DEVELOPING A PROJECT MANAGEMENT CULTURE IN INSTITUTIONS OF HIGHER LEARNING

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Abstract: *This paper explains the importance of projects in higher education and presents a conceptual framework for developing a mature project management culture in institutions of higher learning, followed by implementation recommendations based on a survey and a series of semistructured interviews with higher education project managers.*

Key words: *project management, organizational culture, higher education.*

1. INTRODUCTION

Institutions of higher learning had to deal with substantial uncertainty in recent years due to market changes, technical developments, and persistent criticism about issues like wastefulness of taxpayers' money [1] or the mass-production of template knowledge [2][3]. Increasing competition at both the national and international level, decreasing public funding, fluctuating corporate training budgets, and the rise of the online learning challenge, together with increasing regulation and the growing importance of institutional accreditation are posing considerable challenges to higher education [4].

Universities exist in a perpetual state of friction between the various demands of major stakeholders, such as faculty and staff, graduate and undergraduate students, future employers of students, and the general public. Changing government regulations, new developments in educational technology, or the inflation of new programs and titles are just a few examples of this multi-dimensional field of tension that constantly wears and tears on them [5].

Like any other organization, universities deal with both project and non-project work. And also like any other organization, universities may be able to profit substantially from competent project management. In fact, projects are a key element within a university's value chain [4], as depicted in Figure 1, and project management competencies may thus be crucial for its long-term success.

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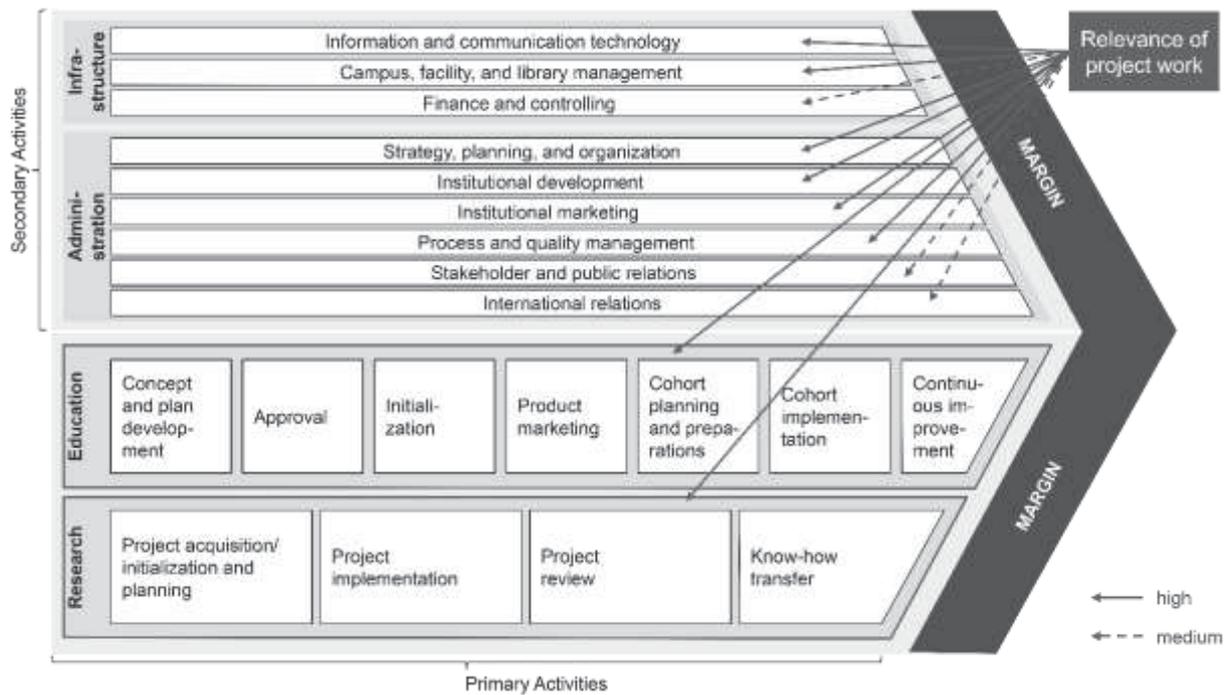
Source: adapted from Seelhofer (2016).

Figure 1: Higher Education Value Chain

Whether strategic planning, marketing, or international relations: each strategy revision, new brochure, or additional international partner school acquisition technically constitutes a project. Particularly important, however, are project management skills at the level of a school's primary value chain activities. These consist of running programs and courses on the one hand and research and services, including consulting, on the other. These four core activities of a university, which in Switzerland are defined by law, all involve extensive project work. Consequently, it is in the university's clear interest to systematically foster a mature project management culture that increases project success and thus overall organizational performance.

