

# What makes Social Institutions of Vocational Education Systems robust?

**Authors:**

Thomas Bolli  
Katherine M. Caves  
Patrick McDonald  
Ursula Renold

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## Abstract

This paper analyzes what dimensions determine the robustness of social institutions in education programs. The data stems from structured surveys among education experts in Benin, Costa Rica, Nepal and Switzerland. The surveys examine functionally equivalent social institutions carrying out the same set of Technical Vocational Educational and Training (TVET) program functions in each country. The results show several dimensions affect social institutions' robustness. Fulfillment of the function is the most important determinant of social institutions' robustness, followed by clarity and formality of structures, involvement and extent of culture as well as rigor of sanctions. Institutionalization phase and breadth of scope show mixed results. These findings suggest that a focus on function, structure and culture is most effective for increasing social-institutional robustness.

**Keywords:** social institutions, robustness, institutionalization

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# 1 Introduction

Education programs are anchored in socially constructed contexts that dictate the names and practical details of education processes embedded in individual programs. However, all education systems address similar functions – among others, training youth and preparing them to enter society (Klieme et al. 2007). A functions-oriented framework on social institutions (Miller 2003) embedded in the cross-contextual social institutions of education programs may therefore provide an avenue for analyzing how differing levels of robustness in education programs impact the success of youth during and after their educational careers.

Rageth et al. (2021) develop a conceptual framework for the determinants of social institutions in terms of the function, structure, culture and sanctions, as well as their breadth of scope and phase of institutionalization. Caves et al. (2024) apply the concept of functional equivalents to identify functions in education and training programs along the curriculum value chain. This paper provides empirical measurement for the combination of these theoretical frameworks. This allows an empirical analysis of the determinants of the robustness of social institutions.

We analyze the robustness of social institutions in four education programs in different countries with various social and economic contexts – Benin, Costa Rica, Nepal, and Switzerland. Focus groups identify the processes involved in the education and training program functions in each country. We then conduct online surveys among education system experts. We further calculate the impact of each dimension on social-institutional robustness, weighted both with objective weightings of the importance of each process as provided by respondents, and an empirical weighting system proposed by Bolli et al. (2018).

We analyze the relationship between the robustness of social institutions and the dimensions of social institutions empirically. The results suggest that fulfilling its function well is the most important determinant of the social institutions' robustness. Structure, culture and sanctions of social institutions also affect social institutions' robustness. Phase of institutionalization and breadth of scope on the other hand have an unclear relationship with the social institutions' robustness. This contradicts the common perception that the success of an education program, reform, or policy depends on scale and longevity, instead placing focus on what it does and the beliefs and ways of working that underlie that work. It provides a strong argument that—although social institutions serving similar functions can be developed in any context—attempts to copy and paste a social institution from one context to another might fail if they do not account for structure and culture within that social institution.

## 2 Theory and Literature

Our main unit of analysis is the social institution. There are various definitions of social institutions in the social sciences literature (Abrutyn, 2014; see overview in Rageth et al., 2021). Social institutions are not necessarily organizations (Abrutyn & Turner, 2011). They are broader than norms or rituals, but specific enough to have a clear purpose or function (Miller, 2019). In general, social institutions serve functions or solve problems by organizing common patterns of behavior (Turner, 1997; Rageth et al., 2021). They structure and legitimize behavior (Parsons, 1940), and endure over time and through changes in the individual participants (Spencer, 1929).

A robust social institution is one that is autonomous (Abrutyn & Turner, 2011), long-lasting (Parsons, 1940), well-defined, coherent, and growing (Spencer, 1929), and dominant in its niche (Jepperson, 1991). Rageth et al. (2021) identify six dimensions of variation in social-institutional robustness. Their dimensions of robustness are institutionalization level, scope, function, structure, culture, and sanction (Rageth et al., 2021). Rageth et al. (2021) argue that each dimension contributes to the overall robustness of a social institution, and that an ideal institution is robust in all dimensions. They do not argue that every dimension is equally important, leaving it to future research to explore the relative weights of each dimension in overall social-institutional robustness. We take up that question empirically, exploring the following research question: **how important is each dimension of social-institutional robustness for the overall robustness of the social institution?**

The following subsections explore the literature related to each dimension of social-institutional robustness. We explore this issue specifically in the context of education programs. Education programs span societal, economic and cultural contexts. This makes them a useful field for empirical comparative research of social institutions, as data collection and analysis are possible in many different social institutions in the same field. We also consider how the dimensions of social-institutional robustness appear in education literature, especially in the part of the literature focused on educational change and reform implementation. This subfield frequently deals with the robustness of new programs or changes to existing programs. In general, three dimensions of social-institutional robustness—their institutionalization, scope, and function—come up frequently in the literature. Three other dimensions—structure, culture, and sanctions—are less prominent.

### 2.1 Institutionalization

The institutionalization of social institutions is a key issue in the theoretical literature (e.g. Parsons, 1990 [1934]; Jepperson, 1991; Holm, 1995; Zucker, 1977; Lapassade & Lourau, 1979). Tolbert and Zucker (1999) suggest that common patterns of behavior of social institutions stabilize and become more persistent over time as institutions move through institutionalization levels. Increased institutionalization enables social institutions to gain stability and the power to determine behavior. Rageth et al. (2021) take a three-level approach based on Tolbert and Zucker (1999) and others. During *pre-*

*institutionalization*, initial patterns of behavior develop but may not survive the departure of key individuals. During *semi-institutionalization*, the institution begins to solidify but its structure and functions may still vary across institutional actors and contexts. *Full institutionalization* denotes an institution completely anchored in its context and which will be transmitted to a next generation of actors. A fully institutionalized social institution can survive the departure of individuals or even founders, while a less-institutionalized social institution cannot. Thus, our hypothesis regarding the institutionalization levels is:

*Hypothesis 1: A social institution is more robust as it advances through the institutionalization process.*

Institutionalization is a key issue in the educational change literature. Reforms or new programs might live or die depending on whether a specific linchpin person is able to remain in their position (see Fullan, 2015). Less-institutionalized social institutions still need these individuals whose presence and efforts are necessary for their sustained success. A similar phenomenon happens when governments or philanthropic funders remove support too early and an innovation collapse (Tompkins-Stange, 2020). Reforms or projects that have been around long enough—or reached full institutionalization quickly enough—can sustain changes like these, but less-institutionalized institutions cannot. This is one of the key components of robustness in the educational change and reform literatures.

