5 Learners' Economic Competence in Switzerland: Conceptual Foundations and Considerations for Measurement[1]

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5.1 Preamble

Economic education is justified by both its function as preparation for activities in the professional economic domain and its role in preparing young people for general participation in the economy and society (a general educational function). The latter has been highlighted in recent years in many countries, predominantly with reference to the continuing economic and financial crisis, high youth unemployment, and the risk of personal and business bankruptcies. In Switzerland, the debate leading to the introduction of direct democratic action and decision making has also been brought to the table. Through their participation in referendums, Swiss citizens have the right to co-determine economic and social developments in Switzerland and to submit citizens' initiatives. For example, in 2014, a citizens' initiative made it possible to vote for a unified health insurance fund, a flat-rate tax on foreign millionaires, and a requirement for the central bank to retain a certain level of gold reserves, among other issues.[2] To make informed decisions about such issues, citizens must be economically competent.[3] It is questionable whether a direct need for economic education and the promotion of specific competencies can be derived from this requirements and/or the requirements of the economic-professional domain; if so, such justification would correspond to a naive variant of the logic underlying educational goals (Eberle 1996: 22 ff.; Beck 1992: 567 ff.; Heid 1977: 837). We assume, however, that a full justification can be rendered (for the general educational function see, for example, Eberle (2006)) and that commercial apprentices require a corresponding economic education to prepare them for both their professions and their participation in society and economic policy.

1 We wish to express our sincere gratitude to the LINCA project team – Sarah Forster-Heinzer, Eva Höpfer, Silja Mentele, Andrea Reichmuth and Madeleine Scherrer – for their input on the article and their contributions to the model.

2 See details at http://www.admin.ch/ch/d/pore/va/vab_2_2_4_1.html.

3 Financial literacy is a necessary but insufficient part of economic literacy.

The aim of this paper is to present an economic competence structure model for Switzerland that is suitable for commercial apprentices. We can refer to similarities in German and Austrian economic and/or commercial education and training. Nevertheless in Switzerland, the adaptation of such concepts, models, and instruments is limited. In Switzerland, commercial vocational education has incorporated the professional and general educational objectives described above into its training and education plans and curricula in a way that is explicit and unique among nations. In the following pages, when we model the competencies to be promoted, we will refer to this real-life educational situation. Therefore, we first outline the characteristics of commercial training in Switzerland. We then present an economic competence model that includes the described objectives of economic education, which are characterized by standardization, and the current discussion on the concept of competence. The focus here is on representing the structure of the economic competence of apprentices in the commercial sector in German-speaking Switzerland. We will also present the similarities between this model and German competence models. In addition to the commercial dimension, Swiss commercial vocational education requires an economic-civic dimension. The theoretical-conceptual considerations presented are based on work that has been developed within the framework of the Swiss Leading House *Learning and Instruction for Commercial Apprentices (LINCA).*[4] LINCA aims to investigate apprentices' economic competence development in the commercial field.

5.2 Economic Education in Initial Commercial Apprenticeship in Switzerland

Commercial apprenticeship is the most frequently chosen type of Vocational Education Training (VET) in Switzerland, with a share of 19% of all VET. In contrast to other countries (e.g., Germany and Austria), Swiss initial commercial apprenticeship is characterized by a standardized vocational school education. Regardless of the industry sectors to which the commercial training belong, the apprentices are taught in common classes at the VET school. Apprentices who complete their vocational education and training in a bank and those who receive their training in a travel agency receive the same schooling. In contrast, practical vocational training and branch-related courses are organized on an industry-specific basis. This training model presents the vocational schools with a major challenge. At the end of vocational training, each apprentice should be qualified to exercise his or her profession in all 21 commercial

