

## **Entrepreneurial competencies of students from productive technical education centres in Peru**

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**ABSTRACT:** Productive technical education centres (CETPROs) are often left aside in research studies which mainly focus on universities and various institutes. Hence this study is an attempt to fill in this gap and demonstrate the competencies of students from these education centres. The main objective is to describe and analyse the perceptions of the students about their entrepreneurial skills. The study involved 253 students from two centres of productive technical education who participated through a voluntary and anonymous on-line survey. This study is descriptive with cross-sectional correlational variables, with a quantitative approach. The results show a high average level in the knowledge of entrepreneurial competencies, validated by the value of Cronbach's alpha (0.969) and other valid and reliable statistics. The results also indicate that support is needed from the training institution in offering internships, scholarship and other forms of assistance at the national or international level. In conclusions is highlighted the need for an entrepreneurial educational framework, and hence emerging curricular changes at the national level.

### INTRODUCTION

There is evidence that learning in groups is effective and positive outcomes are easier achievable [1]. Also, if groups are set up and given entrepreneurial guidance, new products can be created speedily for the market as long as sound new and old strategies are used [2]. This can be achieved with the help of teachers providing feedback on personal development issues [3]. The teamwork and feedback are especially important as the Covid-19 pandemic has adversely affected engineering programmes, including design. Yet some students have thrived in the Covid-19-induced non-optimal environment according to thriving theory [4], and they have learned new skills and become more resilient. Nevertheless, effective educational methods to develop and foster entrepreneurial self-efficacy are needed, considering significant differences between students in factors, such as family background, entrepreneurial competencies acquired so far, experience and gender [5]. There is also limited knowledge on how to prepare students within a corporate entrepreneurial vision [6] which is crucial as it impacts the students' entrepreneurial intention in planning entrepreneurial activities [7]. In that preparation, creativity as an additive model [8] and exploring the dimension of individual or group feedback also play a vital role [9].

Another important factor is the professional vocation which leads to forming a proactive, positive team and tutorial support [10]. The mental models applied in education by teachers in different countries reveal various ways to achieve changes in the student community [11]. Social interdependence and social competence can impact on firm/company performance as demonstrated in relation to small business managers in Korea [12]. Moreover, vocational identity and creativity are intertwined, and to succeed young people should have them developed when they are about to mark their professional future [13].

Economic growth has to have an engine of entrepreneurial spirit and education, and should be backed-up by people with entrepreneurial characteristics, such as positive attitude and mind-set, self-efficacy and an ability for self-evaluation [14]. For example, women in India, Tamil Nadu, unleash their leadership and entrepreneurial spirit by facing their challenges and focusing on service and innovation, thus generating wealth and providing employment [15].

Student entrepreneurial competence is fundamental to achieve competitive goals whether conceptualised or in actual practice [16]. Factors such as an innovative spirit and administrative competencies were identified as crucial for an entrepreneurial education by business and support groups with a mediator needed between entrepreneurial opportunities and learning [17]. The entrepreneurial competence of students at the high school level was significant and had an entrepreneurial effect with the mediating variable to generate an entrepreneurial spirit in China [18]. However, in a different study and at the university level, when the entrepreneurial intention of students was analysed - as it plays

a fundamental role along with effectiveness and self-efficacy in entrepreneurial education - the students did not recognise their education as entrepreneurial [19].

Some research studies showed that females have higher entrepreneurship rates than males, with possible prospects and perspectives for change in the current rules of the game [20]. International academic mobility resulted in entrepreneurial knowledge acquisition by academics interacting through social networks abroad and becoming familiar with other economies [21]. Also, with technological advancements the status of education and industry has risen and along with it entrepreneurship with innovation [22]. Due to the Fourth Industrial Revolution sustainable growth has been obtained through the relationship of members and leaders, with positive effects on work performance and innovative behaviour [23]. This can lead to entrepreneurial success, which is also influenced by the internal mechanism that is the entrepreneurial passion [24].