## 2.2 Scope

The **scope** of an institution depends on its boundaries, which define who is subject to an institution's rules and how far the institution's rules reach (Turner, 2010). Leslie and Clunan (2011) argue that broader scope increases social institutions' robustness by protecting the institution and providing institutional continuity. An institution with a *narrow* scope is only relevant for a small number of people, while a *broad-scope* institution has a wider sphere of influence.

Our empirical setting uses technical and vocational education and training (TVET) programs. In TVET programs, scope may be considered along two dimensions. First, *geographic scope* denotes to what extent a program is available across a country or education system. While programs with a broad geographic scope will be available to an entire cohort within an education system, programs with a narrow geographic scope may be only available to a smaller number depending on their location. Second, *occupational scope* refers to the number of occupational fields a TVET program is available in. A broad occupational scope means a program is available in many occupations, while a narrow occupational scope means only a select few occupations are available.

We therefore pose the following hypothesis on the social institution's scope:

*Hypothesis 2: A social institution is more robust when it is broader in scope.*

*Hypothesis 2a: A social institution is more robust when it is broader in geographic scope.*

*Hypothesis 2b: A social institution is more robust when it is broader in scope of covered occupations.*

Scope is perhaps the most easily measurable characteristic of social-institutional robustness. Empirical work on the success of educational changes starts with how many students or schools are involved (e.g. Marhuenda- Fluixá, et al., 2019; Caves & Oswald-Egg, 2023; Wortham et al., 2023), or how widely it is spread across geographies and networks (e.g. Kober & Rentner, 2011; Ramey et al., 2024). Scope is relevant for the robustness of a social institution, but it is not always clear whether the focus on scope comes from the degree of its importance or from its ease of observability.

## 2.3 Function

Social institutions exist to solve a fundamental problem that needs to be solved through their joint action (Scott 2008). Hence, a social institution needs to fulfil its **function** (Turner, 1997, Miller 2019). Literature on function of social institutions is relatively vague in terms of the characteristics that define a high quality of function. We can nevertheless posit that a social institution's function should be both **relevant** and **clear** to its members. In terms of TVET programs, this means that the program's function should be focused towards providing skills demanded by the labour market, and that this should be known and acted upon by all actors within the program. A focus on another function – for instance, should the program be too focused on theoretical skills, or merely on its own survival, would be an example of a social institution with a function that lacks relevance. A function that is not known, understood or acted upon by all actors would be an example of a social institution with a function that lacks clarity. In both these cases, we would expect a social institution with a weak level of robustness.

Therefore, our hypothesis on the function is:

*Hypothesis 3: A social institution is more robust when it fulfills its function more effectively.*

Like institutionalization and scope, function is a major factor in the educational change and reform implementation literatures. Caves et al. (2021) review the literature on the implementation of TVET reforms, finding that function-related factors like a reform's strategy, its context fit, and political will are all key success factors. Successful reforms need to have a plan that makes sense, aligns to the need, and resonates with stakeholders. Fullan (2015) similarly argues that the key characteristics of a successful educational change are need, clarity, (low) complexity, and quality/practicality. The change needs to be something that solves a problem, is clear to stakeholders, and is an effective solution to the problem it addresses. These patterns are common throughout the literature, where function is clearly a key component of robustness.

## 2.4 Structure, Culture, and Sanction

It is easy to come to the idea that a robust social institution is long-established, large, and serving an important purpose effectively. The other dimensions of social-institutional robustness are more subtle, although certainly not missing from the literature entirely. For example, Senge et al. argue that “the

fundamental flaw in most innovators' strategies is that they focus on their innovations, on what they are trying to do—rather than understanding how the larger culture, structures, and norms will react to their efforts” (Senge et al., 1999; p.26). However, it can be difficult to tease apart references in the literature to these more quality-focused aspects of social-institutional robustness. Rageth et al. (2021) propose a quality dimension entailing the aforementioned **function**, as well as **structure**, **culture** and **sanctions**, based on the existing literature. We take these dimensions as the basis of our empirical study as described below.

## 2.4.1 Structure

**Structure** of a social institution captures the lateral and vertical relations among individuals (Abrutyn 2016). Social institutions that clearly define roles, linkages among actors, and hierarchies are more robust (Miller 2019). As with function, while ensuring the structure of the social institution is fit-for-purpose is important, the clarity of roles and their anchoring in formal rules or regulations is also critical for robustness. Therefore, our hypothesis on structure is:

*Hypothesis 4: A social institution is more robust when its structure is more clearly defined and more enduring.*

*Hypothesis 4a: A social institution is more robust when its structure is more clearly defined.*

*Hypothesis 4b: A social institution is more robust when it is more formal.*

Structure often comes up in the education reform literature in terms of alignment. Coburn et al. (2016) review decades of implementation literature and argue that lack of alignment is a key hindering factor. They describe this in similar terms as social-institutional structure, pointing out that different levels of educators (teachers, school leaders, district and state leaders, etc.) may have different interpretations, messages, and levels of familiarity with a reform. Roles are unclear, as are priorities. Coburn et al. (2016) argue that low alignment hinders implementation due to mixed messages, lack of support, superficial engagement, inconsistent engagement, and even resistance or “efforts to game the system” (p.5). All of these reflect the power structures that can help or hinder an education program or reform.