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At the same time, institutions of higher learning have come under increasing financial pressure in many countries over the past decade, with cuts in public funding meaning that they need to generate more and more of their operating funds themselves. In addition to classic teaching and research, many universities have thus started to branch out into new fields, such as customized executive training, online programs, consulting activities, and so on [6][7]. For this, mature project management competencies are highly beneficial [8]. An important factor in fostering this maturity is a stringent project management culture [9]. Specifically, a mature project management culture enables the organization to regularly complete its projects successfully, i.e. on target, on time, and on budget. Universities, however, differ from private companies in

a number of ways, and it is at present unclear what the key aspects of such a project management culture in higher education should be and how these could be developed and embedded in a school's DNA. This paper aims to start a corresponding discussion. Specifically, it attempts to, one, develop an application-focused model of higher education project management culture; two, derive and validate an appropriate measurement instrument; and three, test the practical usefulness of this instrument and thereby the underlying model.

2. THEORETICAL BACKGROUND And Conceptual Framework

A project is a temporary undertaking with a clearly defined beginning and ending [10]. It is designed to meet novel goals and objectives and intended to produce unique results [11]. Organizational project management maturity refers to an organization's level of achievement with consistent methods and repeatable delivery of project goals [12]. In his definition used in the Project Management Maturity Model (ProMMM), Hillson [9] identifies an organization's project management culture—i.e. the way it uses projects to overcome challenges and initiate change—as an important breeding ground for the maturity of its project management competencies. In turn, mature project management has been shown to have clear organizational benefits [8][12][13]. However, although there are sizable bodies of literature on organizational culture and on project management (PM), little has been written on organizational project management cultures (PMC).

The existing literature is neither uniform in its use of the term nor its view of the concept. Specifically, there are three strands of literature that have quite different rationales for examining the subject, although they conceptually overlap and use similar terminology. One strand takes an organization theory perspective and conceptually describes 'project management culture' as an ideal form of organization [14] by contrasting it to some other, less ideal form, such as 'hierarchical culture' [15] or 'bureaucratic culture'[16]. A second strand take a professional culture view, seeing project management as a profession like law or medicine and aiming to identify the elements of that profession's unique culture [17]. Finally, a third strand takes an organizational culture approach to identifying and classifying the dimensions of project management culture and their sub-aspects in order to allow comparisons across organizations or industries [18][19], or to systematically analyze an organization's project management culture in order to identify improvement potentials [13] [17] [20] [21].

Firth & Krut [15] attempt to describe what a project management organization might look like by contrasting 'hierarchical management' with 'project management'. In their view, a project management organization is network or matrix shaped, suited to instability, and challenges or even redefines existing definitions; change happens step-wise rather than in evolutionary fashion; work is often non-routine and organized by task rather than function, with project managers relying on networking and negotiation rather than authority, having multiple responsibilities, and managing to all levels; meetings have a task force rather than

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committee character; information flows are governed by individual needs; and controls are forward looking and predictive.

Similarly, Graham [16] sees 'project management culture' as the opposite of 'bureaucratic culture', with the former being defined by having fewer, mostly new procedures, processes, and products; more heterogeneous teams with a limited life span; lower staff levels and fewer structures but more teamwork and team building with people that are not interchangeable; authority that is based more on influence than position; and matrix rather than departmental structures.

In contrast, Wang [17] is interested in identifying elements that could be used to describe and foster the professional culture of project managers. Based on an extensive literature review and a survey among 790 members of the Australian Institute of Project Management, he uses factor analysis to identify four dimensions of project management culture, with two or three subdimensions each: professional commitment (project management career pursuit, project management reference group, contributing leisure time for project management); project team integration (consciousness of team identity, knowledge-based influence, informal process); work flexibility (job decodification, work autonomy); and work performance (performance orientation, view of personal relationships).

Attempting to identify aspects of project management culture abstract enough to allow comparisons across industries, Cooke-Davies & Arzymanow [18] identify ten so-called 'domains': the pervasiveness of the organization's project culture; the commitment of upper management to this; the business—rather than technical—focus project teams apply to all decisions; the prioritization of projects according to their strategic importance to the organization; the extent that project management systems, methods, and processes are used; the authority project teams have to carry out their missions; the centralization of relevant information in each project; the way teams are matched to projects; the competence of project team members; and the ability of a project's head—rather than functional management—to manage people and money.