Another factor to consider is the negative effect of the Covid-19 pandemic that has radically changed many businesses, and especially the tourism sector. Now, tourism companies seek to find a balance point in this uncertain era, with the capital and innovation initiatives of small businesses (restaurant, accommodation and others) responding to these obstacles [25].

The impact of entrepreneurial education on new businesses in China was analysed, with entrepreneurs who received it standing out in comparison with those who did not [26]. The rise of consumerism, entrepreneurship and university engagement are strong points for discussion and possibly intervention in relation to mental (psychological) health as entrepreneurship education at the university level marks an improvement in that health area, but this can only be achieved with pressure [27]. Other studies highlight co-operative learning as it motivates students to develop entrepreneurial skills and individual goals (academic, social and personal achievement), and corporate learning is considered a powerful tool to motivate and encourage entrepreneurial knowledge [28]. Entrepreneurship education can be considered a moderator for recent graduates who have the entrepreneurial spirit to undertake an enterprise and act independently [29].

Social factors have a positive influence on the sustainability of businesses, and even more so, if they are in the tourism sector, including hotels and restaurants; however, they have to innovate and change strategies quickly due to the competitive environment in which they operate [30]. There are different models of mediation and flexibility in the organisation and education to create greater opportunities and improve entrepreneurial commitment [31], which has been achieved in several countries through strict governmental provisions by drastically changing and shaping education [32].

The literature review presented above forms an introductory part of this article. The theoretical framework presented here refers to the international level on entrepreneurship education and innovation at educational institutions from the secondary level, to productive technical education centres (CETPRO) and universities. The second part includes the justification and the respective objectives of the study outlined in this article. The third part deals with the methodologies including the samples, measurement instrument, procedure, data analysis and its results. This is followed by the discussion part, with conclusions of this study presented at the end of the article. The study included students from two centres of productive technical education in the province of Cusco, Peru, and was conducted in 2022.

#### Justification and Study Objectives

Before the onset of Covid-19, during the pandemic and at its final stages, business education has advanced with theories and methodologies to help students to gain entrepreneurial skills, to achieve their business goals and unleash their business knowledge obtained during their training in an education centre. This educational aspect is essential for the economic growth of the entire population with sectors that can excel in the products and services they offer and according to their clients' needs and the available resources. Entrepreneurship education has to be approached from the point of view of the student and incorporate the development of collaborative spirit in young persons who want to succeed upon completion of their university studies. However, as there is a high demand for applicants to business career training, international business, industry, tourism and other students have the option of following a short career course in institutes and/or choose productive technical education centres, where business education has to be part of their training. In view of that, the general objective of this study was to investigate the perceptions of the overall entrepreneurship level of students from productive technical education centres of the district of Cusco, Peru. The specific objectives are mentioned below, and have been established to describe and analyse:

- collaboration between students of productive technical centres of the district of Cusco, Peru;
- entrepreneurial competencies of these students;
- their working life and entrepreneurship.

#### METHODOLOGY

In this study, a descriptive and predictive method has been deployed with cross-sectional correlational variables, with a quantitative approach.

## Sample

In productive technical centres of the district of Cusco, Peru, students are trained for a technical career and for high performance in the working world in competition with those who studied at university. The students in this study were selected from state and private technical centres, and 253 students were surveyed.

The sample was made up of 10.3% male students (26 males) and 89.7% of the opposite sex (227 females) in the majority. This selection is congruent with national and international studies indicating that women practice more entrepreneurial and innovative spirit than men. The average age was between 21-25, with 30% of the students between 15-20, which represents the largest number of students with entrepreneurial ambitions; 21.7% were students aged between 21-25, 12.6% were aged 26-30, 8.7% were aged 31-35; another larger group were students aged 36- to >> who represented 26.9% - this high percentage indicates that students aged 36 plus formed a second largest group who wanted to start their own business, and wanted to show and practice the acquired skills and entrepreneurial spirit. Of all the participants, 54.2% were students from a state productive technical centre and 45.8% from a private productive technical centre.