Another important aspect of structure that comes up frequently in the literature is power. The role of teachers in educational change is an important issue, and the role of teachers changes along with gender politics, various reform waves, and reform movements (Datnow, 2020). Successful reforms need to engage with and balance the needs of teachers, principals, students, parents, community members, district or regional administrations, and governments (Fullan, 2015). The educational change literature makes it clear that structure matters for social-institutional robustness.

## 2.4.2 Culture

**Culture** of a social institution covers the meanings, belief systems, social norms, and symbolic systems that are shared by an institution's constituents (Scott 2008). Culture includes the common behavioral patterns of actors in a social institution (Miller 2019). The organizational culture should be oriented

towards the function and facilitate the structural elements of the institution through encouraging the involvement of all actors. This means fostering a sense of ownership and belonging for all the relevant actors—students, teachers, school leadership, parents, community members, employers if they are involved, and others. Our hypothesis on culture is:

*Hypothesis 5: A social institution is more robust if its culture more strongly influences a common pattern of behavior among its actors.*

*Hypothesis 5a: A social institution is more robust if its actors are more deeply involved.*

*Hypothesis 5b: A social institution is more robust if actors share norms, attitudes, expected behavior and values to a larger extent.*

Culture is an important component of education programs' or reforms' robustness, although it is usually mentioned indirectly. In the educational change literature, Fullan (2015) articulates the importance of culture by arguing that new curricula or other educational innovations are not just a matter of giving teachers new materials. They also require changing teaching approaches and altering beliefs. Failure to address all three of these aspects means the change will not occur in practice. Pak et al. (2020) echo this sentiment, stating that implementation calls for leadership that can address both the technical and adaptive sides of change.

Other change-related literatures also highlight the importance of culture for robustness. Building on the organizational change literature, Wang et al. (2023) argue that change-ready schools are high in four dimensions of readiness for both individuals and as organizations. Those dimensions are efficacy (belief in capability for change), valence (belief in value of the change), commitment, and leadership. Bridwell-Mitchell (2015) takes a sociological approach and theorizes how the culture within a school can make it open to or resistant to change—specifically the beliefs that shape peer learning, community interaction, and teachers' shared norms and practices. Although they do not use the word culture, these examples highlight how culture appears as a key part of social-institutional robustness in the empirical and theoretical literatures about education.

### 2.4.3 Sanction

**Sanctions** of social institutions ensure regulation and control, preventing deviation from shared patterns of behavior. Sanctions can be coercive (e.g. Durkheim 1893, Turner, 2010) or moral (Parsons, 1940) to ensure individuals' compliance with the agreed-upon rules of conduct, standards, and responsibilities. Sanctions may involve a formal or informal punishment for violation of agreed-upon rules. On the other hand, a social institution may reward behavior that contributes to the functioning of the institution. In terms of TVET programs, sanctions may vary based on the actor – students may be suspended or excluded, teachers may be disciplined, companies excluded from apprenticeship programs, for instance. Our hypothesis on the sanctions is:

*Hypothesis 6: A social institution's quality is higher when its sanctions are applied more rigorously in response to violations of agreed-upon rules.*



Sanction is a key issue in the education reform literature, often described as accountability (Coburn et al., 2016). For example, accountability-focused reforms in the United States in the 2000s applied public pressure, financial incentives, school closures, and teacher rewards or penalties as sanctions. Based on previous research, Coburn et al. (2016) argue that sanctions like these can drive reform implementation, making a new social institution robust. However, they also point out that sanctions can go too far, especially in the absence of structural constraints. Accountability in school reform is often more specific than our broader definition of sanctions, focusing on performance and standardization (DiGaetano, 2015). Darling-Hammond (2004) emphasizes this point, arguing that successful accountability systems need to focus on more than just test scores—they need to include broader accountability measures that also address teacher skill, support of learning, and assessments that drive improvement. Sanctions need to align with the function of the social institution to be effective.

## 2.5 Overall Robustness

The theory and literature above already hints at relationships among the different dimensions of robustness. These dimensions might be interconnected (Abrutyn, 2014). Therefore, our last hypothesis considers the cumulative nature of robustness:

*Hypothesis 7: A robust social institution is robust in every dimension of the framework: it is fully institutionalized, broad in scope, and has high quality in all four properties. A weak element in any dimension makes for a weaker institution.*

# 3 Data and Methodology

## 3.1 Survey development

We develop the survey in several steps described in this section. We define the unit of analysis, identify comparable functions of VET, match country-specific processes to these functions and operationalize the dimensions of social institutions in structured survey questions.

Our **unit of analysis** (Grollmann, 2008) is on the level of programs, which are defined based on pathways, comprised of levels (ISCED<sup>1</sup>) and types (Caves et al. 2024). We analyze one program in each country:

*Benin – CQP*

<sup>1</sup> <https://uis.unesco.org/en/topic/international-standard-classification-education-isced/>

In Benin, the *Certificat de Qualification Professionnelle* (CQP) is a workplace-based apprenticeship program where apprentices spend a day a week in a TVET school. The CQP developed from the traditional informal apprenticeships in the country, adding a formal education element and leading to official certification at lower-secondary level after three years and successful completion of a theoretical and practical examination. At present, CQP diplomas do not allow for continuation to further education. CQP is only available in 14 occupations, and is currently only attended by less than 10% of the educational cohort (Nouatin et al. 2020), although graduates have significantly improved labor market outcomes than those from other programs (Kudrzycki et al., 2020).

