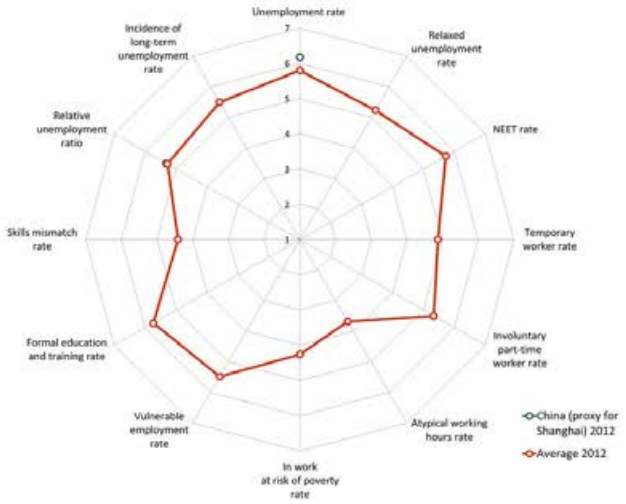
Economic Data	2011	2012
GDP (US$, bn)	7322	8229
GDP Growth (Annual %)	9.30	7.65
Inflation (Annual %)	5.41	2.65
Key Indicators		
Population (mn)	1344.1	1350.7
Education Budget (% of GDP)	-	-

PISA





Activity State (A)	Score	Rank
Unemployment Rate	6.17	9/20
Relaxed Unemployment Rate	-	-/-
NEET Rate	-	-/-
Working Conditions (W)		
Temporary worker rate	-	-/-
Involuntary part time worker rate	-	-/-
Atypical working hours rate	-	-/-
In work at risk of poverty rate	-	-/-
Vulnerable employment rate	-	-/-
Education (E)		
Formal education and training rate	-	-/-
Skills mismatch rate	-	-/-
Transition Smoothness (T)		
Relative unemployment ratio	5.32	11/20
Incidence of long term Unemployment rate	-	-/-



Issues for comparing VET curricula

- Fragmentation is low in Shanghai.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- It should be possible to access VET curricula through the Shanghai Education Bureau.

ASIA

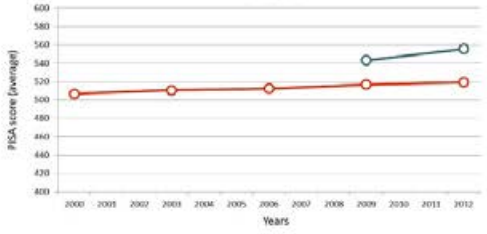
Singapore

In Singapore, the Ministry of Education facilitated the development of quality vocational education programmes through the Institutes for Technical Education (ITE) and for Polytechnics, as well as through private specialized Skill Training Centers. ITE is the principal provider of career technical education and is the principal authority for national occupational skills certifications and standards. ITE Headquarters continues to oversee policy formulation and common functional areas of interest for curriculum development.

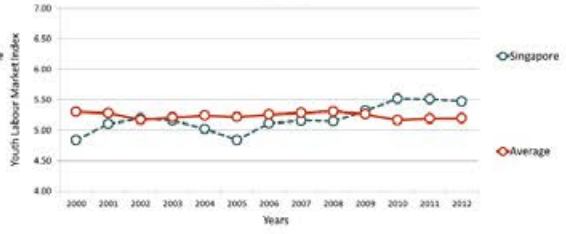
Source		Score	Rank
OECD PISA	Math 573 Science 551 Reading 542	556	2/20
KOF YLM INDEX	A 6.26 W 4.74 E - T 5.41	5.47	6/20

Economic Data	2011	2012
GDP (US$, bn)	274.1	286.9
GDP Growth (Annual %)	6.06	2.50
Inflation (Annual %)	5.25	4.53
Key Indicators		
Population (mn)	5.18	5.31
Education Budget (% of GDP)	4.94	3.13

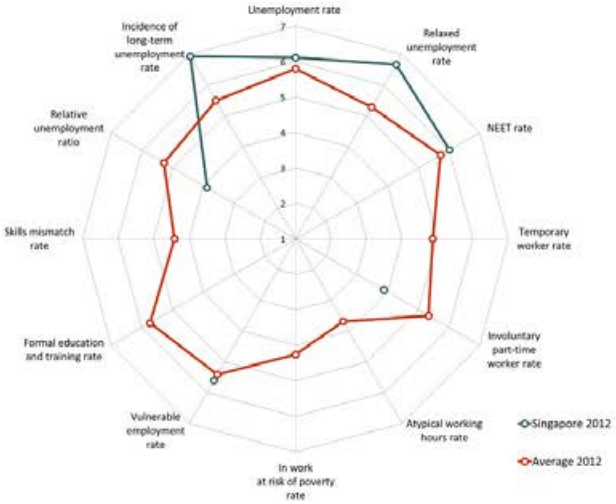
PISA



YLMI



Activity State (A)	Score	Rank
Unemployment Rate	6.11	10/20
Relaxed Unemployment Rate	6.67	1/15
NEET Rate	6.01	9/18
Working Conditions (W)		
Temporary worker rate	-	-/-
Involuntary part time worker rate	3.88	14/16
Atypical working hours rate	-	-/-
In work at risk of poverty rate	-	-/-
Vulnerable employment rate	5.60	11/19
Education (E)		
Formal education and training rate	-	-/-
Skills mismatch rate	-	-/-
Transition Smoothness (T)		
Relative unemployment ratio	3.88	20/20
Incidence of long term Unemployment rate	6.94	2/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- It should be possible to access VET curricula through the ITE.

ASIA

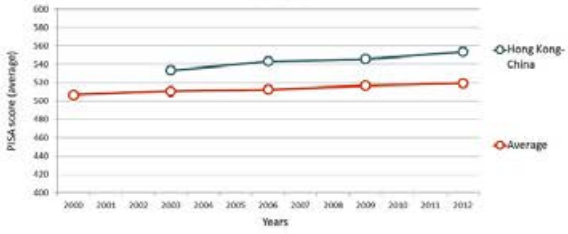
Hong Kong

In Hong Kong, VET is provided and administered through the Vocational Training Council (VTC) and its member institutes. The VTC itself is monitored by the Education Bureau (EDB). The overall responsibility for setting curriculum lies with the Education Bureau of Hong Kong, China.

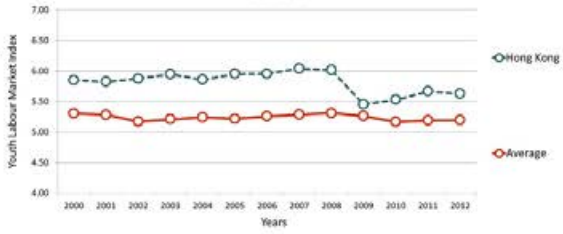
Source		Score	Rank
OECD PISA	Math 561 Science 555 Reading 545	554	3/20
KOF YLM INDEX	A 6.14 W 5.08 E - T 5.66	5.63	3/20

Economic Data	2011	2012
GDP (US$, bn)	248.5	262.6
GDP Growth (Annual %)	4.79	1.55
Inflation (Annual %)	5.26	4.06
Key Indicators		
Population (mn)	7.07	7.15
Education Budget (% of GDP)	4.98	3.51

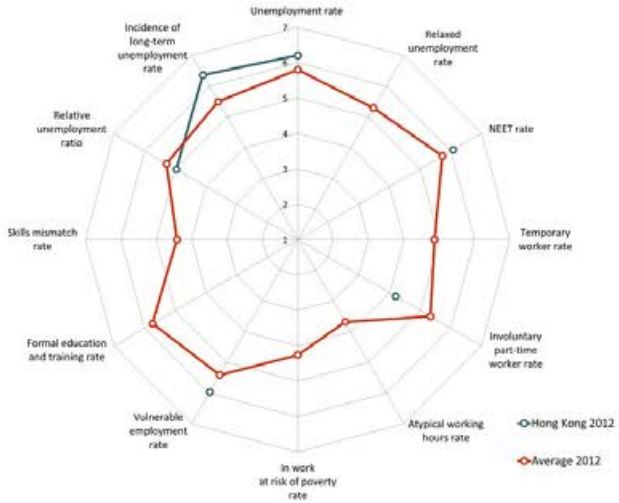
PISA



YLMI



	Score	Rank
Activity State (A)		
Unemployment Rate	6.20	7/20
Relaxed Unemployment Rate	-	-/-
NEET Rate	6.07	6/18
Working Conditions (W)		
Temporary worker rate	-	-/-
Involuntary part time worker rate	4.20	13/16
Atypical working hours rate	-	-/-
In work at risk of poverty rate	-	-/-
Vulnerable employment rate	5.96	6/19
Education (E)		
Formal education and training rate	-	-/-
Skills mismatch rate	-	-/-
Transition Smoothness (T)		
Relative unemployment ratio	4.96	16/20
Incidence of long term Unemployment rate	6.36	6/17



Issues for comparing VET curricula

- Fragmentation is low at the governance level.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- Accessing VET curricula should be possible as they are approved by the Education Bureau.

ASIA

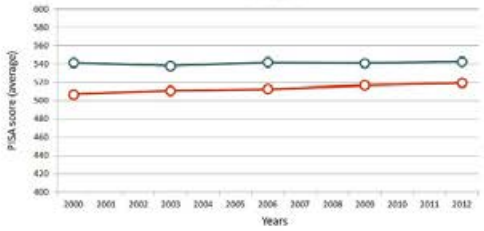
Korea

In Korea, the Ministry of Education, Science and Technology (MEST) has been responsible for all types of education since 1948. The Korean Research Institute for Vocational Education and Training (KRIVET) revitalizes VET and enhances the public's vocational competencies. KRIVET has developed the National Competency Standards, upon which are based the curricula, work-study dual programs, the national qualification framework, evaluation of training programs, and provision of career information.