4 The State Secretariat for Education, Research and Innovation (SERI) subsidizes LINCA (2011-2016).

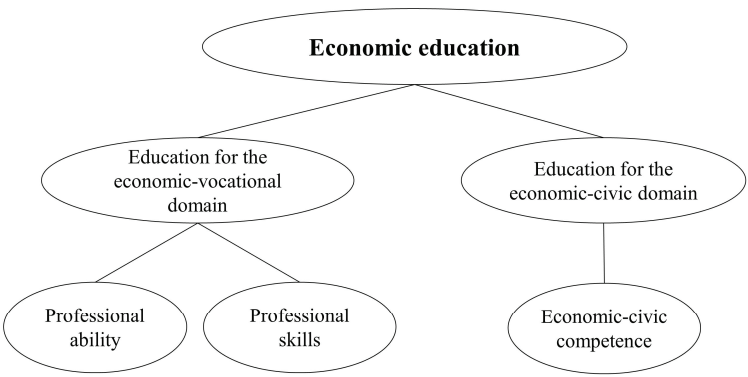
sectors. The initial commercial training is offered in three grades: 1) basic programme (a *Federal VET Diploma in Commerce*, basic programme, or *B-Profile*), 2) advanced basic programme, (a *Federal VET Diploma in Commerce*, expanded programme, or *E-Profile*) and 3) advanced basic programme with a vocational diploma (*Vocational Baccalaureate* or *M-Profile*). In principle, the duration of all three courses is three years. The vocational diploma can also be acquired by pursuing an additional year beyond the expanded basic training.

The comprehensive understanding of economic education described in the preamble is chiefly derived from the long-term work of Dubs (2014: 18). He makes it clear that economic education should prepare individuals for both subsequent professional activity and for participation in the economy and society outside the workplace. This twin objective is shown in Figure 1.

Training for the economic-vocational domain (on the left side of Figure 1) takes place in vocational schools, in companies that provide traineeships, and in branch-related courses and aims to prepare trainees for their specific professional activities; this training promotes vocational skills and/or competencies (Dubs 2014: 18).

The promotion of competence in the economic-civic domain (on the right side of Figure 1) also takes place in vocational schools, which have an explicit general education mandate in Switzerland. A general understanding of economics and society is necessary to enable the individual to understand and assess personal economic and social situations, regardless of his/her profession (Dubs 2014: 18).

Figure 1: Economic education according to Dubs (2014: 18)



In non-commercial vocational schools, vocational and general education contents are separated into corresponding disciplines. In commercial vocational schools, however, both general economic education and much of vocational economic education are taught as a single discipline – *economy and society* – which is responsible for promoting vocational and non-vocational economic competence. This model is internationally unique and, compared with other occupations that require training, peculiar to Switzerland. The discipline includes the classic economic areas of learning such as *economics, business administration, law,* and *finance and accounting*, while also covering aspects of *law and state*. The content of the discipline is similar for the advanced basic training levels with and without a vocational diploma (the E- and M-profiles), although the content is discussed in more detail at the advanced basic training level with a vocational diploma (the M-profile). Therefore, in the M-profile, the content is formally divided into the two disciplines: *finance and accounting (FA)* and *economics, business administration and law (EBL)*. Civic education is transferred to the discipline of *history and political science*.

Dubs' (2014) considerations are also specifically reflected in the curriculum for aspiring business people (Bundesamt für Berufsbildung und Technologie 2011)[5], in which the key objective of the *economy and society* discipline is explained as follows:

> To understand fundamental relationships, problems and challenges in enterprises, in the economy and in society, business people need thorough knowledge and basic insights. In the areas of financial interrelationships and accounting, business management and law, they are able to identify problems and propose, implement or evaluate solutions in their area of activity. They explain the essential relationships in the overall economy and are conscious of their responsibility and possibilities as economic and social citizens.[6]

The content of the discipline is formed by both commercial education ("*solutions in their area of activity ...*") and economic-civic education ("*… as economic and social citizens*"). A model of economic competence in the commercial sector must reflect these two objective dimensions in a way that embraces this unique Swiss characteristic.