#### *Costa Rica – Colegios Técnicos*

The *Colegios Técnicos* are Costa Rica's main formal VET program. Offered at the upper-secondary level, these secondary schools provide school-based VET programs and are attended by a little under one-third of students in the country's formal education system (Camacho Calvo et al., 2020). A program lasts two to three years, and can lead to either the general high-school diploma, allowing access to universities, or a mid-level technician diploma, which does not allow for further progression in the formal education system. The program is almost entirely school-based, save for a short internship or traineeship at the end of the study period. Non-completion of the program is relatively high, with around one-third of students beginning in 2015 dropping out before graduation in 2018 (Camacho Calvo et al., 2020).

#### *Nepal – TVET Programs*

Nepal's VET sector is complex but most formal programs are either offered by the Council for Technical and Vocational Education and Training (CTEVT), or at private schools offering CTEVT curricula. TVET programs are at the upper-secondary level with the possibility of enrolling in an 18-month "pre-diploma" or a 3-to-4-year diploma, and are offered in 24 occupational fields, largely in health, agriculture, engineering, and hospitality. They are largely school-based, with some time spent in companies towards the end of the program. TVET programs account for approximately one-quarter of the formal upper-secondary enrolment in Nepal. There are currently no pathways to higher TVET programs, but graduates with a diploma may apply for academic university programs. Graduation rates are, however, quite low, below 50% for most programs (Baral et al. 2020, Caves et al. 2021).

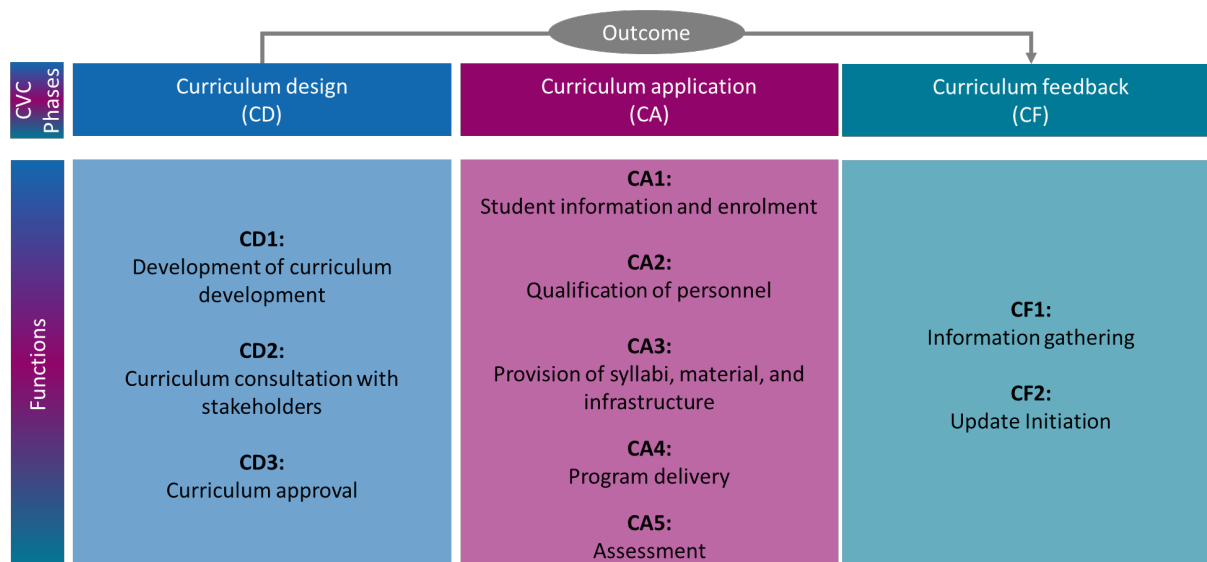
#### *Switzerland – Federal Diploma/Certificate of Education and Training*

Switzerland's TVET programs at the upper-secondary level are divided into the Federal Diploma (3-4 years) and Federal Certificate (2 years) of Education and Training. Offered in almost 250 occupations, these programs account for 70% of educational enrolment at the upper-secondary level (SERI 2022). Programs are generally dual-track, meaning that apprentices spend a significant amount of their time – 60 to 80% – in the workplace. Employers are heavily involved in curriculum design, application, and feedback processes. On completing the program, graduates can access tertiary-level TVET programs, or, upon completion of additional requirements, Universities of Applied Sciences and academic universities.

## Empirical framework

Our empirical framework differentiates between social institutions for different functions. Following Caves et al. (2024), we **identify functions** along the curriculum value chain (Bolli et al., 2018). Figure 1 provides an overview of the differentiated functions that Table 3 describes in more detail. First, in the curriculum design phase, actors define and decide upon the ‘intended’ (Billett, 2006, 2011) or ‘planned’ (Marsh & Willis, [1984] 1995; Kelly, [1977] 2009) curriculum, thus developing, consulting and approving curriculum content, qualification standards, and examination forms. Second, the curriculum application phase covers all aspects of program delivery, i.e., who is taught, by whom, where, with what equipment, and financed by whom. The curriculum application phase includes the information of students and their enrolment. It also entails processes of preparing resources in terms of personnel qualification, syllabus, material, and infrastructure. The curriculum application phase also includes program delivery and assessment. Third, the curriculum feedback phase, gathers information whether the curriculum had its intended effects (Finch & Crunkilton, 1993) to help determine curriculum update timing, which re-starts the cycle.

Figure 1: Main functions along the curriculum value chain



We **match functions to country-specific processes** by conducting focus groups. We invite decision makers from the education and employment system for these focus groups. In Benin, the focus group took place as a part of a broader two-day seminar on TVET. Costa Rica’s one-hour focus group involved ten TVET experts from the Ministry of Education. The focus group in Nepal was a two-hour event with ten experts from the Ministry of Education and CTEVT. In Switzerland, five individuals participated in an online focus group of one hour.