Based on a meta-review of prior studies on organizational culture, Morrisson, Brown, and Smit [19] list 17 generic dimensions of organizational culture and 12 dimensions specifically addressing the organizational concerns of project management. The latter are: a flexible and innovative organization; integration across departments; performance-driven project management; standardized processes and systems; a supportive leadership orientation; an external or market focus; clear strategic direction; people-orientation; rational decision-making; feeling comfortable with decentralized decision-making; openness of communication and information; and emphasis on personal competency development.

Du Plessis & Hoole's [20, p. 36] stated intent is "to develop an operational 'project management culture' framework, which can be used by project managers and organisations to support project work". Based on a survey among 50 practicing South African project managers, they list four dimensions that define an organization's project management culture: the project process or approach, including continuous improvement and learning; the project team and stakeholders, described by aspects such as their mindset, commitment, and competence; the project management methodology used; and the project environment, characterized by aspects such as upper management support, strategic emphasis, or organizational support.

Finally, Zeng et al. [21] take a somewhat different approach by using the well-known Denison model of organizational culture [22] as the basis to define project management culture. Denison and Mishra's model consists of four dimensions (mission, consistency, involvement, and adaptability), which are further described by three factors each. Following this approach, Zeng et al.'s [21] project management culture model also consists of four dimensions with three factors each: participation (project authorization, project teamwork, and project human resources); consistency (project culture construction, project internal control, and project risk management); adaptability (project reform and innovation, project customer orientation, and project governance); and mission (project objectives vision, project core values, and project responsibility).

When summarized, these frameworks contain a total of 107 dimensions and criteria derived from the seven models. By carefully analyzing the specific meaning behind the various authors' formulations and merging identical or nearly identical concepts, this number was reduced to 39. In a final iteration, remaining conceptual overlaps were resolved and closely related concepts aggregated, bringing the final number to 23 specific criteria. As evident from Table 1, 17 of these appear in at least two models, 11 in at least three, six in at least four, three in at least five, and one in six. No criterion appears in all seven models.

Project management culture criteria		Contributions						
		Firth & Krut (1991)	Graham (2001)	Wang (2001)	Cooke-Davies & Arzymanow (2003)	Morrisson, Brown & Smit (2006)	Du Plessis & Hoole (2006)	Zeng et al. (2015)
1	Empowerment		X	X	X			X
2	Environmental adaptation	X						
3	Knowledge management				X	X	X	
4	Networking/negotiating	X		X			X	
5	Organizational flexibility	X						
6	Organizational change	X				X	X	X
7	Organizational learning						X	
8	Organizational structure	X	X					
9	Organizational support				X	X		
10	Project goals and objectives							X
11	Project mindset	X		X	X	X	X	X
12	Project oversight						X	X
13	Project ownership	X						X
14	Project process					X		
15	Project process and methodology	X	X				X	
16	Risk management						X	X
17	Skills development				X	X	X	
18	Skills selection		X		X			X
19	Standardization		X	X	X	X	X	
20	Strategic direction and focus				X	X	X	X
21	Task focus					X		
22	Task nature	X	X					
23	Teamwork		X	X		X	X	X

Table 1: Project Management Culture (PMC) Criteria

In light of higher education's unique circumstances, a dedicated project management culture model should be easy to use but account for the specific context of the corresponding institutions. Following Zeng et al. [21], the well-established Denison model of corporate culture [22] was used as the basis for a Higher Education Project Management Culture Model (HE-PMCM). Using the Denison model's basic setup of four dimensions with three factors each, a initial HE-PMCM was derived by comparing and integrating Denison and Mishra's [22] and Zeng et al.'s [21] models. The PMC criteria listed in Table 1 were then used as the starting point for a third model level, specific measures that describe each factor. This draft model, which also integrated aspects of Cooke-Davies & Arzymanow [18], Morrisson, Brown, and Smit [19], and Du Plessis & Hoole [20], was then discussed with three university project management experts to see where it fit the higher education context and where it needed to be fine-tuned further. The result is seen in Table 2.