5 Federal Office for Vocational Training and Technology
6 This key objective was translated for this paper.

5.3 Modelling of Economic Competence in LINCA

5.3.1 Understanding competence

The term *competence* comprises many very different definitions. Hartig and Klieme (2006: 128–129) summarize six variants of the concept of competence expounded by Weinert[7] as follows[8]:

1. Competencies as general cognitive performance dispositions that enable people to master very different tasks.
2. Competencies as context-specific cognitive performance dispositions that are functionally related to particular classes of situations and requirements. These specific performance dispositions can also be characterized as knowledge, skills or routines.
3. Competencies in terms of the motivational orientations necessary to master challenging tasks.
4. Competence to act in ways that integrate the first three concepts with regard to the requirements of a specific field of activity, such as a profession.
5. Competencies regarding the knowledge, strategies or motivations that facilitate the acquisition and application of specific competencies.
6. Key competencies in the functional sense, as stated in 2, that are relevant to a relatively wide range of situations and requirements. These include, for example, native languages or mathematical skills.

For matters of educational research, Hartig and Klieme (2006: 129) favour the second definition of competence as a good foundation. They justify this choice with reference to Weinert (2001a: 59), by arguing that basic cognitive abilities are standard equipment and can only be influenced in a limited way.

Various research works make frequent reference to Weinert's (2001b: 27–28) cognitive psychological concept of competence. This concept states that competencies

> [are] the cognitive abilities and skills available in or learnable by individuals for the solving of certain problems, and the associated motivational, volitional and social readiness and capacity to successfully and responsibly use the solutions in a variety of situations.[9]

This conception most closely corresponds with the fifth definition listed in Weinert's Organisation for Economic Co-operation and Development

7 Weinert (1999, cited by Klieme and Hartig 2006) summarized these conceptions in the context of an OECD report. Various articles on the definition of key competencies – including Weinert's definition – were collected and published in a book by Rychen, Dominique Simone and Salganik, Laura Hersh (2001): Defining and Selecting Key Competencies. Kirkland, Toronto, Bern, Göttingen: Hogrefe & Huber Publishers.

8 Hartig's and Klieme's German summary was translated into English for this paper.

9 This definition was translated for this paper.

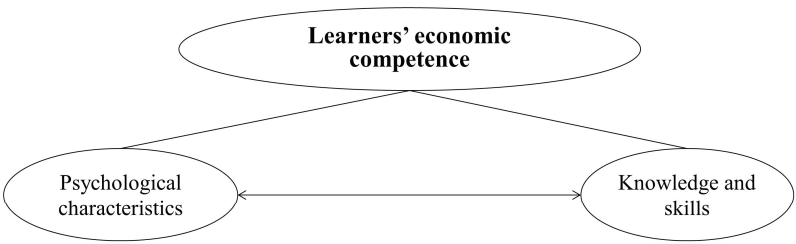
(OECD) report (1999, cited in Hartig & Klieme 2006: 128-129), which at least in part incorporates the preceding.

Regarding vocational and economic education, Seeber et al. (2010: 4) concluded that despite numerous differences, similarities can be found in the various definitions of and approaches to the conceptualization of competence. This conclusion implies, among other things, that competencies appear as context-specific performance dispositions in certain domains. In their work, Rosendahl and Straka (2011: 190) use this narrower definition of competence in relation to vocational training in Germany. This definition systematically neglects motivational aspects.

For the modelling of economic competence in Switzerland, we subscribe to a broader understanding of competence, as espoused by Weinert (2001b). Competence in this sense allows one to act responsibly and successfully in a professional environment. Economic competence is on the one hand based both on knowledge and skills and on the other hand, based on psychological characteristics.

The context or domain in which the competence is to be expressed is important for honing the competence's content, internal structure and level. Therefore, the next chapter presents a reflection on the domains that relate to economic competence.

Figure 2: The concept of competence in the commercial sector according to Weinert (2001b)



5.3.2 Reference domains for economic competence

The elements of knowledge and skills (cognitive skills and abilities), as shown in Figure 2, and the psychological characteristics (e.g., motivational disposition) used in the model can be general or domain-based. According to Klieme et al. (2007: 72), in expertise research, *domain* refers to a discipline or subject area. Weinert (2001a: 47) states that

> Specialized cognitive competencies refer to clusters of cognitive prerequisites that must be available for an individual to perform well in particular content area (e.g., chess playing, piano playing […]. The domains of specialized competencies can be very narrowly defined (e.g., chess competency) or very broadly and openly defined (e.g., diagnostic competencies in medicine).