We **operationalize dimensions** of social institutions as shown in Table 3 in the Appendix. Thereby, we follow closely the hypotheses of Rageth et al. (2021). We also follow the process of Caves et al. (2024) in identifying functional equivalents from education processes.

## 3.2 Data gathering

We gather the data through online surveys of education experts. The **survey population** is constructed by the researchers in each country based on desk-research. Table 1 shows the distribution of the survey population, differentiating between population from the education and employment system.

In Switzerland, most of the population came from representatives of the employment system, while in Benin and Costa Rica, most came from the education system. In both these countries, representatives of academic institutions and (International) Non-Government Organizations active in TVET were also surveyed, which was not the case in Switzerland. No data on the respondent type was collected for Nepal.

Table 1: Survey Population and Sample

	Total	Benin	Costa Rica	Nepal	Switzerland
Population education system		105	23	NA	34
Population employment system		22	2	NA	717
Population (I)NGOs		15	2	NA	0
Population academia		3	8	NA	0
Total Population	1035	145	35	104	751
Responses	283	110	30	50	93
Response rate	27%	76%	86%	48%	12%
Observations	1690	816	205	340	329

We ask respondents to assess the robustness of social institutions for each of the ten processes. To ensure that respondents know the processes, we ask them with which processes they are familiar with. On average, respondents are familiar with seven processes. Respondents in Benin are familiar with slightly more processes (7.7) than respondents in Costa Rica (7.4), Nepal (7.3) and Switzerland (6.1) In addition, item non-response decreases our sample further. This yields a total of 1690 **individual-process observations**, whereas Benin contributes more observations (816) than Nepal (340), Switzerland (329) and Costa Rica (205).

### 3.3 Empirical Methodology

We test our hypotheses by estimating the empirical relationship between the subjective assessment of robustness,  $y$ , and the values of dimensions,  $X$ . The unit of observation is the response of individual  $i$  for process  $p$ . The **estimation equation** is given by:

$$\text{Subjective Robustness}_{ip} = \alpha_i + \alpha_p + \beta X_{ip} + \varepsilon_{ip}, \quad (1)$$

We estimate equation (1) by OLS.  $\varepsilon$  refers to the normally distributed error term clustered at individual level. All estimations include process fixed effects. We report three estimation variations regarding individual fixed effects: The first includes no fixed effects, the second adds country fixed effects and the third includes individual fixed effects. Following our hypotheses,  $X$  includes aggregate or disaggregate versions of scope (combined vs geographic and occupation), structure (combined vs clarity and formality) and culture (combined vs involvement and extent).

We further use the data to calculate the **weights of the dimensions**. These weights build upon the literature that defines weights of features using their explanatory power for a target variable that is available in rich data sets but not in a broader application (see, e.g., Abeyasekera, 2005, Hentschel et al., 2000). We observe both the subjective aggregate evaluation (*Subjective Robustness*) and the corresponding feature scores ( $X$ ). This allows to analyze the relative weight the experts place on each feature by estimating equation (2). The coefficient estimates for each dimension,  $d$ ,  $\hat{\beta}_d$  of equation (1) allow us to calculate a robustness index in each process as the weighted sum of dimension scores, where weights refer to the relative explanatory power of each feature in equation (1). We replace negative coefficient estimates arising due to multicollinearity by 0. Formally, this robustness index of each process is calculated as

$$\text{Robustness index}_{ip} = \sum_{d=1}^D \omega_d * x_{ipd} = \sum_{d=1}^D \frac{\hat{\beta}_d}{\sum \hat{\beta}_d} * x_{ipd} \quad (2)$$

While the robustness index has a useful application in measuring overall social-institutional robustness, allowing for measurement of development over time and cross-program comparison, it is less useful in the context of determining the effect of the separate dimensions on social-institutional robustness. We therefore present the results of the robustness weights, to provide a more intuitive understanding of the importance of each of the dimensions, but do not present calculations of the robustness index for the four countries.

# 4 Empirical Results

## 4.1 Dimensions and Robustness

This section presents the results regarding the empirical relationship between the robustness of social institutions and dimensions. Table 2 shows the main estimation results, differentiating according to the level of fixed effects (Only process fixed effects in m1 and m2, country fixed effects in m3 and m4, individual fixed effects in m5 and m6), and the disaggregation of dimensions (combined in m1, m3, m5, disaggregated in m2, m4, m6).

We find little evidence that the phase of **institutionalization** affects robustness. Coefficients in all models are centered around zero, with relatively large standard errors and no sign of statistical significance. Hence, we do not find support for hypothesis H1.

**Breadth of scope** is statistically significant when combined with a coefficient of about 0.06. This supports hypothesis H2. However, the disaggregated estimations suggest that breadth of scope across occupations drives this finding. Coefficients for geographic scope vary between -0.004 and 0.03 and are in no case statistically significant. On the other hand, occupational scope coefficients vary between 0.03 and 0.04 and are statistically significant at the 10% level in two of the three regression models. This nuances the findings concerning H2, with the results supporting hypothesis H2b but not H2a.

**Function** is highly statistically significant and has a relatively large coefficient of about 0.3, which remains stable across all estimations. This stability suggests that the role of function is particularly clear for social-institutional robustness, in strong support of hypothesis H3.

**Structure** is also statistically significant, supporting hypothesis H4, though the magnitude of about 0.2 is lower than for function. As with function, the coefficients remain relatively stable across estimates. In the decomposition, both clarity and formality of the structure are statistically significant though the coefficients for clarity, ranging between 0.12 and 0.14, are around double the magnitude of those for formality, ranking between 0.06 and 0.08. These findings support H4a and H4b.