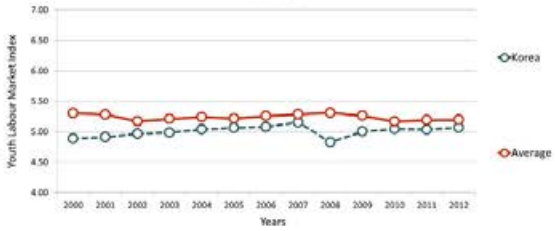
Source		Score	Rank
OECD PISA	Math 554 Science 538 Reading 536	**542**	4/20
KOF YLM INDEX	A 5.46 W 3.71 E - T 6.04	**5.07**	14/20

Economic Data	2011	2012
GDP (US$, bn)	1202.5	1222.8
GDP Growth (Annual %)	3.68	2.29
Inflation (Annual %)	4.00	2.19
Key Indicators		
Population (mn)	49.78	50.00
Education Budget (% of GDP)	3.78	-

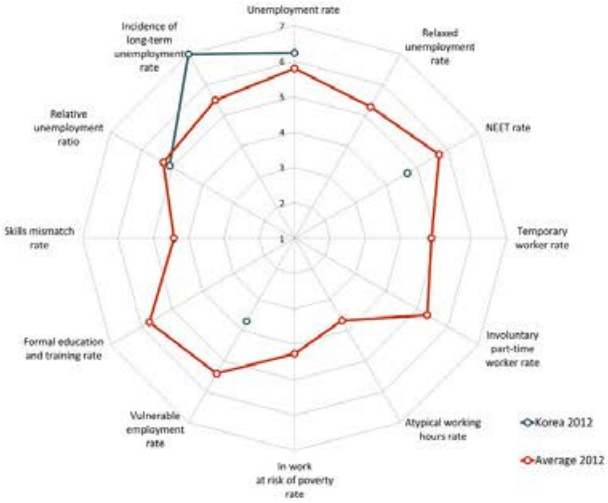
PISA



YLMI



Activity State (A)	Score	Rank
Unemployment Rate	6.24	6/20
Relaxed Unemployment Rate	-	-/-
NEET Rate	4.68	18/18
Working Conditions (W)		
Temporary worker rate	-	-/-
Involuntary part time worker rate	-	-/-
Atypical working hours rate	-	-/-
In work at risk of poverty rate	-	-/-
Vulnerable employment rate	3.71	19/19
Education (E)		
Formal education and training rate	-	-/-
Skills mismatch rate	-	-/-
Transition Smoothness (T)		
Relative unemployment ratio	5.08	15/20
Incidence of long term Unemployment rate	7.00	1/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- It should be possible to access VET curricula through KRIVET.

ASIA

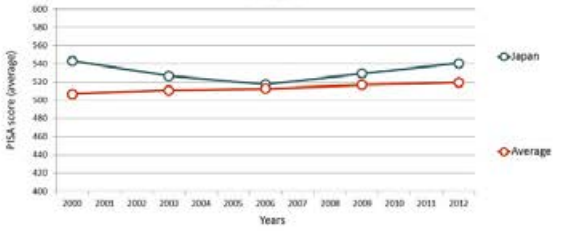
Japan

In Japan, the administration of VET is in the hands of Ministry of Education, Culture, Sports, Science and Technology; some institutions are accredited by the Ministry of Labor or the Ministry of Health. Curriculum setting for each VET program is dependent on the accreditation authority for that particular program.

Source		Score	Rank
OECD PISA	Math 536 Science 547 Reading 538	540	5/20
KOF YLM INDEX	A 6.09 W 3.72 E - T 4.85	4.89	19/20

Economic Data	2011	2012
GDP (US$, bn)	5905.6	5954.5
GDP Growth (Annual %)	-0.45	1.75
Inflation (Annual %)	-0.28	-0.03
Key Indicators		
Population (mn)	127.82	127.56
Education Budget (% of GDP)	3.78	-

PISA



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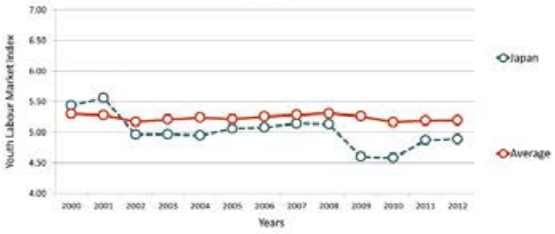
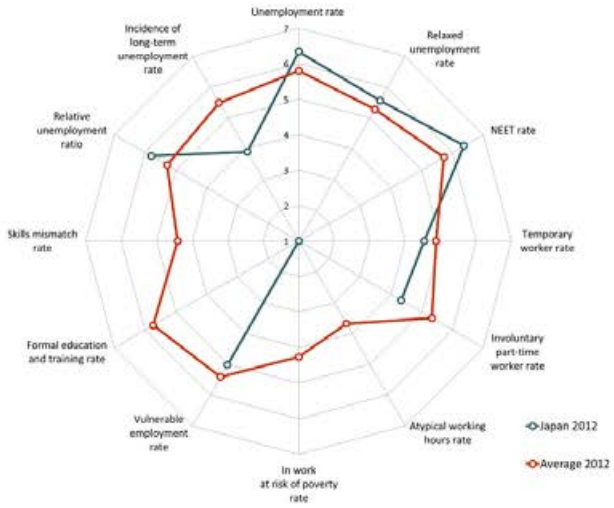


Activity State (A)	Score	Rank
Unemployment Rate	6.33	1/20
Relaxed Unemployment Rate	5.57	6/15
NEET Rate	6.37	1/18
Working Conditions (W)		
Temporary worker rate	4.53	9/13
Involuntary part time worker rate	4.33	12/16
Atypical working hours rate	-	-/-
In work at risk of poverty rate	1.00	14/14
Vulnerable employment rate	5.02	16/19
Education (E)		
Formal education and training rate	-	-/-
Skills mismatch rate	-	-/-
Transition Smoothness (T)		
Relative unemployment ratio	5.80	2/20
Incidence of long term Unemployment rate	3.90	16/17



Issues for comparing VET curricula

- Fragmentation is remarkable at the national level. One ministry is responsible for VET curriculum development while a separate accreditation authority is responsible for VET curriculum validation.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- It should be possible to access VET curricula through the appropriate accreditation authority.

ASIA

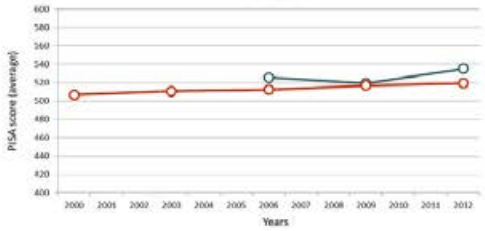
Taiwan

In Taiwan, the Department of Technological and Vocational Education is under the Ministry of Education and is responsible for all technological and vocational education matters nationally. Curriculum standards for senior vocational schools and junior colleges are administered and promulgated by the Ministry of Education approximately every 10 years. Curricula for institutes of technology are principally school-based.

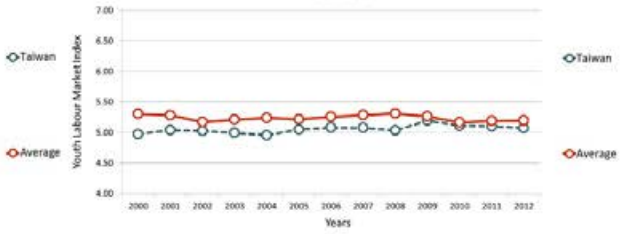
Source		Score	Rank
OECD PISA	Math 560 Science 523 Reading 523	535	6/20
KOF YLM INDEX	A 5.93 W 4.39 E - T 4.90	5.07	13/20

Economic Data (China)	2011	2012
GDP (US$, bn)	7322	8229
GDP Growth (Annual %)	9.30	7.65
Inflation (Annual %)	5.41	2.65
Key Indicators		
Population (mn)	1344.1	1350.7
Education Budget (% of GDP)	-	-

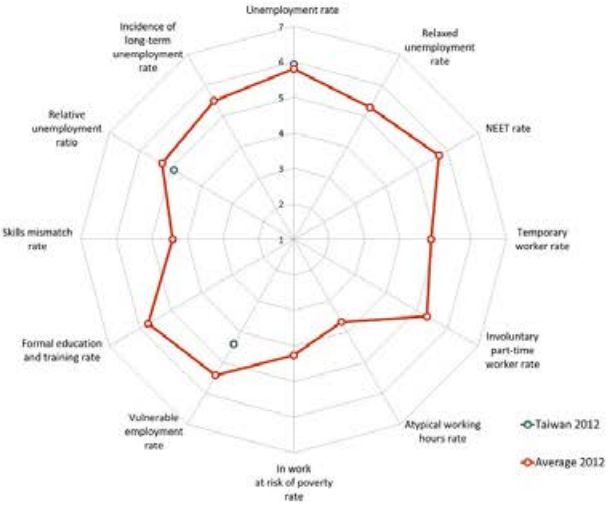
PISA



YLMI



	Score	Rank
Activity State (A)		
Unemployment Rate	5.93	11/20
Relaxed Unemployment Rate	-	-/-
NEET Rate	-	-/-
Working Conditions (W)		
Temporary worker rate	-	-/-
Involuntary part time worker rate	-	-/-
Atypical working hours rate	-	-/-
In work at risk of poverty rate	-	-/-
Vulnerable employment rate	4.39	17/19
Education (E)		
Formal education and training rate	-	-/-
Skills mismatch rate	-	-/-
Transition Smoothness (T)		
Relative unemployment ratio	4.90	17/20
Incidence of long term Unemployment rate	-	-/-



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- Accessing VET curricula needs to be clarified. It should be possible through the Ministry of Education.

EUROPE

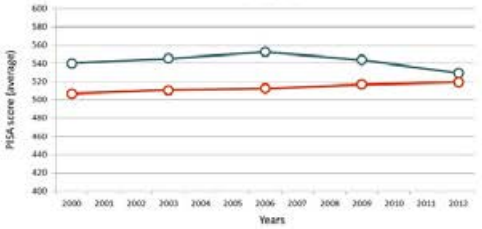
Finland

In Finland, vocational education and training falls within the administrative power of the Ministry of Education and Culture. Provisions on vocational education and training are defined in the Acts of Parliament. The Finnish National Board of Education sets the national core curricula and qualification requirements, and VET providers prepare their vocational education curricula for their specific fields.