Dimension	Factor	Measure		Definition
Focus	Strategic justification	1	Strategic link	Every project contributes to the university's overall mission in some way.
		2	Clear purpose	Every project has a clear and accessible purpose and outcome/benefit.
	Goals and objectives	3	Project charter	Every project has a written project charter that defines the project's goals and structure.
		4	Project plan	Every project has a written, sufficiently detailed project plan that is used to gauge progress against milestones.
	Project oversight	5	Project committee	Every project has a defined supervisory committee tasked with ensuring the project stays on course and compliant.
		6	Oversight activity	Project supervisory committees meet sufficiently regularly to gauge project success and influence project progress.
Consistency	Project philosophy	7	Value awareness	The university's leadership has a clear and communicated view of the value and uses of projects.
		8	Standard methodology	There is a defined standard project management methodology that all project managers are required to follow.
	Agreement	9	Intra-project agreement	Project teams generally agree on what needs to be done.
		10	Cross-project agreement	There is generally little conflict between different projects due to conflicting goals or competition.
	Integration	11	Organizational obstacles	There are generally little or no organizational obstacles (e.g. organizational unit boundaries, non-project-related reporting structures, etc.) that stand in the way of effective and efficient project work.
		12	Disciplinary obstacles	Differences in expertise and educational background do not generally negatively impact projects.
Involvement	Empower-ment	13	TAR congruence	Tasks, authority, and responsibilities of project managers are generally aligned in all projects.
		14	Ownership	Project managers and projects teams feel jointly responsible for the success of projects.
	Teamwork	15	Project leadership	Project managers generally rely on a leadership style that emphasizes participation and is conducive to good teamwork.
		16	Project teamwork	Project teams generally work together efficiently and effectively.
	Capability develop-ment	17	Skills selection	Project managers and project team members are selected based on their skills.
		18	Skills development	The institution systematically develops project-related skills.
Adaptability	Change support	19	Change driving	Projects are used to drive change and bring the university forward.

		20	Risk management	Risk management is an inherent part of project management at this institution.
	Environ-mental fit	21	Environmental adaptation	Projects support the organization's adaption to environmental changes.
		22	Stakeholder consideration	Projects take the needs of the university's stakeholders into account.
	Organizatio-nal learning	23	Knowledge management	The university systematically collects, analyzes, and disseminates the lessons learned from projects.
		24	Continuous improvement	Lessons learned from previous projects are systematically integrated into subsequent projects.

Table 2: Higher Education Project Management Culture Model (HE-PMCM)

Finally, in order to provide a compact overview that can be used to easily summarize the analysis results of a university's project management culture, the radial visual representation in Figure 2 was created. This onion-style depiction of the HE-PMCM can easily be color-coded in order to provide a 'traffic light' style indication of where an institution stands with regard to the corresponding aspect.
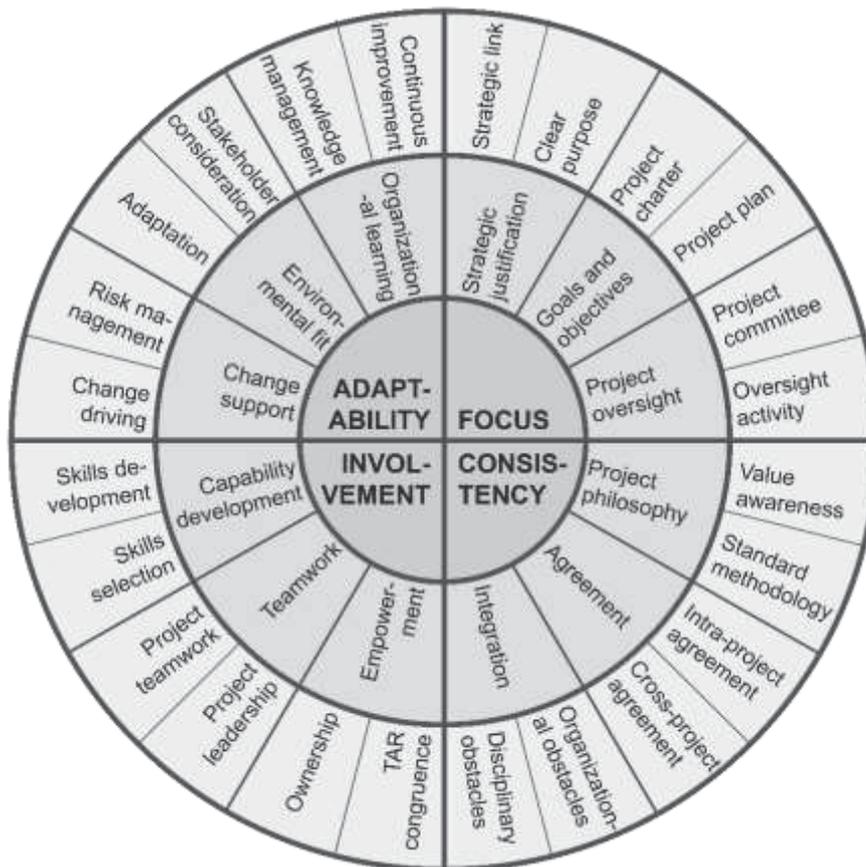
Figure 2: Higher Education Project Management Culture Model (HE-PMCM)

3. METHODOLOGY

A validation study was conducted in order to test the HE-PMCM's practical usefulness. The test case selected was one of Switzerland's largest university-level public business schools, with about 6,500 students and around 540 faculty and staff in 2017. It was chosen due to data availability and the large number of projects being conducted at any time on all levels of

operation. Due to this high importance of project work, a certain maturity of the institution's project management culture as well as a comparatively large number of experienced project managers could be expected, which made it an ideal test candidate.