**Culture** has a similar coefficient and statistical precision as structure, supporting hypothesis H5. However, when decomposed into the constitutive elements of depth of involvement and extent of shared culture, the contributions are unstable across estimations, though findings for extent remain statistically significant at the 10% level throughout. This suggests some support for H5b, but unclear results concerning H5b.

**Sanctions** are statistically significant, supporting hypothesis 6. However, the magnitude of the coefficient remains relatively small, ranging between 0.04 and 0.05 throughout all six models.

Table 2: Estimation Results

	m1	m2	m3	m4	m5	m6
Institutionalization	0.0001 (0.0290)	-0.0014 (0.0288)	-0.0053 (0.0292)	-0.0049 (0.0286)	0.0458 (0.0304)	0.0474 (0.0301)
Scope: combined	0.0539** (0.0259)		0.0388 (0.0255)		0.0457 (0.0325)	
Scope: geographic		0.0320 (0.0264)		-0.0040 (0.0262)		-0.0026 (0.0314)
Scope: occupation		0.0254 (0.0166)		0.0353** (0.0166)		0.0399* (0.0208)
Function	0.2893*** (0.0359)	0.2855*** (0.0358)	0.2995*** (0.0358)	0.2965*** (0.0357)	0.2633*** (0.0349)	0.2607*** (0.0346)
Structure: combined	0.2188*** (0.0425)		0.2129*** (0.0406)		0.1743*** (0.0412)	
Structure: clarity		0.1504*** (0.0378)		0.1443*** (0.0391)		0.1204*** (0.0365)
Structure: formality		0.0778** (0.0309)		0.0771** (0.0304)		0.0586* (0.0332)
Culture: combined	0.1978*** (0.0408)		0.1870*** (0.0389)		0.1887*** (0.0369)	
Culture: involvement		0.0671* (0.0388)		0.0549 (0.0365)		0.1120*** (0.0338)
Culture: extent		0.1247*** (0.0480)		0.1303*** (0.0479)		0.0728* (0.0429)
Sanction	0.0483* (0.0254)	0.0476* (0.0260)	0.0397 (0.0259)	0.0388 (0.0260)	0.0493* (0.0270)	0.0527* (0.0277)
Fixed effects						
Country	No	No	Yes	Yes	No	No
Individuals	No	No	No	No	Yes	Yes
SEs	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Observations	1690	1690	1690	1690	1690	1690
Individuals	239	239	239	239	239	239
R2	0.40849	0.40991	0.42265	0.42476	0.60486	0.60579
Within R2	0.37322	0.37473	0.32823	0.33069	0.22288	0.22471

Notes: The table shows OLS estimates and individual-level clustered standard errors in parentheses. The dependent variable is the process-specific robustness measured on a 5-point Likert scale. All estimates include process fixed effects. \*, \*\* and \*\*\* denote significance at 10%, 5%, and 1% level, respectively.





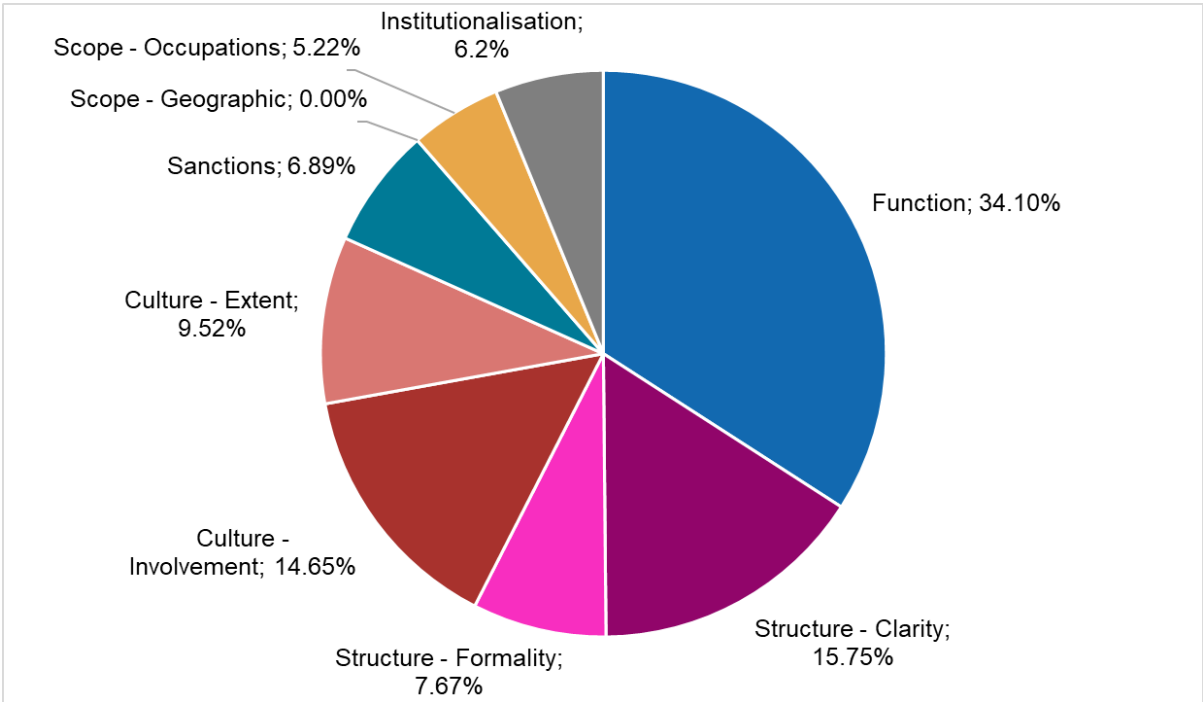


# 4.2 Weighting Dimensions

While the results in section 4.1 point us towards accepting H3, H4 and H6, partially supporting H2 and H5, and rejecting H1, they do not necessarily inform us of the extent to which each of the dimensions impacts social-institutions robustness. In this section, we show the results of the weights calculation for a more intuitive interpretation of the importance of each of the dimensions.