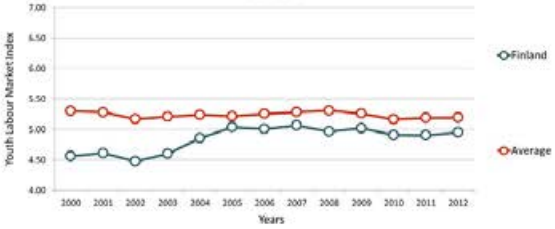
Source		Score	Rank
OECD PISA	Math 519 Science 545 Reading 524	**529**	7/20
KOF YLM INDEX	A 5.22 W 4.11 E 4.63 T 5.85	**4.95**	17/20

Economic Data	2011	2012
GDP (US$, bn)	273.7	255.8
GDP Growth (Annual %)	2.57	-1.46
Inflation (Annual %)	3.42	2.81
Key Indicators		
Population (mn)	5.39	5.41
Education Budget (% of GDP)	5.16	-

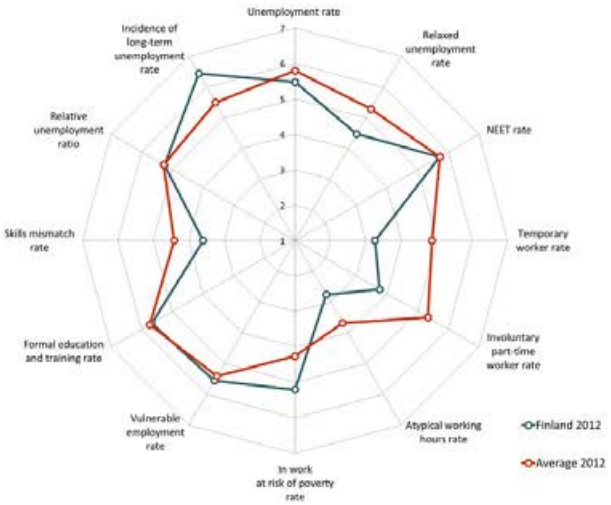
PISA



YLMI



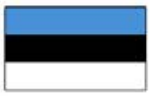
Activity State (A)	Score	Rank
Unemployment Rate	5.47	15/20
Relaxed Unemployment Rate	4.47	12/15
NEET Rate	5.71	12/18
Working Conditions (W)		
Temporary worker rate	3.26	11/13
Involuntary part time worker rate	3.76	15/16
Atypical working hours rate	2.76	10/13
In work at risk of poverty rate	5.20	4/14
Vulnerable employment rate	5.56	12/19
Education (E)		
Formal education and training rate	5.67	8/13
Skills mismatch rate	3.60	12/13
Transition Smoothness (T)		
Relative unemployment ratio	5.26	12/20
Incidence of long term Unemployment rate	6.44	5/17



Issues for comparing VET curricula

- Curricular control is highly fragmented. Individual VET providers prepare their own curricula to meet their specific needs.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- It will be difficult to access the relevant VET curricula, and they may not be comparable within the country.

EUROPE



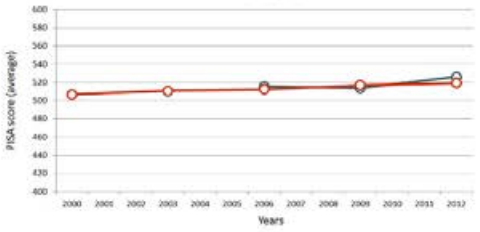
Estonia

In Estonia, the parliament, the government of the Republic of Estonia and the Ministry of Education and Research (MoER) administer the vocational education and training system at the legislative level. The MoER co-ordinates the preparation and implementation of education policies and approves curricula, study programmes, textbooks, and teaching/study aids at all levels excepting universities. It also administers public assets allocated to the education system.

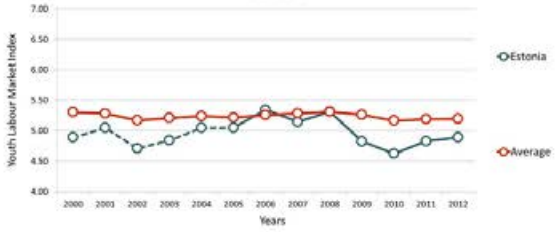
Source		Score	Rank
OECD PISA	Math 521 Science 541 Reading 516	526	8/20
KOF YLM INDEX	A 4.80 W 5.28 E 4.65 T 4.82	4.89	18/20

Economic Data	2011	2012
GDP (US$, bn)	22.8	22.7
GDP Growth (Annual %)	8.28	4.65
Inflation (Annual %)	4.98	3.93
Key Indicators		
Population (mn)	1.33	1.32
Education Budget (% of GDP)	8.75	-

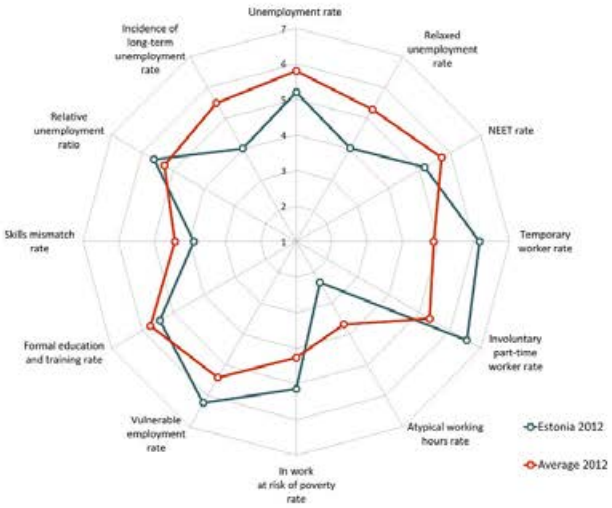
PISA



YLMI



Activity State (A)	Score	Rank
Unemployment Rate	5.20	18/20
Relaxed Unemployment Rate	4.03	15/15
NEET Rate	5.17	17/18
Working Conditions (W)		
Temporary worker rate	6.16	4/13
Involuntary part time worker rate	6.54	1/16
Atypical working hours rate	2.33	11/13
In work at risk of poverty rate	5.14	5/14
Vulnerable employment rate	6.24	1/19
Education (E)		
Formal education and training rate	5.43	9/13
Skills mismatch rate	3.88	10/13
Transition Smoothness (T)		
Relative unemployment ratio	5.62	5/20
Incidence of long term Unemployment rate	4.02	15/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- Accessing VET curricula should be possible as they are approved by the government.

NORTH AMERICA

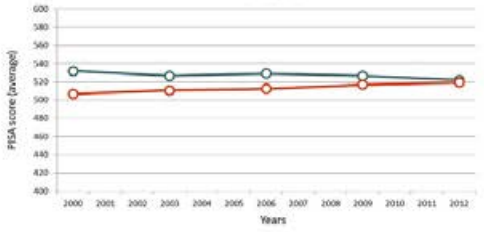
Canada

The Canadian constitution allocates responsibility for education to the provincial and territorial governments, and each province or territory has its own laws, policies, and procedures that govern the operation of educational institutions. Curriculum implementation is delegated to local authorities. Most colleges (VET centers) have boards of governors. These are appointed by the provincial or territorial government and include representatives from the public, students, and instructors.

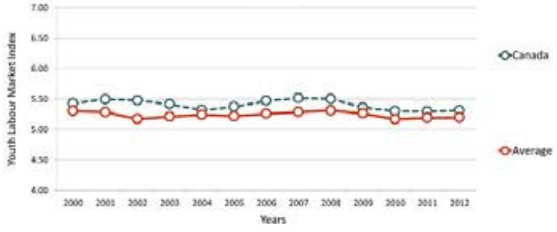
Source		Score	Rank
OECD PISA	Math 518 Science 525 Reading 523	522	9/20
KOF YLM INDEX	A 5.61 W 4.29 E - T 6.03	5.31	10/20

Economic Data	2011	2012
GDP (US$, bn)	1779	1821
GDP Growth (Annual %)	2.53	1.71
Inflation (Annual %)	2.91	1.52
Key Indicators		
Population (mn)	34.34	34.75
Education Budget (% of GDP)	6.55	-

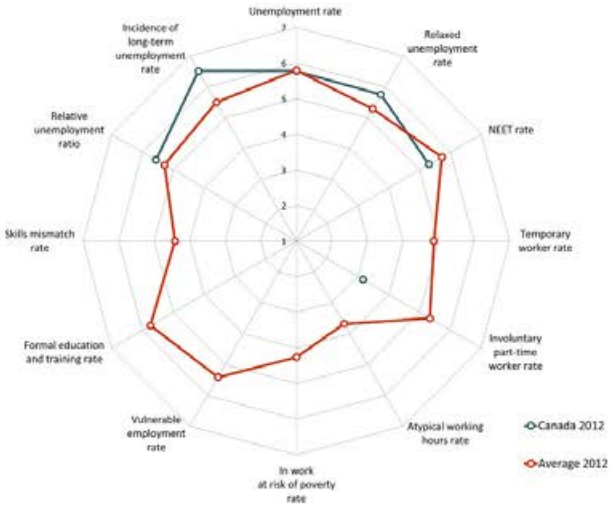
PISA



YLMI



Activity State (A)	Score	Rank
Unemployment Rate	5.77	14/20
Relaxed Unemployment Rate	5.75	4/15
NEET Rate	5.31	15/18
Working Conditions (W)		
Temporary worker rate	-	-/-
Involuntary part time worker rate	3.17	16/16
Atypical working hours rate	-	-/-
In work at risk of poverty rate	-	-/-
Vulnerable employment rate	5.40	13/19
Education (E)		
Formal education and training rate	-	-/-
Skills mismatch rate	-	-/-
Transition Smoothness (T)		
Relative unemployment ratio	5.56	7/20
Incidence of long term Unemployment rate	6.51	4/17



Issues for comparing VET curricula

- Curricular control is highly fragmented. If Canada is to be considered as case study, we will need to choose one province for the analysis.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- It will be difficult to access the relevant VET curricula, and they may not be comparable within and across provinces.

EUROPE

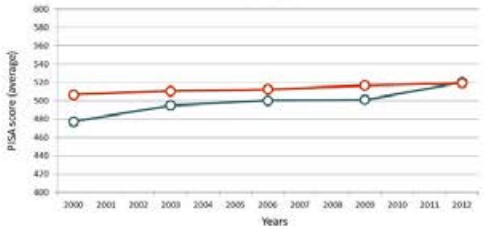
Poland

In Poland, educational policy is formulated and implemented centrally at the Ministry of National Education. The Ministry is responsible for the legal framework of all educational establishments including VET. The Ministry also defines the basis for designing curricula in formal VET at the national level by three decrees: the classification of occupations for vocational education, the core curriculum for vocational education, and the core curriculum for general education.