A 24-item questionnaire, the Higher Education Project Management Culture Inventory (HE-PMCI) was designed to measure each construct (or variable) in the model on a six-point Likert scale, from 'strongly agree' (5) to 'strongly disagree'(0). In order to avoid—or at least reduce—self-completion bias, be able to answer remaining questions, and recognize the need for adjustments in the wording of certain items, all questionnaires were administered by the same two interviewers. Before rolling out the survey, these tested the instrument on each other in order to reach a common understanding of all items and agree on a common approach to the interviews. To further reduce interviewer-introduced bias, a supplementary codebook was developed that included all variables and their operational definitions and provided further clarification and instructions.

The maturity of a particular item was measured linearly as the average response to each item, in line with the Likert scale's scoring: nascent (0.00 and 1.24), developing (1.25 to 2.49), adolescent (2.50 to 3.74), and mature (3.75 to 5.00).

In order to profit from expert know-how and discuss the HE-PMCI's usefulness and limitations, participants in the validation study needed to be experienced project managers who adequately represented the institution's overall project portfolio. Consequently, interviewees were selected based on an iterative process. First, a list of all active projects was obtained from the institution's ERP system. In a next step, all entries that did not conform to the definition of a project as stipulated in the previous section or whose project managers had less than two years project management experience were eliminated. This led to a list of 155 active projects with experienced project managers. Of those projects, two were very large (CHF 1 million and above), 22 large (between CHF 200,000 and 999,999), 48 medium (between CHF 50,000 and 199,999) and 83 small (below CHF 50,000). This was the initial pool from which a working list was drawn in a stratified random sampling approach. For this, a quota control matrix was developed that, due to their particular importance, included both of the very large projects, while the other three project categories were considered according to their relative weight. This led to the inclusion of 14% (3) of the large projects, 31% (15) of the medium, and 54% (45) of the small projects in the quota control matrix. Next, the corresponding number of projects were randomly selected from each category, for an initial target sample of 65 projects. The project managers responsible for these were then contacted and asked to sit for an interview of about 15-20 min duration. In light of the specific period in the academic year during which this took place (semester wrap-up), a comparatively solid acceptance rate of 57% was attained, for a final working sample of 37 higher education project managers from the same institution. Together, they adequately represented the school's project portfolio.

Three control variables were collected. *Gender* was defined as a binary categorical variable (male or female). *Project management training* was defined as a categorical variable with three possible values: formal training with certification, formal training without certification, or no formal training. *Project experience* was defined as a categorical variable that indicated the maximum size of projects with which a respondent had experience: very large, large, medium, or small, according to the above definition. To guarantee anonymity, age was not collected, as the combination of age, gender, and project size would have allowed the identification of some respondents.

4. RESULTS AND DISCUSSION

Over two thirds of all project managers in the sample had received some kind of project management training, although all but one had not attained formal certification. Almost a third (30%), however, had so far received no project management training whatsoever. The vast majority (84%) had experience with medium-sized projects and almost half (49%) with large projects, but only a few (8%) with very large projects. A bit more than one third of the project managers in the sample were female. Table 3 lists the sample's characteristics.

Sample Characteristics			
Gender	Male	23	(62.2%)
	Female	14	(37.8%)
Project management training	Formal training with certification	1	(2.7%)
	Formal training without certification	25	(67.6%)
	No formal training	11	(29.7%)
Project experience	Includes very large projects (CHF 1 million and above)	3	(8.1%)
	Includes large projects (CHF 200k to 999k)	18	(48.6%)
	Includes medium projects (CHF 50k to 199k)	31	(83.8%)
	Includes small projects (< CHF 50k)	37	(100.0%)

Table 3: Sample characteristics

Aggregate results for the test case are listed in Table 4. Evidently, this particular institution possesses an overall fairly uniformly adolescent project management culture. None of the dimensions, only two of the factors, and a mere six of the measures diverge from this image.