Figure 2 shows the weights of the dimensions for social-institutional robustness. These weights correspond to the relative size of the coefficient estimates of  $m_6$  in Table 2. The results suggest that function is the most important dimension (34%), followed by structure – clarity (16%) and culture – involvement (15%). Including structure – formality (8%) and culture – extent (10%), over 80% of the social-institutions robustness is covered. The remaining dimensions cover between 5% and 7%, with geographic scope having a weight of zero, in line with the rejection of H2a. These results suggest that while, in line with the hypotheses, most of the dimensions are relevant for social-institutional robustness, the extent to which this is the case varies considerably. Given these results, we reject H7.

Figure 2: Weights of Dimensions for Social Institutions Robustness Index



## 5 Discussion

We hypothesized that all the dimensions of social institutions robustness, as theorized by Rageth et al. (2021), would impact the overall robustness of education programs. Results show this is both not the case – neither geographic scope nor degree of institutionalization have any meaningful impact on overall robustness – and that where it is, the level of importance of the dimensions varies considerably. The weighting of the robustness indicates that the function is the largest contributor to social institutions robustness, accounting for over a third of the overall robustness of the programs, while the culture and structure elements each explain approximately one-quarter of the overall robustness. Sanctions and occupational scope account for a further 7 and 5 per cent, respectively.

Taken together, our results point to social institution robustness being driven by the robustness of their **function, structure, and culture**. Concretely, this means that a program with a clear goal in mind, with well-delineated roles and responsibilities, and where the program's aims and ethos are widely held, will be more robust than a program where this is not the case. Conversely, a program where this is not the case, but which is widespread across a country or a region, or has existed for a long time, will not be. For social-institutional robustness, therefore, the focus should be on the social institution's aims and organizing principles, not on how far it reaches and how long it has existed. To the extent that the literature on social institutions has to date mostly focused on institutionalization, scope and function, this finding suggests a rethink is required on the general acceptance of the factors that matter most to successful social institutions.

This has concrete implications for those working within the social institutions that comprise education programs. Reformers looking to improve on their own programs will likely find that they cannot simply copy and paste elements of successful programs from elsewhere, if they do not consider the compatibility of the function, structure and culture with the needs of their own context. These dimensions are at the heart of the common patterns of behavior towards the goal of the institution and are considerably more difficult to replicate than the external, visible structures. This finding is in line with Fullan's (2015) observation that educational reforms that ignore the shared meaning of education are doomed to fail: without implicating the people and culture of a social institution, its robustness will be unlikely to improve greatly.

Moreover, it also indicates a possible threat for established social institutions. A large, long-lasting social institution will not be robust if it does not ensure its function, structure, and culture remain relevant. Indeed, these results indicate that focusing too much on scope and degree of institutionalization at the expense of the other dimensions may be a key source of institutional decay. To an extent this is borne out by country-level results in our sample: the well-established social institutions governing TVET in Nepal score highly on scope and degree of institutionalization, but comparatively poorly on the other dimensions, resulting in lower robustness overall than the other programs. On the contrary, a comparatively young program in Benin has high function and structure scores especially and is a more robust social institution overall.

## 6 Conclusion

This paper analyzes the relationship between the dimensions and robustness of social institutions. We combine two theoretical frameworks to develop a structured survey. We survey VET experts in Benin, Costa Rica, Nepal and Switzerland. The results suggest that function is the most important driver of robustness, followed by structure and culture. Further dimensions, such as sanctions, scope and degree of institutionalization, are less important or not important at all.

This paper contributes to the large existing literature on social institutions by proposing a first empirical measure of the dimensions that constitute social institutions. To a certain extent, theoretical literature has either assumed that all dimensions of social institutions are equally important for their robustness or made no judgment at all on this point. Critically, our study demonstrates two things: first, that it is possible to apply an empirical measurement to a field that has thus far been entirely theoretical. Second, that the theorized dimensions of social institutions robustness do not matter equally, and, indeed, some, especially the degree of institutionalization, hardly matter at all. These findings should provoke further discussion about how we conceptualize social institutions in future.

We also contribute to the literature on educational change and reform. Like the social institutions literature, this body of work has articulated the importance of different characteristics of reforms. The literature has demonstrated that different reform characteristics are important and, while not necessarily assuming equal importance of all characteristics, has not examined their relative importance. Our study again demonstrates that function, structure, and culture are important while institutionalization, scope, and sanctions may not be. This contradicts the focus on scale and accountability and aligns with the arguments in the literature that characteristics like accountability (sanctions) have limited utility without the other characteristics. Furthermore, because the key components of social-institutional robustness are function, structure, and culture, we underscore the point that copying and pasting an education program or practice from one context to another is unlikely to succeed. These social institutions are robust because of not only what they do, but how it is done and the shared beliefs among those who are doing it.

In this study, we applied the empirical measurement of social institution robustness to education programs. We believe that it has application beyond this context. The flexibility of the questionnaire, which allows for the substitution of specific programs, processes and contexts to suit the social institution in question, means it is easily adaptable to social institutions in any field. Extending the application beyond education programs would further allow to test whether the same dimensions of social institutions matter for robustness in all contexts, or if they are specific to the field in which the social institution is present. While the results suggest that the importance of each of the dimensions for the robustness of the social institutions is similar across countries, our country-level sample size is small, and results may not be replicated in other countries. Moreover, we do not investigate the extent to which factors that are outside of the social institutions framework, but are nevertheless important to the

functioning of the social institutions, may affect the robustness. The role of institutional leadership in particular may be an important missing piece in understanding the robustness of social institutions.