Domains can also be other specific areas of learning and action (Seeber et al. 2010: 4). In our understanding, a domain can be an area of expertise, an area of activity, or an area of problem-solving.

The commercial and economic-civic objectives of Swiss economic education in initial commercial training relate to the specific competence in two different areas of activity and problem-solving. Therefore, a Swiss model for economic competence must include two domains.

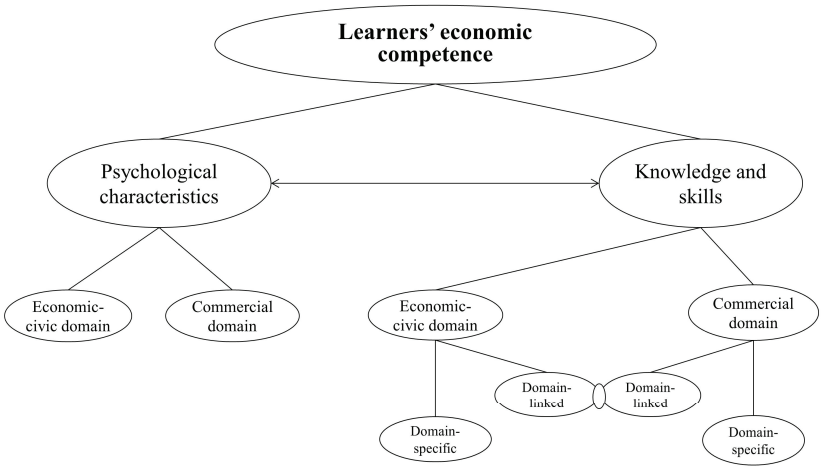
The competence to exercise domain-specific commercial activities or to resolve relevant problems, such as planning, executing and controlling professional activities in the workplace, should fall within the commercial domain. This competence includes, for example, the correct processing of a customer order (see also Table 1).

The competence to understand private, politico-economic and business administration problems in state and non-state social systems, evaluate proposed solutions, and personally develop solutions for simpler problems should fall within the economic-civic domain (Dubs 2014: 18). Economic-civic competence specifically facilitates the participation of all people, not just business people, in economic affairs, including the perception of citizens' democratic rights and duties. An example of this competence is the ability to understand and assess the actions of the Swiss National Bank with regard to the high exchange rate of the Swiss franc against the euro. Therefore, acting in this economic-civic domain demands not only financial literacy but also political and/or economic literacy.

Winther (2010: 31 ff., 79 ff.) proposes a further differentiation of the reference domains. Her concept of competence, based on the developmental psychological notions of Gelman and Greeno (1989), distinguishes between domain-linked and domain-specific competencies. Domain-specific competence refers to the mastery of the typical requirements within a domain, whereas domain-linked competence can support or intends to support the mastery of individual requirements within the domain.

This differentiation between domain-specific and domain-linked dimensions of competence applies to both the economic-civic and the commercial domains. The model of economic competence in the commercial sector thus appears as shown in Figure 3.

Figure 3: Model of economic competence in the commercial sector (own illustration according to Weinert (2001b) and Dubs (2014))



This model does not include other knowledge and skills relevant to competence, such as those related to subjects (e.g. German or mathematics), general cognitive areas, or general psychological characteristics (e.g., general and school-related self-efficacy beliefs and the general motivation to achieve).

The inclusion of both a domain-specific domain and a general educational domain in a single competency model is unique to the German-speaking region of Switzerland. In Germany, debate persists about the failure, until now, to include general economic education in competence measures in vocational schools. This debate arose around the discussion of standards for general economic education by the German Society for Economic Education (DeGÖB) (Seeber et al. 2012: 17–19).