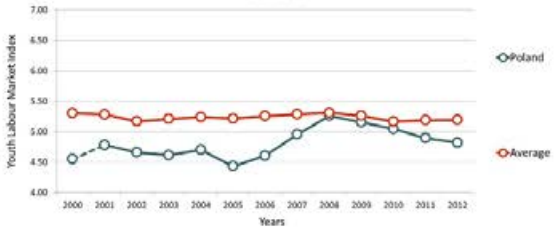
Source		Score	Rank
OECD PISA	Math 518 Science 526 Reading 518	**521**	10/20
KOF YLM INDEX	A 4.70 W 4.28 E 5.50 T 4.80	**4.82**	20/20

Economic Data	2011	2012
GDP (US$, bn)	524.4	496.2
GDP Growth (Annual %)	4.76	1.76
Inflation (Annual %)	4.26	3.56
Key Indicators		
Population (mn)	38.53	38.54
Education Budget (% of GDP)	6.55	-

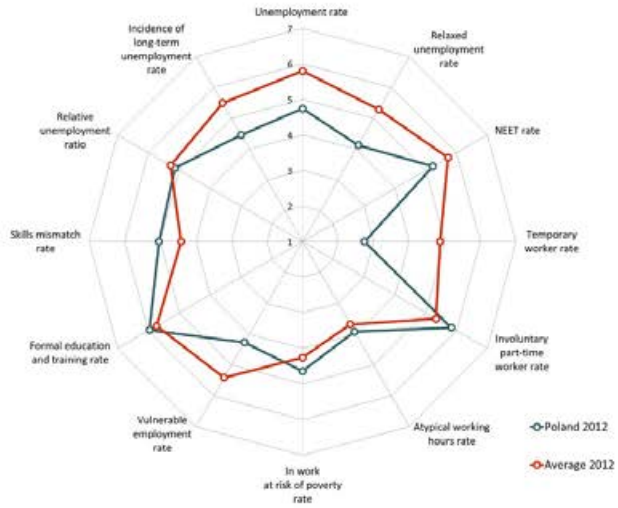
PISA



YLMI



Activity State (A)	Score	Rank
Unemployment Rate	4.74	20/20
Relaxed Unemployment Rate	4.13	14/15
NEET Rate	5.23	16/18
Working Conditions (W)		
Temporary worker rate	2.74	12/13
Involuntary part time worker rate	5.83	8/16
Atypical working hours rate	3.92	8/13
In work at risk of poverty rate	4.64	10/14
Vulnerable employment rate	4.27	18/19
Education (E)		
Formal education and training rate	5.97	4/13
Skills mismatch rate	5.03	4/13
Transition Smoothness (T)		
Relative unemployment ratio	5.14	14/20
Incidence of long term Unemployment rate	4.46	13/17



Issues for comparing VET curricula

- Fragmentation is low at the national level.
- Couplings between the education and employment systems are not explicit and will need to be clarified.
- It should be possible to access VET curricula through the Ministry of National Education.

The leaders on the youth labor market: Hong Kong, Singapore and Canada

As notable from the previously presented fact sheets, the set of available KOF YLMI indicators for the best-performing countries on PISA is in some cases quite limited. Comparisons between countries with a restricted number of indicators—and possibly different indicators when they are available—are a delicate issue. The interpretation of Figure 8 is hence critical[13]. Even though it has a limited set of indicators, the graph does suggest some tendencies with regard to the leaders on the youth labor market among the 10 top-performing countries in PISA. Hong Kong performs best, but shows a strong decline after 2008. This is probably a reaction to the Great Recession, and the index indicates a recovery in subsequent years. Singapore presents an increasing trend since 2005, and in this case the Great Recession does not seem to have affected the youth labor market. Lastly, Canada's trend is similar to the average, though the level is slightly better.

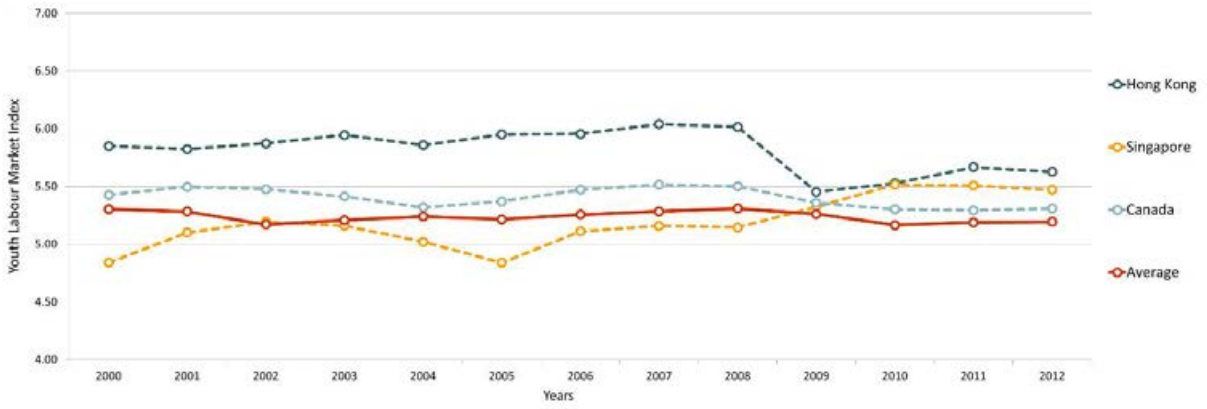


Figure 8: *Evolution over time of the KOF YLMI in Hong Kong, Singapore, Canada and the average of 20 countries analyzed in this report*

Figure 9 reports the detailed results for these three countries (and again the average with the red line) in 2012. Unfortunately, as already suggested by the dashed lines in the previous figure, these countries provide only a small set of indicators. Comparability across time is hence imperfect.

[13] *A possible solution could be to compare these countries on a restricted set of commonly available indicators. The restricted set should also be applied to the calculation of average values. These procedures, however, are beyond the scope of this report.*

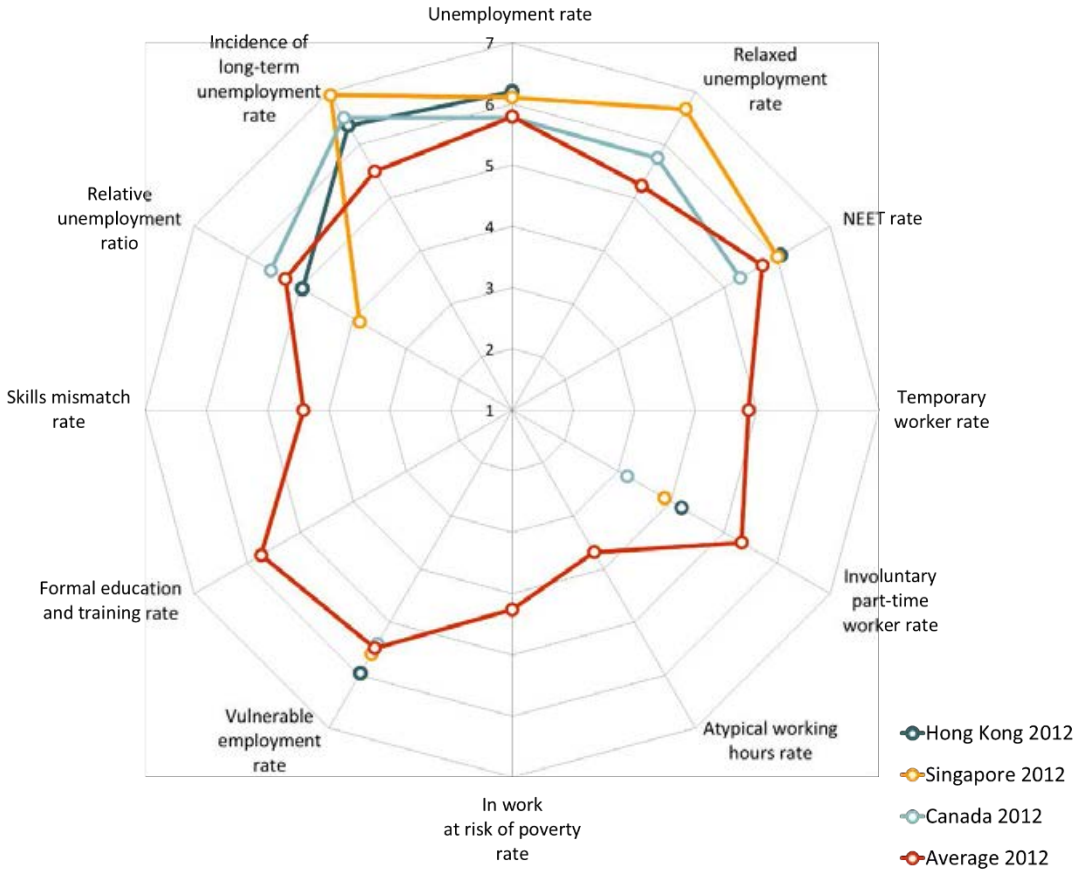


Figure 9: *KOF YLMI spider web for Hong Kong, Singapore and Canada in 2012 as well as for the average of 20 countries analyzed in this report*

Except for the vulnerable employment ratio and the involuntary part-time worker rate, we unfortunately do not have any indicators that allow us to draw general statements about working conditions in these countries.

Finally, the indicator "Relative unemployment rate," which relates the unemployment rate of youth with that of adults, gives us some insight into the situation in Singapore. While the country performs incredibly on relaxed unemployment rate and on the incidence of long-term unemployment, Singapore is lowest-ranked on relative unemployment ratio. This specification partially relativizes the exceptionally low values of unemployment rate by pointing out the poor position of youth relative to adults. This topic requires further investigation.

5. Comparing the Top-performing Countries

This chapter describes the 20 top-performing countries from a more general perspective. The approach is twofold: on one dimension we aggregate the country scores by the two types of best-performing countries. This allows us to deepen the discussion on the correlation that we started in Chapter 3.3. On the other side, we disentangle the values of the KOF YLMI into its four categories and present PISA competences by subject. This facilitates statements about specific levels. Finally, representation over time allows additional statements about trends.

KOF YLMI

Figure 10 shows the evolution over time of the four categories contained in the KOF YLMI. On the left side we report the scores for the 10 top-performing countries on PISA (abbreviated to the PISA group). The sub-graph on the right side refers to the 10 top-performing countries with respect to the KOF YLMI (KOF YLMI group).