## Instrument

The instrument used for this study was part of the research conducted by Nevalainen et al in Proakatemia, Tampere, Finland, with university students [33]. The measurement instrument was validated by experts and in its original version had an average Cronbach's alpha of 0.8033 value that means it was valid to be applied in other research studies. After revision and validation in the Peruvian environment by experts, Cronbach's alpha was equal to 0.969, which is an acceptable value to continue research as recognised by the scientific community.

The entrepreneurial competencies evaluation instrument is composed of six dimensions with a total of 21 questions. The first dimension is composed of two questions (CR1 and CR2) referring to trust and respect; the second dimension has three questions (CA1, CA2 and CA3) referring to whether everyone is special; the third dimension - five questions (CA1, CA2, CA3, CA4 and CA5) referring to open collaboration; the fourth dimension - four questions (M1, M2, M3 and M4) referring to goals; the fifth dimension - four questions (CP1, CP2, CP3 and CP4); and the sixth dimension has three questions (VL1, VL2 and VL3) referring to work life and entrepreneurship.

Sociodemographic data, such as sex, age and type of institution were also collected. The data for this study was collected from CETPRO students through an on-line survey. A five-point Likert scale was used (1 - strongly disagree, 2 - disagree, 3 - neither agree nor disagree, 4 - agree and 5 - strongly agree); also and a dichotomous (two points in opposite to each other) scale and the Likert scale were used in the sociodemographic questions.

According to the original manuscript, the Cronbach's alpha values were valid, so by using the same measurement instrument (only one of several), it was possible to translate it into Spanish with two language experts, and then proceed to perform the corresponding validation and reliability in the Peruvian context. The valid and reliable data found in the statistics were: ANOVA with Tukey's test for non-additivity  $F = 527.849$  and  $\text{sig.} = 0.000$ ; Hotelling's  $t$ -squared = 240.599,  $F = 11.123$ ,  $\text{sig.} = 0.00$ ; Spearman-Brown's coefficient = 0.949; Guttman's split-half coefficients = 0.949; KMO and Bartlett's test = 0.966,  $\text{Sig.} = 0.000$ .

## Procedure and Data Analysis

The study was initiated in December 2021, when students (applicants) visited the institution and asked if in their studies they would be taught entrepreneurial skills, and if they would be able to apply their knowledge in their businesses that they had already started. Based on that, an appropriate measurement instrument on entrepreneurial skills was identified for the Peruvian context. Then, the sample was determined by selecting students from CETPROs in the district of Cusco, Peru, using a convenience sampling technique. Participation was voluntary and the on-line survey anonymous.

The survey was elaborated with Google Forms, surveying each student of the CETPROs, so that they could answer only once, always maintaining anonymity. The data were collected over three months from January to March 2022, downloaded from Excel and adapted to the SPSS statistical program, version 25. Also, descriptive statistical data, such as the mean, standard deviation, variance, skewness and other statistical indicators were obtained to support the analysis.

## RESULTS

In the descriptive analysis carried out with the selected measurement instrument, a medium to high valuation was obtained because the mean of each dimension was higher than 3.5. The low average resulting from CA4 (an average of 2.80), refers to the question *...do you think that the CETPRO does not co-operate or only does it internally?* The lower score indicates that there is no support from the CETPRO, and that it is only dedicated to training and does not provide any help to its graduates to further develop and foster business skills. It is also indicative of the lack of institutional support with agreements, internships, scholarships, jobs and other matters that it could manage for its own students. Table 1 presents the descriptive data obtained in the study.

Table 1: Distribution of values across different categories.