Previous modelling and measurements of economic competence have mostly been concerned with one domain or the other. To develop an economic competence model for Switzerland, concepts and findings from both domains must be integrated. For the economic-civic domain, there is hardly any empirical evidence to support the construct; however, for the commercial domain, other connecting factors arise from studies of competence modelling and measurements. The next two chapters refer to relevant works.

5.4 Work and Research on Economic-civic Competence

There is a wide range of programmatic works on the concept of economic-civic competence, most of which fall under the heading of economic competencies or economic education; however, these studies were not further empirically investigated. Additionally, the competence model for economic education developed by Seeber, Retzmann, Remmele and Jongebloed (2012) arose from a comparison and discussion of various earlier proposals. This model formed the basis of the educational standards for general economic education, which have implemented the requirements set forth in the expert opinion by Klieme et al. (2007) for the Conference of the Ministers of Education and Cultural Affairs of the States (KMK).

In German-speaking Switzerland, as part of the Economic Competencies in Swiss Upper Secondary Education (OEKOMA) study[10], the theory and research status of the modelling and measurement of economic competencies was reviewed, and economic-civic competence was ascertained from a representative sample of high school graduates (Schumann & Eberle, 2014). Consistent with Weinert the authors Schumann and Eberle (2014: 107) understand *economic competencies* as

1. *Economic knowledge and skills as a prerequisite for solving economic problems (the core dimension of economic competencies),*
2. *Interest in economic problems and motivational orientations with the aim of solving economic problems; and*
3. *Attitudes and values that allow economic problems to be deliberated and responsibly resolved.*

The authors were able to demonstrate that the contents of the fields of business administration, economics and accounting can be distinguished as three separate knowledge dimensions. Furthermore, the data from the study show positive correlations between motivational orientations, interests and attitudes towards knowledge and skills (Schumann & Eberle 2014: 115). The Swiss economic competence model is based on the OEKOMA-conception of economic-civic knowledge and skills as well as psychological characteristics (Figure 4).

5.4.1 Work and research on commercial competence

To differentiate the commercial part of the Swiss economic competence model, we may best refer to findings from business education for the com-

10 The Project *Economic Competencies in Swiss Upper Secondary Education* is financed by the Swiss National Science Foundation.

mercial sector of German-speaking region.[11] In vocational and economic education, three major empirical studies provide clues about the structure of competence in the commercial sector: the ULME study by Lehmann and Seeber (2007), the commercial competence structure model of Winther and Achtenhagen (2008), and the findings described by Rosendahl and Straka (2011) about aspiring bankers.

The ULME study (Lehmann & Seeber, 2007) is one of the first studies in the field of vocational training in which the professional competencies for various occupations that require training, including seven commercial occupations, were comprehensively modelled and measured. In addition to measuring specialist knowledge and general cognitive skills, the learners' biographical, social and motivational characteristics were measured. To model knowledge, the authors used a modified matrix by Anderson and Krathwohl (2001). They modelled tasks in which declarative, conceptual and procedural knowledge (knowledge categories) must be a) reproduced, b) understood/applied or c) criticized/deliberated (Hofmeister 2005)[12]. No *a priori* assumptions were made regarding the specialized dimensionality of the competencies because the model was used for various partly commercial/technical occupations that require training (Seeber et al. 2010: 5). However, the empirical data on becoming office clerks showed that knowledge in economics, business administration and law, and accounting had a two-dimensional nature (Lehmann & Seeber 2007: 108–109, 117).

Achtenhagen and Winther (2008; 2009a; 2009) base their commercial competence structure model on two dimensions: understanding and action. The understanding-based dimension involves specialized knowledge of economic literacy and numeracy in the work context. The action-based dimension involves specific problem-solving skills in work situations; the measurement of this dimension is computer-based and aided by business processes in purchasing, sales and work scheduling. Using a sample of aspiring industrial clerks near the end of their training, the authors show that the understanding- and action-based dimensions can be differentiated with regard to three business transactions. Furthermore, Winther (2010: 100–117, 234–243) adds a level model based on the complexity of the content, the functional modelling and the cognitive classification of tasks; this model was confirmed empirically.