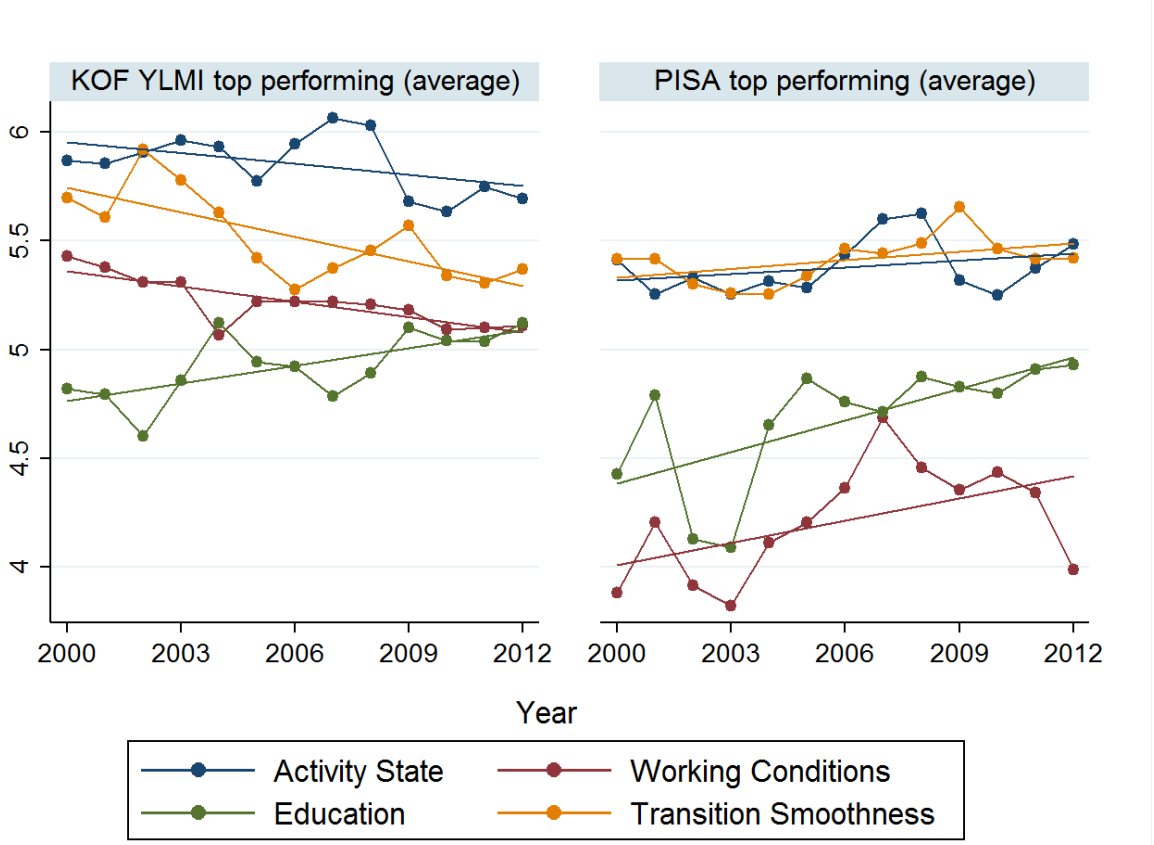


Figure 10: *KOF YLMI over time for the two groups of top-performing countries*

At first sight, one can observe that the PISA group has a general positive trend in each category. This is not the case for the KOF YLMI group. Here, only the category *Education* shows

positive evolution over time. The values for *Transition Smoothness* have different trends across groups but similar levels. The levels of the other categories are different. The low value of *Working Conditions* in the PISA group are especially remarkable, while *Activity State* performs particularly well. For *Activity State*, the KOF YLMI group exhibit a slight upward trend until 2007, and after 2008 the situation deteriorates abruptly. The impact of the Great Recession appears to be stronger in the KOF YLMI group than in the PISA group, which recovers quickly. Lastly, the PISA group's striking downward trend post-Great Recession in *Working Conditions* is alarming, though the relatively restricted data availability for that category suggests a need for additional research more than anything else.

PISA scores

Figure 11 presents PISA scores disaggregated by subject. Again, we subdivided the countries PISA and KOF YLMI groups. Because PISA tests are conducted every three years, the graphs contain only five points for each category. Despite the low frequency, the data allows to compare developments over time.

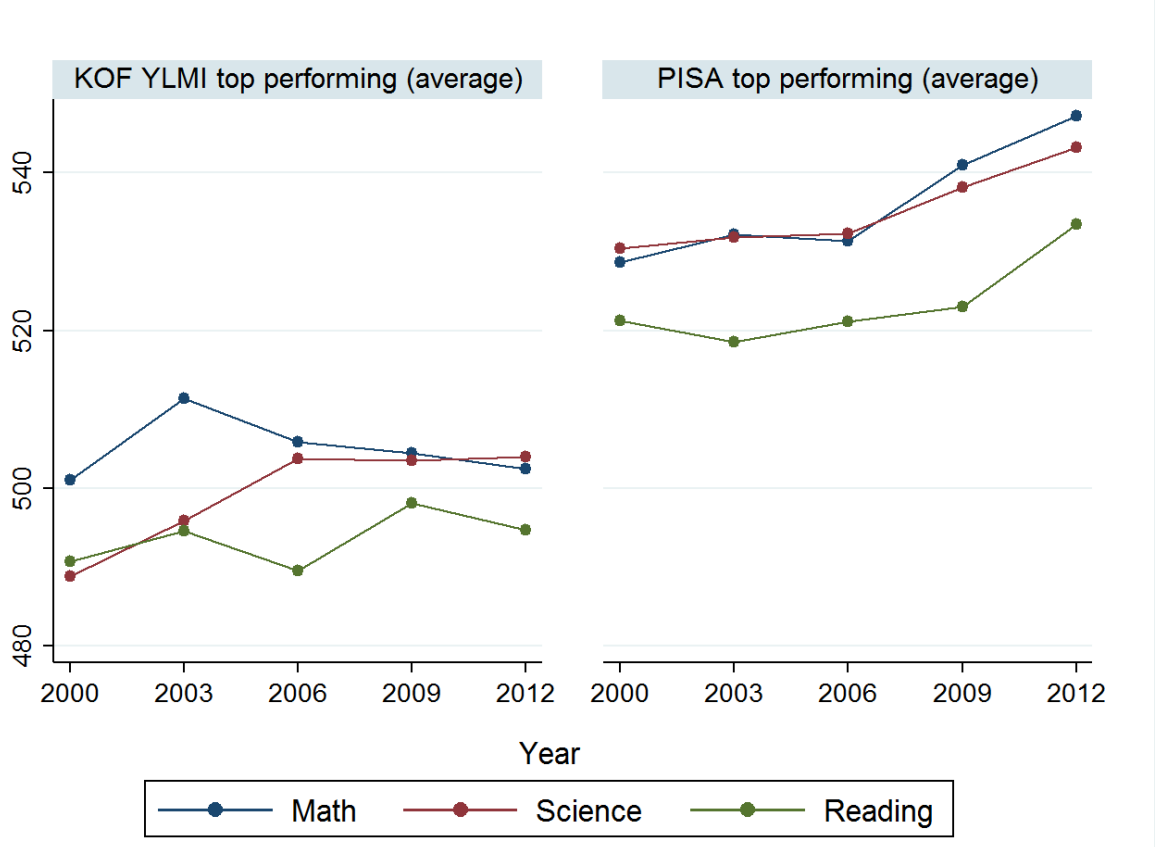


Figure 11: *PISA scores (disaggregated by subject) over time for the two groups of top-performing countries*

We focus first on the levels. The PISA group, by definition, performs better than its counterpart. The gap is, however, remarkable. Looking by subject, it is noteworthy that scores for *Reading* exhibit lower values than other fields in both groups of countries.

By looking at the trends, we can observe how the already good position of the PISA group continues improving over time, particularly since 2006. In contrast, the KOF YLMI group shows a relatively stagnant trend with improvements only in the *Science* subject.

6. Conclusion and Outlook

This first intermediary report summarizes the findings of the first phase of our Feasibility Study for a VET curriculum comparison. The main aim of this first phase was to provide the conceptual basis for the identification of top-performing countries in the field of VET, and to give an overview of the countries identified on that basis. In this final chapter, we now draw our conclusions with regard to the second project phase in which these countries will be analyzed in terms of the broader framework of curriculum design.

In our introduction, we highlighted the challenges for a curriculum comparison in VET and the reason why a Feasibility Study needs to be conducted before the comparison itself. Figure 3 summarizes our theoretical and conceptual framework.