Finally, although the social institutions framework is important for assessing the robustness of the social institution itself, it does not provide any information about whether or not a more robust social institution ultimately leads to better outcomes. Further research should investigate the link between robustness and the success of a social institution in creating the outcomes it aims to.

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# Appendix

**Table 3: Description of Processes**

**Curriculum design**

Development of curriculum content	This process includes the definition of the curriculum development method, curriculum framework, curriculum content, teaching methods and exam form.
Curriculum consultation with stakeholders	The following questions refer to the process of curriculum consultation with stakeholders. This process includes consultation with stakeholders, mitigation of different opinions and decision making after consultation.
Approval of curriculum	The following questions refer to the process of approving the curriculum. This process includes submission for approval, quality assurance, approval by competent authority, and legal enactment.

**Curriculum application**

Student information and enrolment	This process includes marketing material, preparation of counsellors and career guidance or counselling, the definition of access conditions and the matching of students and learning or training places (incl. apprenticeship markets).
Qualification of personnel	This process includes the initial and continuing education of teachers, instructors, and exam experts.
Provision of syllabi, material and infrastructure for learning places	This process includes the provision of syllabi, learning material, training material and infrastructure for schools and workplaces.
Delivery of teaching and training	This process includes school teaching, workplace training and other forms of program delivery.
Assessment ( <i>examination, certification and quality assurance</i> )	This process includes examinations in the school and at the workplace, certification, and quality assurance (incl. program output measurement).

**Curriculum Feedback**

Gathering of information about the program	This process gathers information about the outcomes and impact of the program.
Initiation of curriculum update	This process initiates a curriculum revision, which in turn initiates a new curriculum content development process.



Table 4: Operationalization of Dimensions

	Hypot	Operationalization	Scale
<i>Institutionalisation</i>	H1	How stable has the process been in the past?	it is completely different every time - It has been the same for many years
<b>Scope: Combined</b>	H2	Average of scope - geographic and scope - occupations	
<i>Scope Geographic</i>	- H2a	How much does the process differ across the country?	different in each municipality - the same in the whole country
<i>Scope Occupations</i>	- H2b	How much does the process differ across occupations?	different in each occupation - the same in all occupations
<i>Function</i>	H3	How well is the function fulfilled?	very badly-very well
<b>Structure: combined</b>	H4	Average of structure - clarity and structure - formality	
<i>Structure - Clarity</i>	H4a	How clearly defined are actors' roles and responsibilities?	very unclearly-very clearly
<i>Structure Formality</i>	- H4b	How accurately does the formal rule (e.g. law, legal document, association statute) define the process?	not at all-very accurately
<b>Culture: combined</b>	H5	Average of culture - involvement and culture - extent	
<i>Culture Involvement</i>	- H5a	How deeply are actors involved?	not at all to completely
<i>Culture - Extent</i>	H5b	To what extent do actors share norms, attitudes, expected behavior and values?	not at all to completely
<i>Sanctions</i>	H6	How rigorously are sanctions applied in response to violations of agreed-upon norms, attitudes, expected behavior and values?	not at all rigorously - very rigorously

Table 5: Robustness across Countries

	m2 Benin	m3 Benin	m2 Costa Rica	m3 Costa Rica	m2 Nepal	m3 Nepal	m2 Switzerland	m3 Switzerland
Institutionalization	0.0137 (0.0353)	0.0737 (0.0457)	0.0101 (0.0807)	-0.0488 (0.0863)	-0.2074** (0.0951)	-0.0381 (0.0694)	0.1077** (0.0478)	0.1020 (0.0655)
Scope: combined	0.0362 (0.0361)	0.0239 (0.0464)	0.0725 (0.0652)	0.1233 (0.0929)	-0.0285 (0.0776)	0.0450 (0.0735)	0.1061** (0.0485)	0.1079 (0.0654)
Function	0.2688*** (0.0494)	0.2237*** (0.0519)	0.3789*** (0.1039)	0.3878*** (0.1144)	0.4086*** (0.0700)	0.2876*** (0.0519)	0.2519*** (0.0649)	0.2572*** (0.0586)
Structure: combined	0.2242*** (0.0524)	0.1705*** (0.0590)	0.2300 (0.1449)	0.2640* (0.1428)	0.0959 (0.0926)	0.0824 (0.0621)	0.2371*** (0.0688)	0.2231*** (0.0773)
Culture: combined	0.2019*** (0.0478)	0.2320*** (0.0475)	0.3019*** (0.0953)	0.3550*** (0.1006)	0.1484 (0.1051)	0.1666 (0.1081)	0.0534 (0.0763)	0.0681 (0.0831)
Sanctions	0.0295 (0.0304)	0.0645** (0.0317)	-0.0161 (0.0986)	-0.0232 (0.0858)	0.0570 (0.0885)	0.0323 (0.0717)	0.0751 (0.0483)	0.0880 (0.0748)
Fixed effects								
Country	No	No	No	No	No	No	No	No
Individuals	No	Yes	No	Yes	No	Yes	No	Yes
SEs	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Observations	816	816	205	205	340	340	329	329
Individuals								
R2	0.37460	0.56685	0.42642	0.54922	0.30621	0.57529	0.34494	0.51468
Within R2	--	0.29732	--	0.33381	--	0.15499	--	0.26028

Notes: The table shows OLS estimates and individual-level clustered standard errors in parentheses. The dependent variable is the process-specific robustness measured on a 5-point Likert scale. All estimates include process fixed effects. \*, \*\* and \*\*\* denote significance at 10%, 5%, and 1% level, respectively.

ETH Zürich  
Chair of Education Systems  
Stampfenbachstrasse 69  
8092 Zürich

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