Rosendahl and Straka (2011) show that for aspiring bank professionals, the postulated general economic and banking-economic dimensions can be empirically confirmed. Their exploratory findings indicate that, as in the ULME

11 The connection is primarily justified by the comparability of vocational training systems between Germany and Switzerland and the resulting generally conceptually comparable understanding of competence.

12 Anderson and Krathwohl (2001) describe six cognitive process dimensions, which are summarized as three dimensions in the ULME study.

study, sub-dimensions of specific specialist categories are also conceivable (Rosendahl & Straka, 2011: 214). However, a better data fit is achieved for sub-dimensions created through business processes, as in the case of Winther and Achtenhagen (2009b: 539)[13]. In their discussion, Rosendahl and Straka (2011: 214–215) suggest that competence models that provide both specialist dimensions and dimensions based on work and business processes may be able to better explain the data. According to Rosendahl and Straka (2011: 215), such a concept requires, *inter alia*, the development of appropriate instruments.

These findings imply that understanding- and action-based commercial knowledge and skills should be modelled in the Swiss economic competence model. In addition, modelling and testing also require the adequate development and implementation of instruments. The implications for LINCA will be described in the following chapters.

5.4.2 Structure of economic competence in LINCA

The Swiss model of economic competence, which was developed as part of the LINCA project and that was explained and justified in Chapter 2, includes the commercial and economic-civic domains. Additionally, according to Hartig and Klieme (2006: 131), the internal structure of a competence model results from the situations and requirements that the competence (or competencies) is (are) intended to manage. In other words, the vocational commercial and non-vocational economic-civic competencies are promoted in a single discipline: *economy and society*. This is a Swiss peculiarity. A Swiss economic competence structure model is considerably more complex than comparable models from the commercial sector in the German-speaking region. The definitions of commercial and economic-civic competence can be found in Chapter 3.2, along with the fundamental distinction between domain-specific and domain-linked knowledge and skills. Figure 4 gives an overview of the other theoretical assumptions about the structure of economic competence, which are explained further below.

Psychological characteristics

According to Weinert (2001b) psychological characteristics should be considered in our economic competence model (see Chapter 3.1 and Figure 2). The psychological characteristics concern attitudes, interests and learning, and achievement motivation in relation to their respective domains. Together

13 Winther and Achtenhagen (2009b: 539) found indications of a three-dimensional model solution for each content area tested in the simulation; however, they opted for the more stable one-dimensional solution.

with the appropriate knowledge and skills, the psychological characteristics constitute the competence and may vary considerably between the two domains. For example, an individual's interest in commercial activities and his/her interest in economic-civic issues may differ.

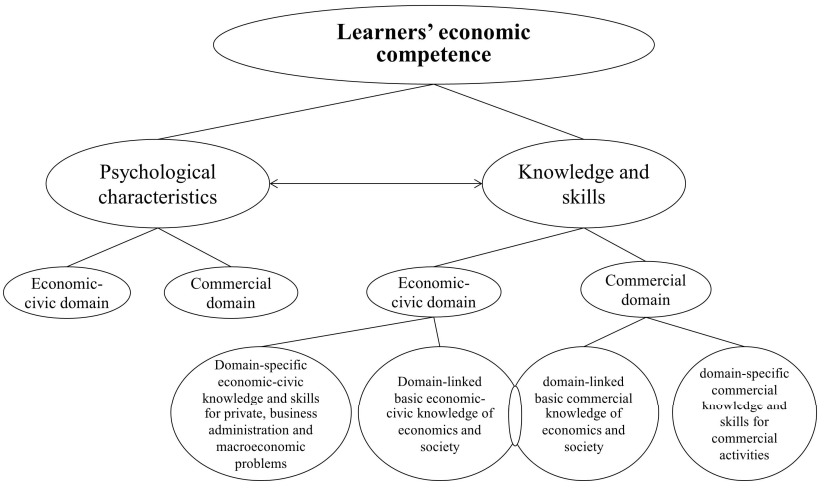


Figure 4: Structure of economic competence in the commercial sector

Commercial knowledge and skills

Domain-specific commercial knowledge and skills concern the actual, specific vocational knowledge and skills related to commercial activities. This knowledge and these skills are both understanding-based and action-based (e.g., the ability to process orders or the ability to obtain offers). Typical action situations are illustrated in the performance objectives of the curriculum for business persons (Bundesamt für Berufsbildung und Technologie 2011). Table 1 shows a sample of these situations.