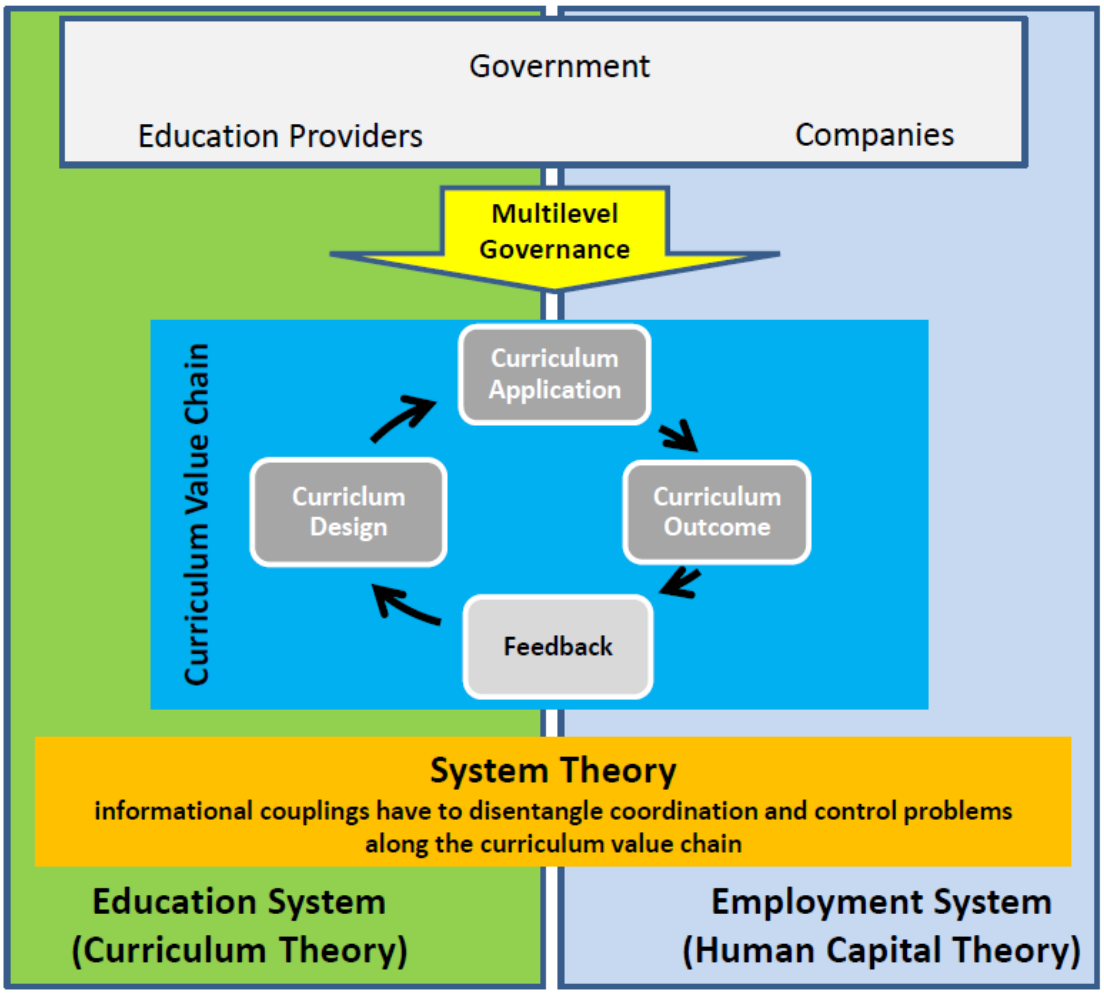


Figure 12: *Theoretical and conceptual framework of this feasibility study for a curriculum comparison in VET*

In this report, we have shown that neither Curriculum Theory nor Human Capital Theory provide a sufficient theoretical framework for tackling the challenges of a curriculum comparison in VET. We therefore propose to add Systems Theory, which offers a convenient analytical approach for analyzing the interface between the education and employment systems—the assessment of coordination and control problems. Furthermore, we argue that these coordination and control problems need to be analyzed based on the concept of a Curriculum Value Chain (CVC) that includes the whole process from curriculum development through its application and outcomes. On this basis, we can disentangle informational couplings between education and employment in order to find out what top-performing countries in the field of VET do better than others with regard to their labor market outcomes.

The CVC also provides the foundation for the selection of outcome measurements we can use to identify the top-performing countries in the field of VET. Our first outcome measurement is the KOF Youth Labor Market Index (KOF YLMI). This comprehensively describes the situation of young people on the labor market, and therefore the outcome of VET with regard to the employment system. In addition, the skills and competences of students at the end of compulsory education—before entering VET in most countries—can be seen as relevant input for VET programs. We measure these using the Programme for International Student Assessment (PISA), which measures the skills and abilities of 15-year-olds all over the world. PISA scores as well as the KOF YLMI are internationally comparable measures, and are available for a broad range of countries.

Our initial correlations show that these two measurements—KOF YLMI values and PISA scores—are not completely independent of each other. Instead, we find indications that there is a positive relationship. We selected the top 10 countries in each measurement. The following Table 5 gives an overview of the selected countries ranked by their average KOF YLMI values and PISA scores, respectively.

Country	Country group	KOF YLMI* Rank	PISA Rank	Fragmentation of governance	Couplings of education and employment	Access to VET curriculum
Austria	KOF YLMI	9/20	14/20	Remarkable	Coupled	Possible
Canada	PISA	*10/20**	9/20	High	Not explicit	Difficult, province-level, school autonomy
Denmark	KOF YLMI	5/20	16/20	Low	Coupled	Relation between central and decentralized level needs to be clarified.
Estonia	PISA	18/20	8/20	Low	Not explicit	Possible
Finland	PISA	17/20	7/20	High	Not explicit	Difficult, school autonomy
Germany	KOF YLMI	8/20	13/20	Remarkable	Coupled	Possible
Hong Kong	PISA	*3/20**	3/20	Low	Not explicit	Possible
Iceland	KOF YLMI	16/20	19/20	Low	Coupled	Possible
Japan	PISA	*19/20**	5/20	Remarkable	Not explicit	Possible
Korea	PISA	*14/20**	4/20	Low	Not explicit	Possible
Lithuania	KOF YLMI	12/20	19/20	Low	Coupled	Possible
Luxembourg	KOF YLMI	11/20	18/20	Low	Coupled	Possible
The Netherlands	KOF YLMI	4/20	11/20	Remarkable	Coupled	Difficult, decentralized
Norway	KOF YLMI	7/20	17/20	Low	Coupled	Possible
Poland	PISA	20/20	10/20	Low	Not explicit	Possible
Shanghai, CN	PISA	*1/20**	1/20	Low	Not explicit	Possible
Singapore	PISA	*6/20**	2/20	Low	Not explicit	Possible
Slovenia	KOF YLMI	15/20	15/20	Remarkable	Coupled	Possible
Switzerland	KOF YLMI	2/20	12/20	Low	Coupled	Possible
Taiwan	PISA	*13/20**	6/20	Low	Not explicit	Possible

Table 7: *Summary of country fact sheets for all selected countries (group of countries selected according to PISA are highlighted blue); *For countries with italic numbers, the data set is not fully comparable as not all indicators of the KOF YLMI are available (for details on the data sources see appendix A-3)*

In addition, we compared these top performers with other countries in the same group as well with those in the other group. In doing so, we find remarkable differences between the two country groups regarding their performances in the KOF YLMI and on PISA, as Figure 13 shows.

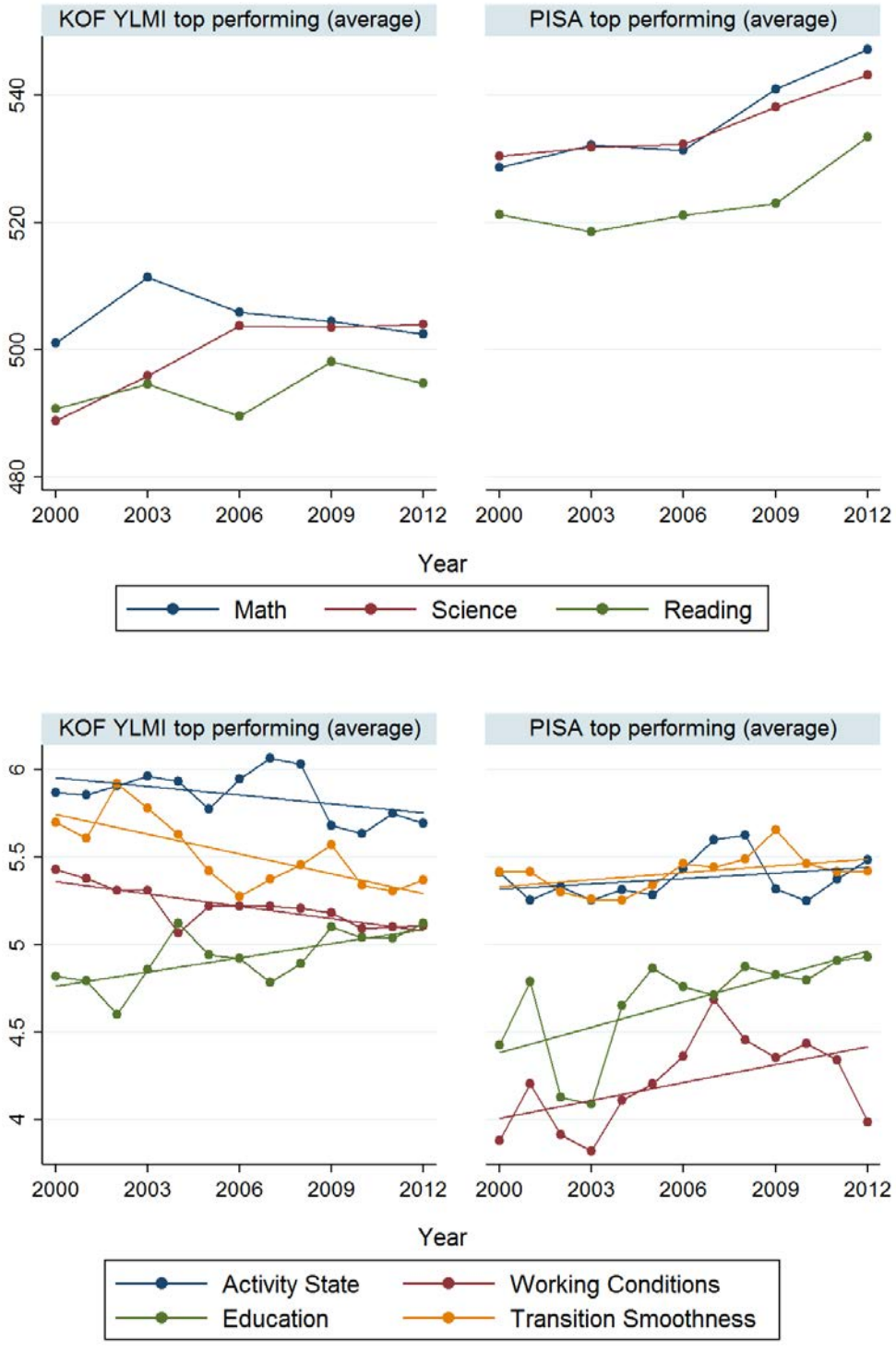


Figure 13: *PISA scores in the left graph (disaggregated by subject) and KOF YLMI in the right graph; both over time, separately for the two groups of top-performing countries*

The two country groups show remarkable differences with regard to their average PISA scores as well as KOF YLMI values. Trends over time show that the PISA group countries are catching up on both sides: on PISA scores as well as in their situation on the youth labor market. However, even if the average activity state in the youth labor market is quite high for the PISA group, their working conditions have a low average value. After the economic crises of 2007, trends become negative with the exception of the education indicators. For the KOF YLMI group, the situation on the youth labor market worsened over time except for indicators in the *Education* category. If we look at the disaggregated time trends however, we can see that some countries with a long tradition in VET—such as Switzerland, the Netherlands, Denmark, and Germany—have stable trends or even managed to improve their values over time. We can see this even more clearly in the country fact sheets in chapter 4.3.

These findings indicate the necessity of considering countries from both country groups in the curriculum comparison to find out what top performers do better in preparing young people for entry into the labor market.