Of the two factors rated as 'developing', an aggregate score of 2.47 for 'capability development' indicates that the institution should more systematically develop its project management potential. Likewise, a score of 2.18 for 'organizational learning' is a clear sign that the institution needs to improve both its project-related knowledge management and continuous improvement processes. Table 4 provides an overview of results at the dimension and factor level.

Aggregate results			
Dimension	Results	Factor	Results
Focus	3.08	Strategic justification	3.54
		Goals and objectives	3.12
		Project oversight	2.58
Consistency	2.92	Project philosophy	2.65
		Agreement	3.30
		Integration	2.81
Involvement	3.16	Empowerment	3.41
		Teamwork	3.61
		Capability development	2.47
Adaptability	2.93	Change support	3.20
		Environmental fit	3.41
		Organizational learning	2.18

Color code
Mature (3.75-5.00)
Adolescent (2.50-3.74)
Developing (1.25-2.49)
Nascent (0.00-1.24)
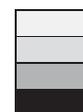
Table 4: Aggregate Results of HE-PMCI Validation Study

Further detail is provided when the third level, measures, is included in the analysis. Of those measures that did not rate as 'adolescent', only one was 'mature', while the remaining five were 'developing'.

Regarding the one item rated as 'mature', 'project leadership', a score of 3.78 indicates that, generally, project managers in the institution rely on a leadership style that emphasizes participation and is conducive to good teamwork. While the fact that only project managers (but not their team members) were interviewed may have introduced some bias, many of these project managers are themselves also project team members in other projects, which reduces the issue somewhat, considering they were asked to convey a general impression instead of just reporting on their own leadership approach.

For the developing items, a score of 2.30 for the item 'standard methodology' indicates that there are some formal guidelines and standards, but that there is no defined standard project management methodology that all project managers are required to follow. For 'organizational obstacles', a score of 2.19 denotes that project managers and their teams generally have to overcome substantial organizational obstacles that stand in the way of effective and efficient project work. Likewise, a score of 1.92 for 'skills development' signifies that there is particular action required regarding how systematically the institution develops project-related skills. For 'knowledge management', the score of 2.11 is a sign that the institution needs to improve regarding how systematically it collects, analyzes, and disseminates the lessons learned from projects. And the score of 2.24 for 'continuous improvement' suggests that the organization needs to more systematically integrate lessons learned from previous projects into subsequent endeavors. Figure 3 provides an overview of the validation study's results at all three levels.
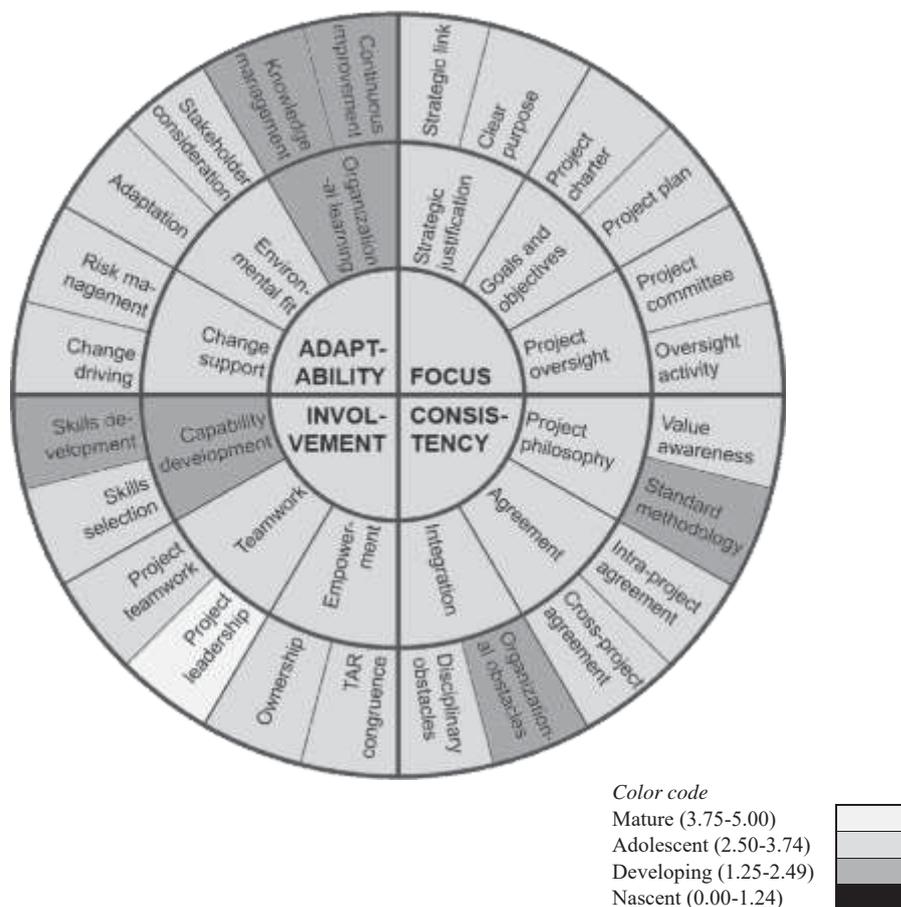
Figure 3: Results of the HE-PMCI validation study