Domain-linked commercial knowledge and skills can or should support the mastery of individual requirements in the specific domain of *commercial competence*. Domain-linked knowledge and skills cover the basic commercial skills required for (economic) vocational actions, which include economic literacy (e.g., the ability to understand business texts) and economic numeracy (e.g., the ability to calculate returns on investment) (Winther 2010: 54 et seq.), and further knowledge of business administration (e.g., about marketing) or economics (e.g., about market pricing). Domain-linked com-

mercial knowledge and skills are also important in other domains, such as the economic-civic domain.

Table 1: A selection of typical action situations in the commercial domain

Administer materials/ goods or services	Advise customers	Process orders	Execute financial processes
Recognize and manage the smooth, effective administration of goods, materials or services	Process customer enquiries professionally and in a customer-oriented manner	Process orders in a customer-oriented manner	Correctly process financial information

Economic-civic knowledge and skills

Domain-specific economic-civic knowledge and skills are those required to understand private, politico-economic and business administration problems in state and non-state social systems, to evaluate proposed solutions and to personally develop solutions for simpler problems. These abilities are based on real-life economic problems, such as the euro crisis, youth indebtedness, management salaries, public debt, energy policy, agricultural protection, safeguarding the old age and survivors' pension, and tax competition between the cantons.

Domain-linked economic-civic knowledge and skills are required to resolve economic-civic domain-specific problems. Similar to commercial knowledge and skills, economic-civic knowledge and skills are context-related linguistic, mathematical and technical abilities that interact with the mobilization of knowledge of business administration and economic models. The contents of domain-linked economic-civic knowledge and skills are logically structured and partially overlap with those of commercial domain-linked competence. Similarities are found mainly in the field of business administration.

Additional areas

Other knowledge and skill components and psychological characteristics are involved in the successful management of commercial action situations and the understanding, evaluation and solving of economic-civic problems; however, such components no longer represent the distinguishing features of the economic competence model. This knowledge and these skills belong to neighbouring domains, such as *law, history* and *political science*, and from general subject areas, such as *mathematics, German* and *foreign languages*, strategic learning, problem-solving knowledge, and general cognitive abilities. The other psychological characteristics, which are not closely linked to

the two domains, include general and school-related self-efficacy beliefs and general achievement motivation.

5.5 Measurement of Economic Competence in LINCA

The following chapter examines how economic competence, as described in Chapter 3.5, was incorporated into instruments designed to record the various components used in the currently ongoing LINCA project. Some of the instruments were adapted to the Swiss context. The adaptations included, for example, a reduction in the content and scope and linguistic adjustments. In addition to the adoption and partial adaptation of existing instruments, a range of new instruments was developed.

5.5.1 Measurement of psychological characteristics

Elaborate instruments were used to measure psychological characteristics. A questionnaire on psychological characteristics was created that contains items on learning motivation by Prenzel et al. (1996) and items on achievement motivation by Ramseier (2004). General and educational self-efficacy beliefs were determined using scales by Schwarzer and Jerusalem (1999) and Jerusalem and Satow (1999).

A new instrument was developed to measure individuals' interest in economic-civic issues (Holtsch et al. 2014). Items were developed regarding their interest in nine problem situations based on typical economic problems that citizens face; two items were created for each problem situation, thus, the instrument consists of 18 individual items. A sample item can be found in Table 2.