However, data availability somewhat limits our analysis. While comparable PISA scores are available for all 20 top-performing countries, this is not the case for the KOF YLMI. For high PISA scorers Canada, Hong Kong, Japan, Korea, Singapore and Taiwan, we had to complement the KOF YLMI data set with identical or similar indicators provided by national statistical offices or other institutions (see appendix A-3). Therefore, the country comparison based on the KOF YLMI should be interpreted with caution. Nevertheless, the identification strategy serves its purpose and remains the best available option for representing strong youth labor markets.

Table 5 summarizes the characteristics of VET governance in our sample of countries—presented in the fact sheet of each country (see chapter 4.2 and 4.3)—highlighting the challenges we will have to face in the next phases of the Feasibility Study. For example, getting access to VET curricula is an important precondition for our investigation. At least for Canada, Finland, and the Netherlands, this will not be easy due to difficulty in accessing or identifying national curriculum standards and to high governmental fragmentation.

In sum, this intermediary report defines the conceptual approach and explains the theoretical background for the Feasibility Study. Based on this approach, we hypothesize that *stronger linkages between the education and employment systems are associated with bet-*

ter results on the youth labor market. Hence, a comparison of VET curricula needs to deal with the linkages between these two systems along the entire process from curriculum design to outcomes. Second, we identified 20 top-performing countries based on their average PISA scores and KOF YLMI values. Third, brief country portraits show important facts and figures as well as selected aspects of VET governance for each country, which are a first indication of challenges when comparing VET curricula.

In next project phase, we will analyze the top-performing VET countries identified here in terms of the broader framework of curriculum design. The VET systems of these countries need to be comprehensively examined, which entails an extensive document analysis to map the structures of these systems along the CVC. This analysis also includes questions such as what VET is understood to be in these countries and how their VET systems are structured—structural features include but are not limited to the legal basis of VET, the institutional framework, and national concepts of VET. We will disentangle of the interface between education and employment systems along the CVC, which itself is an important step for identifying relevant features of successful VET. We will then classify these countries based on the relevant features of their VET systems and their labor markets—which will be explored in the second project phase.

Furthermore, we will identify occupations or vocational areas that can be compared across the 20 top-performing countries. This requires that these occupations exist in many different countries, and that people working in these vocational areas execute tasks requiring similar skills—examples include nursing, manufacturing, and IT support. In addition, an explicit curriculum must exist and be available for the occupation in order for it to be included in the comparison. Consequently, the next intermediary report will summarize the analysis and identification of relevant features for classifying the VET systems and approaches of the selected 20 top-performing countries. On that basis, the outcome of the next project phase is a new classification of VET systems based on the features defined as relevant. This classification and system of features can then be used to identify comparable VET curricula among top-performing countries. Finally, in the last project phase, we can develop the instrument for the final curriculum comparison.

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Appendix

A-1: Additional Figure

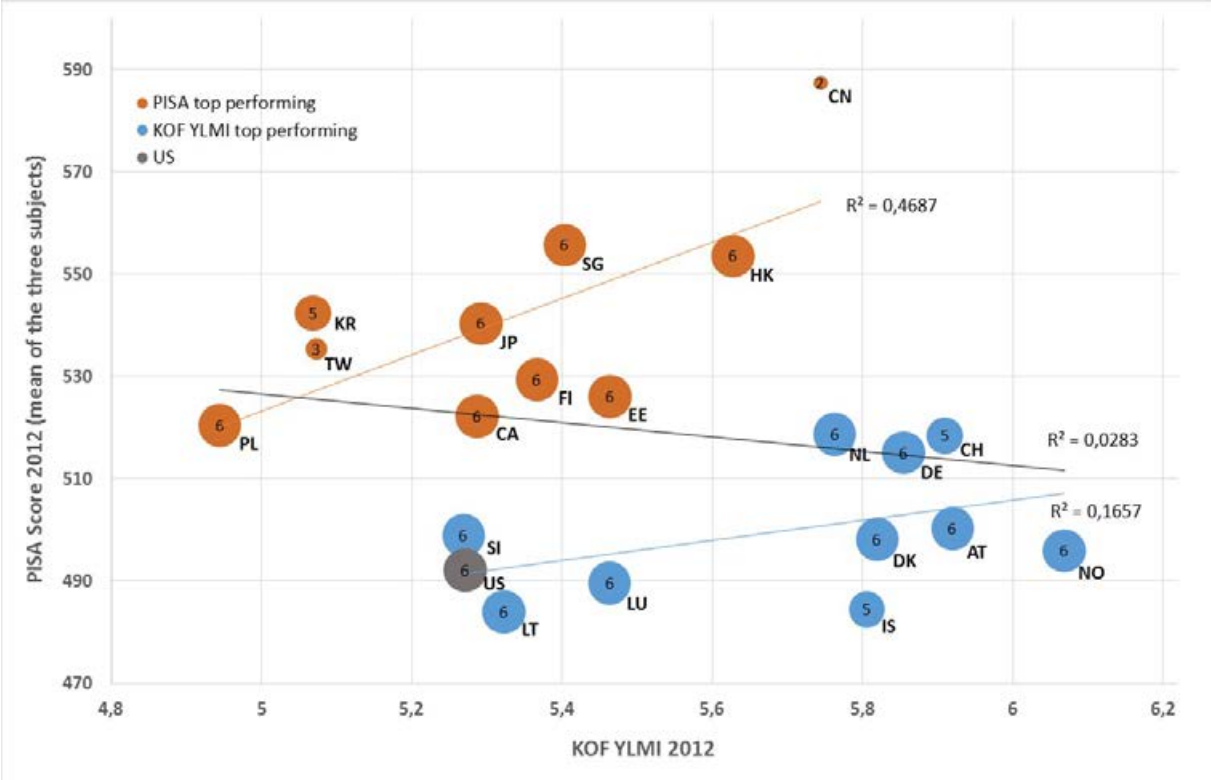

Figure 14: *Group-specific (orange and blue lines) and overall (black line) correlations between KOF YLMI and PISA scores for the 20 top-performing countries; the size of the bubble and the number inside indicate the number of available indicators on the KOF YLMI. We restricted the set of indicators to those six indicators that are available for most countries (unemployment rate, NEET rate, involuntary part-time worker rate, vulnerable employment, relative unemployment ratio and incidence of long-term unemployment rate); China has been taken as proxy for Shanghai because of missing data for the KOF YLMI.*

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A-3: Data Sources for Description of Youth Labor Market

The data source for Austria, Denmark, Estonia, Finland, Germany, Iceland, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Slovenia and Switzerland is the KOF YLMI (first release). For further information about the definition of the variables or the calculation methods please refer to Renold et al. (2014).

Indicator		Institution	Detailed Source	Time coverage
1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012
2.	Relaxed Unemployment Rate	EUROSTAT	Tables: lfsa_ugan, lfsi_sup_age_a , lfsa_pganws	2005-2012
3.	NEET rate	ILO	KILM 8th Edition; Table 10c	2000-2012
4.	Temporary Worker Rate	EUROSTAT	Table: lfsa_etgadc	2000-2012
5.	Involuntary Part-Time Worker Rate	OECD	Incidence of involuntary part time workers	2000-2012
6.	Atypical Working Hours Rate	EUROSTAT	Tables: lfsa_ewpnig, lfsa_ewpshi, lfsa_ewpsun	2005-2012
7.	In Work at Risk of Poverty Rate	EUROSTAT	Table: yth_incl_130	2004-2012
8.	Vulnerable Employment Rate	ILO	KILM 8th Edition; Table 3	2004-2012
9.	Formal Education and Training Rate	EUROSTAT	Table: trng_lfs_09	2004-2012
10.	Skills Mismatch Rate	ILO	KILM 8th Edition; Table 15a	2000-2012
11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012
12.	Long-Term Unemployment Rate	ILO	KILM 8th Edition; Table 11a	2000-2012

For the following countries, the data contained in the KOF Youth Labor Market Index (first release) were complemented by identical or similar values provided by national institutions or national statistics offices. More precisely:

Country	Indicator		Institution	Detailed Source	Time coverage	Notes
Canada	1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012	
	2.	Relaxed Unemployment Rate	.	.	.	
	3.	NEET rate	ILOSTAT	Annual indicators, Share of youth not in employment and not in education by sex (%) (extracted on 02 February 2015)	2005-2012	
	4.	Temporary Worker Rate	.	.	.	
	5.	Involuntary Part-Time Worker Rate	OECD	Incidence of involuntary part time workers	2000-2012	
	6.	Atypical Working Hours Rate	.	.	.	
	7.	In Work at Risk of Poverty Rate	.	.	.	
	8.	Vulnerable Employment Rate	ILO	KILM 8th Edition; Table 3	2000-2008	
			ILO	ILOSTAT (self-calculated)	2009-2012	
	9.	Formal Education and Training Rate	.	.	.	
	10.	Skills Mismatch Rate	.	.	.	
	11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012	
	12.	Long-Term Unemployment Rate	ILO	KILM 8th Edition; Table 11a	2000-2012	
China	1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012	
	2.	Relaxed Unemployment Rate	.	.	.	

Country	Indicator		Institution	Detailed Source	Time coverage	Notes
	3.	NEET rate	.	.	.	
	4.	Temporary Worker Rate	.	.	.	
	5.	Involuntary Part-Time Worker Rate	.	.	.	
	6.	Atypical Working Hours Rate	.	.	.	
	7.	In Work at Risk of Poverty Rate	.	.	.	
	8.	Vulnerable Employment Rate	.	.	.	
	9.	Formal Education and Training Rate	.	.	.	
	10.	Skills Mismatch Rate	.	.	.	
	11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012	
	12.	Long-Term Unemployment Rate	.	.	.	
Hong Kong	1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012	
	2.	Relaxed Unemployment Rate	.	.	.	
	3.	NEET rate	ILOSTAT	Annual indicators, Share of youth not in employment and not in education by sex (%) (extracted on 02 February 2015)	2009-2012	
	4.	Temporary Worker Rate	.	.	.	
	5.	Involuntary Part-Time Worker Rate	ILOSTAT	Annual indicators, Time-related underemployment by sex and age (extracted on 06 April 2015)	2009-2012	The threshold of part-time was set to 35 hours per week instead of 30
	6.	Atypical Working Hours Rate	.	.	.	
	7.	In Work at Risk of Pov-	.	.	.	