Finally, additional comments made by the interviewees were analyzed. Interviewees were not required to comment. It seems reasonable, therefore, that those that did comment would do so about areas of particular concern to them. Consequently, the comments were first transcribed verbatim. Then, key words or short key statements were identified, analysed and coded regarding their tendency (positive, neutral, or negative), and attributed to one of the instrument's 24 measures. In total, 47 comments were made. Of those, six concerned the HE-PMCI itself, which led to the slight rewording of three of the Likert-scale scored statements in the instrument. The other 41 concerned the test institution's project management culture. Of those, 9 were neutral statements, 2 concerned strengths that should be maintained, and 30 concerned improvement needs. Table 5 shows the number of improvement comments made per measure and aggregates them by factor and dimension.

Dimension	Number of comments	Factor	Number of comments	Measure		Number of comments
Focus	4 (13.3%)	Strategic justification	1 (3.3%)	1	Strategic link	0 (0.0%)
				2	Clear purpose	1 (3.3%)
		Goals and objectives	1 (3.3%)	3	Project charter	1 (3.3%)
				4	Project plan	0 (0.0%)
		Project oversight	2 (6.7%)	5	Project committee	1 (3.3%)
				6	Oversight activity	1 (3.3%)
Consistency	7 (23.3%)	Project philosophy	3 (10.0%)	7	Value awareness	0 (0.0%)
				8	Standard methodology	3 (10.0%)
		Agreement	0 (0.0%)	9	Intra-project agreement	0 (0.0%)
				10	Cross-project agreement	0 (0.0%)
		Integration	4 (13.3%)	11	Organizational obstacles	4 (13.3%)
				12	Disciplinary obstacles	0 (0.0%)
Involvement	11 (36.7%)	Empowerment	3 (10.0%)	13	TAR congruence	0 (0.0%)
				14	Ownership	3 (10.0%)
		Teamwork	0 (0.0%)	15	Project leadership	0 (0.0%)
				16	Project teamwork	0 (0.0%)
		Capability development	8 (26.7%)	17	Skills selection	1 (3.3%)
				18	Skills development	7 (23.3%)
Adaptability	8 (26.7%)	Change support	2 (6.7%)	19	Change driving	0 (0.0%)
				20	Risk management	2 (6.7%)
		Environmental fit	1 (3.3%)	21	Environmental adaptation	0 (0.0%)
				22	Stakeholder consideration	1 (3.3%)
		Organizational learning	5 (16.7%)	23	Knowledge management	3 (10.0%)
				24	Continuous improvement	2 (6.7%)

Color code
Unimportant (<10%)
Moderately important (10-20%)
Important (21-30%)
Majorly important (>30%)

Color code
Unimportant (<5%)
Moderately important (5-10%)
Important (11-15%)
Majorly important (>15%) > 6

Table 5: Focus of interviewee additional improvement comments

This result is largely in line with the analysis of the institution's project management culture. Interviewee comments were particularly concerned with the lack of systematic project management skills development and the existence of organizational obstacles that are seen as standing in the way of efficient and effective project management, followed by organizational learning aspects and the need for formal project management standards.

5. SUMMARY AND CONCLUSIONS

Overall, the application of the HE-PMCI to the test case revealed that the model is easily understood and seen as comprehensive. The instrument is well-suited to the analysis of a particular higher education institution's project management culture, although its explanatory power is necessarily restricted due to the limited number of items. The systematic application to a sample of experienced project managers that collectively adequately represented the test institution's project portfolio allowed for slight finetuning of the HE-PMCI and incidentally yielded valuable information about the institution's project management culture and corresponding improvement potentials.

There are two particular uses for the HE-PMCI, monitoring an institution's project management culture health or initiating and implementing project management culture improvements. Specifically, the instrument enables a higher education institution to, one, characterize its project management culture; two, assess corresponding strengths and weaknesses; and three, track the progress made when implementing associated improvement actions.

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In order to make maximum use of the HE-PMCI, therefore, it should be administered in regular intervals.