A new instrument was also developed to measure individuals' interest in commercial activities (Mentele et al. 2012). The current curriculum for commercial training was analysed for this purpose. In the context of the eight achievement objectives for the training company, the trainees are prepared for activities in, for example, customer service, order processing and administrative and organizational processes (Bundesamt für Berufsbildung und Technologie 2011). For each of the eight achievement objectives, three typical action situations were identified and represented in an item. The instrument consists of 18 individual items. A sample item can be found in Table 2.

Table 2: Sample items for measuring economic-civic and commercial psychological characteristics

Psychological characteristics	
Economic-civic domain	Commercial domain
Interest in economic-civic issues:	Interest in commercial activities:
"How interested are you in the extent to which the insurance for safeguarding the old age and survivors pension (AHV) is sustainable?"	"How interested are you in how customer interviews are conducted?"

5.5.2 Economic-civic knowledge and skills

The instrument for measuring economic-civic knowledge and skills includes items that were developed and used in the OEKOMA project (Schumann et al. 2010) and items from the German version of the *Test of Economic Literacy* (Beck & Krumm 1998). Additionally, new items were developed as part of the CoBALIT project[14]. In the instrument used to measure economic competence, trainees are confronted with typical problems and challenges in contemporary European society, such as the euro crisis, public debt, and energy policy. The instrument includes items that measure domain-linked and domain-specific economic-civic knowledge and skills. In the case of the domain-linked items, knowledge and skills pertaining to economic, business administration and financial concepts and terms are surveyed; the domain-specific items require economic-civic problems to be analysed and evaluated, proposed solutions to be assessed and/or individual solutions to be found. To avoid the effects of the item format, domain-specific and domain-linked items were developed, and both open and closed question formats were used. Sample items are presented in Table 3.

5.5.3 Commercial knowledge and skills

To measure vocational commercial competence in aspiring industrial clerks in Germany, Achtenhagen and Winther (2009) have developed the ALUSIM simulation, which they use to realistically measure workplace competence. ALUSIM was tested for adaptation to the Swiss context, and two independent studies showed that ALUSIM is limited in scope from the start of training for all of the authentic work tasks of Swiss trainees in the 21 industry sectors (Eberle et al. 2012a; Eberle et al. 2012b). Therefore, a new computer-based

14 CoBALIT is a project network developing and implementing a test platform measuring competencies required in the commercial sector in Germany and Switzerland. For more information, please visit: http://ascot-vet.net/de/264.php.

instrument was developed: LINCA. For this purpose, school and occupational curricula were analysed, and common intersections of typically challenging commercial situations were identified. Three of these challenging situations were selected, and domain-linked and domain-specific items were developed. In this assessment, the students work in several departments of the fictitious company LINCA. They resolve domain-linked issues and process complex, domain-specific tasks (e.g., processing a request for a quote). The tasks are presented in the form of video scenarios, audio recordings or written assignments, and the domain-linked and domain-specific tasks are embedded in specific work situations. Both domain-linked and the domain-specific items were integrated into the computer simulation to measure the individual facets within a setting and to avoid instrument effects. Table 3 shows sample items.

Table 3: Sample items for measuring economic-civic and commercial knowledge and skills

	Knowledge and skills	
	Economic-civic domain	**Commercial domain**
Domain-linked	Who is eligible to receive pension insurance?	The company LINCA sends an invoice to the customer. Which VAT rate is used for the cost of transportation and beverages?
Domain-specific	What effect does an increase in the retirement age, e.g., to 68 years, have on the employment market? Name and explain two influencing factors.	"Dear Sophie, would you please post the attached receipts according to the net method? Thank you, Nicole" (work order by e-mail)

5.6 Outlook

In LINCA, the validity of the dimensions of competence for Swiss commercial education, which embraces all sectors, is to be empirically tested over a protracted period of time. The first survey took place at the beginning of training in the autumn of 2012, the second survey took place in the middle of the second year of training at the beginning of 2014; and the third survey was performed in early 2015. A fourth survey will take place shortly before the final examination in the spring of 2015. The first reliable empirical findings and detailed analyses of the complete economic competence model will be available at the end of 2015.

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