Country	Indicator		Institution	Detailed Source	Time coverage	Notes
		erty Rate				
	8.	Vulnerable Employment Rate	ILO	KILM 8th Edition; Table 3	2000-2012	
	9.	Formal Education and Training Rate	.	.	.	
	10.	Skills Mismatch Rate	.	.	.	
	11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012	
	12.	Long-Term Unemployment Rate	ILO	General Household Survey, Census and Statistics Department Hong Kong Special Administrative Region	2005-2012	Unemployed include beside jobseekers also persons without a job, have been available for work but have not sought work because (i) have made arrangements to take up a new job (ii) were expecting to return to their original jobs (iii) believe that work is not available
Japan	1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012	
	2.	Relaxed Unemployment Rate	Statistics Japan	Labor Force Survey, Detailed Tabulation, Table IV-1	2002-2010 2012	
	3.	NEET rate	ILOSTAT	Annual indicators, Share of youth not in employment and not in education by sex (%) (accessed on 02 February 2015)	2011-2012	
	4.	Temporary Worker Rate	Statistics Japan	Labor Force Survey, Detailed Tabulation, Statistical table, Whole Japan, Yearly,	2012	All contract are included and not just the ones shorter than 18

Country		Indicator	Institution	Detailed Source	Time coverage	Notes
				2012, Table 5		months
	5.	Involuntary Part-Time Worker Rate	OECD	Incidence of involuntary part time workers	2000-2012	
	6.	Atypical Working Hours Rate	.	.	.	
	7.	In Work at Risk of Poverty Rate	Statistics Japan	Labor Force Survey, Detailed Tabulation, Whole Japan, Yearly , Table 2-12-1	2012	Median Equalized Income is interpolated linearly in the income distribution
	8.	Vulnerable Employment Rate	ILO	KILM 8th Edition; Table 3	2000-2008	
			Statistics Japan	Labor Force Survey, Detailed Tabulation, Statistical table, Whole Japan, Yearly, 2012, Table 5	2012	Self-employed include also self-employed workers with employees while family worker not only include unpaid worker
	9.	Formal Education and Training Rate	OECD	Education at a Glance 2013, Table C5.4a	2000-2011	
	10.	Skills Mismatch Rate	.	.	.	
	11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012	
	12.	Long-Term Unemployment Rate	ILO	KILM 8th Edition; Table 11a	2000-2012	
Korea	1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012	
	2.	Relaxed Unemployment Rate	.	.	.	
	3.	NEET rate	OECD	OECD (2015), Youth not in education or employment (NEET) (indicator). doi: 10.1787/72d1033a-	2008-2012	Population-weighted mean of the 15-19 and 20-25 age

Country	Indicator		Institution	Detailed Source	Time coverage	Notes
				en (accessed on 29 May 2015)		groups
	4.	Temporary Worker Rate	.	.	.	
	5.	Involuntary Part-Time Worker Rate	.	.	.	
	6.	Atypical Working Hours Rate	.	.	.	
	7.	In Work at Risk of Poverty Rate	.	.	.	
	8.	Vulnerable Employment Rate	Statistics Korea	Table DT_1DA7010	2000-2012	
	9.	Formal Education and Training Rate	.	.	.	
	10.	Skills Mismatch Rate	.	.	.	
	11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012	
	12.	Long-Term Unemployment Rate	ILO	KILM 8th Edition; Table 11a	2000-2012	
Singapore	1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012	
	2.	Relaxed Unemployment Rate	ILOSTAT	Annual indicators, Discouraged jobseekers by sex and age (accessed on 6 April 2015)	2009-2012	
				Annual indicators, Unemployment by sex and age (accessed on 6 April 2015)	2009-2012	
				Annual indicators, Labor force by sex and age (accessed on 6 April 2015)	2009-2012	
	3.	NEET rate	ILOSTAT	Annual indicators, Youth not in education and not in employment by sex (ac-	2009-2012	

Country	Indicator		Institution	Detailed Source	Time coverage	Notes
				cessed on 6 April 2015)	2009-2012	
				Annual indicators, Working-age population by sex and age (accessed on 6 April 2015)		
	4.	Temporary Worker Rate	.	.	.	
	5.	Involuntary Part-Time Worker Rate	ILOSTAT	Annual indicators, Time-related underemployment rate by sex and age (accessed on 6 April 2015)	2009-2012	The threshold of part-time was set to 35 hours per week instead of 30
	6.	Atypical Working Hours Rate	.	.	.	
	7.	In Work at Risk of Poverty Rate	.	.	.	
	8.	Vulnerable Employment Rate	ILO	KILM 8th Edition; Table 3	2001-2004 2006-2012	
	9.	Formal Education and Training Rate	.	.	.	
	10.	Skills Mismatch Rate	.	.	.	
	11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012	
	12.	Long-Term Unemployment Rate	Singapore Ministry of Manpower	Comprehensive Labor Force Survey, MOM	2002-2004 2006-2012	Long-term unemployed are defined as people unemployed for more than 25 weeks
Taiwan	1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012	
	2.	Relaxed Unemployment Rate	.	.	.	
	3.	NEET rate	.	.	.	

Country	Indicator		Institution	Detailed Source	Time coverage	Notes
	4.	Temporary Worker Rate	.	.	.	
	5.	Involuntary Part-Time Worker Rate	.	.	.	
	6.	Atypical Working Hours Rate	.	.	.	
	7.	In Work at Risk of Poverty Rate	.	.	.	
	8.	Vulnerable Employment Rate	ILO	KILM 8th Edition; Table 3	2000-2012	
	9.	Formal Education and Training Rate	.	.	.	
	10.	Skills Mismatch Rate	.	.	.	
	11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012	
	12.	Long-Term Unemployment Rate	.	.	.	
United States	1.	Unemployment Rate	ILO	KILM 8th Edition; Table 10a	2000-2012	
	2.	Relaxed Unemployment Rate	ILOSTAT	Annual indicators, Discouraged jobseekers by sex and age (accessed on 6 April 2015)	2009-2012	
				Annual indicators, Unemployment by sex and age (accessed on 6 April 2015)	2009-2012	
				Annual indicators, Labor force by sex and age (accessed on 6 April 2015)	2009-2012	
	3.	NEET rate	ILOSTAT	Annual indicators, Share of youth not in employment and not in education by sex (%) (accessed on 02 February 2015)	2009-2012	

Country	Indicator		Institution	Detailed Source	Time coverage	Notes
	4.	Temporary Worker Rate	.	.	.	
	5.	Involuntary Part-Time Worker Rate	OECD	Incidence of involuntary part time workers	2000-2012	
	6.	Atypical Working Hours Rate	.	.	.	
	7.	In Work at Risk of Poverty Rate	.	.	.	
	8.	Vulnerable Employment Rate	KILM	KILM 8th Edition; Table 3	2000-2011	
			ILOSTAT	Employment distribution by sex and status in employment	2012	
	9.	Formal Education and Training Rate	.	.	.	
	10.	Skills Mismatch Rate	.	.	.	
	11.	Relative Unemployment Ratio	ILO	KILM 8th Edition; Table 10a	2000-2012	
	12.	Long-Term Unemployment Rate	ILO	KILM 8th Edition; Table 11a	2000-2012	

A-4: Biographies of Authors

Ursula Renold is head of the research center for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. In addition, she is Chairman of the University Board of the University of Applied Sciences and Arts, Northwestern Switzerland. She was a Visiting Fellow at the Harvard Graduate School of Education between September 2012 and March 2013. Prior to this, Renold was Director General of the Federal Office for Professional Education and Technology (OPET) until June 2012. In this position, she headed Switzerland's competence center for professional education, the universities of applied sciences, and led program innovation starting in 2005. Before becoming Director General, she was head of OPET's Vocational Education and Training Division and Director of the Swiss Federal Institute of Vocational Education and Training (teacher education). During her career, Renold has launched numerous key initiatives that have had great impact on the Vocational and Professional Education and Training system in Switzerland. She holds an honorary Professorship in Professional Education at the University of Applied Labor Studies in Mannheim (Germany).

Ladina Rageth is a researcher and doctoral student at the center for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. She has a master's degree from the Institute of Sociology in the Faculty of Arts at the University of Zurich, Switzerland, She is currently working on her PhD in the fields of sociology of education, focusing on comparative research on Vocational Education and Training (VET), as well as its outcomes on the youth labor market. In addition, her research interest lies in the social status of VET. In her PhD thesis, she applies different methodologies from social sciences including theoretical work as well as quantitative and qualitative empirical methods. Before starting her PhD, Ladina worked for several years as a Scientific Associate and Project Manager at consulting and research company econcept AG, Zurich, Switzerland. She spent 6 months in India where she was employed as a University Relations and Programme Manager at swissnex India in Bangalore.

Thomas Bolli is a postdoctoral researcher in the research center for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. Before starting this position in April of 2013, he was awarded a Swiss National Science Foundation grant to visit the University of Lancaster as a postdoctoral researcher. He wrote his PhD thesis on the production and measurement of knowledge capital in the research center for innovation at the Swiss Federal Institute of Technology (ETH) in Zurich. Building on this, his research interests consist of the statistical analysis of knowledge, in particular applying microeconometrics

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Katherine Caves is a researcher at the center for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. She has a bachelor's degree from the University of California at Berkeley and earned her master's degree in the field of Education. Her PhD research was on the economics of education at the University of Zurich. In her dissertation, she examined educational policy issues using diverse empirical and theoretical approaches. She is currently working on identifying the success factors and barriers to labor market-oriented education systems reforms through the Center for the Economics and Management of Education and Training Systems (CEMETS).

Vipul Agarwal is a graduate student at Birla Institute of Technology and Science (Pilani, India), pursuing majors in Economics and Electrical & Electronics engineering. As a master's thesis student at the center for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich, he wrote a thesis on "Labor market Institutions and their Impacts on Training Specificity in OECD Countries' under the guidance of Dr. Ursula Renold. He has worked with several NGOs and corporate outfits through several internships during his studies. During his work with the Honey Bee Network he developed a database for the Indian K-12 curriculum that is currently used by top institutes to make tutorials in regional languages across India. He also received the international Gurukul Scholarship to study Buddhism under the Dalai Lama. He will be joining McKinsey & Company as a Business Analyst in the near future. When he is not busy reading about business and current affairs in India, he enjoys playing cricket and singing.

Filippo Pusterla is research assistant at the center for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. At the same time, he is doing his master's degree in economics at the University of Zurich. His research interests are educational economics and labor economics with a particular focus on the youth labor market situation.

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