6. LIMITATIONS

Applied models necessitate a trade-off between academic rigor and ease-of-use that may conceivably reduce their explanatory power, reliability, or validity. Additionally, results may be context-specific, meaning certain constructs may carry particular meanings in a given organizational culture that differ from the way they are regarded in others. Future research should further explore this context-specificity, including the model's cross-cultural comparability and usefulness.

Regarding the sampling approach, the fact that strata were constructed by project size and considered according to their relative weight within the overall project portfolio may have introduced bias, as a different kind of weight attributed to each category could conceivably have led to different outcomes. Additionally, the final sample of 37 interviewees is rather small. Further testing with larger samples will provide additional insights into the instrument's reliability and validity.

Finally, a clear limitation is that the HE-PMCI's test-retest stability was not determined for this study, which future research should aim to do.

REFERENCES

[1] Natale, S.M. and Doran, C. (2012). Marketization of education: an ethical dilemma, Journal of Business Ethics, Vol. 105 No. 2, pp. 197-196

[2] Mintzberg, H. (2004). Managers not MBAs: a hard look at the soft practice of managing and management development, Pearson Education, Harlow, UK

[3] Starkey, K., Hatchuel, A. and Tempest, S. (2004). Rethinking the business schools. Journal of Management Studies, Vol. 41, No. 1, pp. 1521-1530.

[4] Seelhofer, D. (2016). Developing business school strategies: a practitioner-oriented conceptualization, Central European Business Review, Vol.5, No. 1, pp. 5-28.

[5] Alajoutsijärvi, K., Juusola, K. and Siltaoja, M. (2015). The legitimacy paradox of business schools: losing by gaining?, Academy of Management Learning & Education, Vol. 14, No. 2, pp. 277-291.

[6] Jurse, M. (2010). Evolution of traditional university business school into market-oriented knowledge provider, Trizste, Vol. 22, No. 2, pp. 167-188.

[7] Xie, C. and Steiner, S.D. (2013). Enhancing management education relevance: Joint creation of knowledge between Institutions of higher learning and business. Business Education & Accreditation, Vol. 5, No. 2, pp. 1-15.

[8] Torres, L. C. (2014). A contingency view on the effect of project management maturity on perceived performance. Doctoral dissertation, Skema Business School, Lille.

[9] Hillson, D. (2001). Benchmarking organizational project management capability. Proceedings of the 32nd Annual Project Management Institute 2001 Seminars & Symposium.

[10] Seelhofer, D. (2017). Interpersonal leadership: an applied guide, OGMA, Zurich.

[11] Nokes, S., & Kelly, S. (2007). The definitive guide to project management: the fast track to getting the job done on time and on budget, Pearson Education, London.

[12] Foti, Ross. (2002). maturity (me-tur-e-te) noun, 21st century. Synonym: survival. PM Network, Vol. 16, No. 9, pp. 39-43.

[13] Ibbs, W. C. and Kwak Y.-H. (1997). The benefits of project management: Financial and organizational rewards to corporations. Philadelphia: PMI Educational Foundation.

[14] Brown, C. J. (1999). Towards a strategy for project management implementation, South African Journal of Business Management, Vol. 30, No. 2, pp. 33-38.

[15] Firth, G., & Krut, R. (1991). Introducing a project management culture, European Management Journal, Vol. 9, No. 4, pp. 437-443.

[16] Graham, R. J. (2011). A Process of Organizational Change: From Bureaucracy to Project Management Orientation, in: Dinsmore, P. C., and Cabanis-Brewin, J. (eds.). The AMA Handbook of Project Management, New York: Amacom Books.

[17] Wang, X. (2001). Dimensions and current status of project management culture. Project Management Journal, Vol. 32, No. 4, pp. 4–17.

[18] Cooke-Davies, T. J., & Arzymanow, A. (2003). The maturity of project management in different industries: An investigation into variations between project management models. International Journal of Project Management, Vol. 21, No. 6, pp. 471-478

[19] Morrison, J. M., Brown, C. J., & Smit, E. V. D. M. (2006). A supportive organisational culture for project management in matrix organizations: a theoretical perspective, South African Journal of Business Management, Vol. 37, No. 4, pp. 39-54

[20] Du Plessis, Y., & Hoole, C. (2006). An operational' project management culture' framework (part 1). SA Journal of Human Resource Management, Vol. 4, No. 1, pp. 36-43.

[21] Zeng, Y., Jin, M., Guo, C., & Zhang, Z. (2015). Research on evaluation of enterprise project culture based on Denison model. Journal of Industrial Engineering and Management, Vol. 8, No. 3, pp. 909-927.

[22] Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. Organization Science, Vol. 6, No. 2, pp. 204-223.