	Mean	Deviation	Variance	Asymmetry	Kurtosis
CR1	3.68	1.118	1.249	-0.967	0.429
CR2	3.62	1.035	1.071	-0.781	0.267
TE1	3.80	1.149	1.320	-1.054	0.403
TE2	3.91	1.125	1.266	-1.101	0.604
TE3	3.80	1.106	1.223	-0.986	0.372
CA1	3.78	1.098	1.205	-1.021	0.557
CA2	3.78	1.075	1.155	-0.911	0.468
CA3	3.73	1.120	1.255	-0.880	0.246
CA4	2.80	1.241	1.540	0.130	-0.905
CA5	3.47	1.060	1.123	-0.789	0.084
M1	3.81	1.071	1.146	-0.964	0.448
M2	3.93	1.084	1.174	-1.130	0.751
M3	3.53	1.104	1.218	-0.711	-0.057
M4	3.89	1.060	1.123	-1.048	0.740
CP1	3.83	1.054	1.110	-1.051	0.783
CP2	3.74	1.088	1.184	-0.928	0.469
CP3	3.68	1.044	1.090	-0.855	0.387
CP4	3.81	1.020	1.041	-1.135	1.123
VLE1	3.69	1.099	1.208	-0.766	0.037
VLE2	3.69	1.103	1.216	-0.789	-0.035
VLE3	3.74	1.110	1.231	-0.865	0.200

Table 2, included as Appendix 1 at the end of this article, shows the correlation of the elements in the study on the entrepreneurial competencies of the CETPRO students.

Figure 1 shows the descriptive data for the first dimension of trust and respect CR (CR1: *Do you think there is trust among students, the institution, staff and in the organisation (CETPRO) as a whole*, CR2: *Do you think there is enough trust to allow mistakes that can lead to new solutions or ideas*).

The results indicate that *yes* the respondents predominantly *agree* with both questions CR1 and CR2.

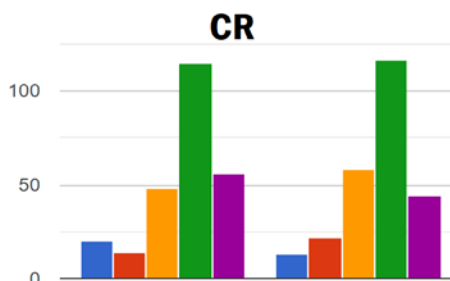


Figure 1: Response distribution in the trust and respect dimension.

Figure 2 shows the descriptive data for the second dimension of everyone is special TE (TE1: *Do you believe that students have an understanding of individual respect and are given the space and opportunity to act individually*, TE2: *Do you believe that people are open/free to express their ideas and thoughts*, TE3: *The institution promotes new and innovative ways of studying and working*).

The results indicate that *yes* the respondents predominantly *agree* with questions TE1, TE2 and TE3.

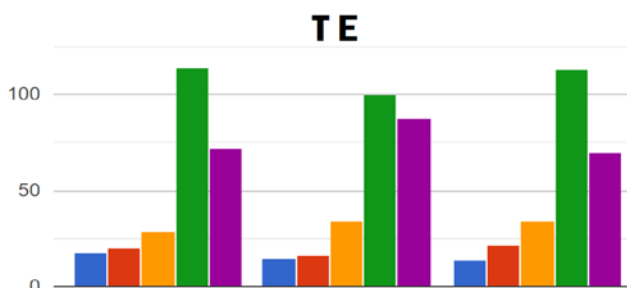


Figure 2: Response distribution in the all are special dimension.

Figure 3 shows the descriptive data for the third dimension of open collaboration CA (CA1: *They encourage a collaborative approach to studies*, CA2: *Do you think students are proud of the team spirit*, CA3: *Do you think students share their ideas*, CA4: *Do you believe that the CETPRO does not co-operate or only co-operates internally*, CA5: *Do you believe that students are developing their networks and external communications*).

The results indicate that *yes* the respondents *agree* with questions CA1, CA2, CA3 and CA5, but in response to question CA4 neither *agree* nor *disagree* dominates.

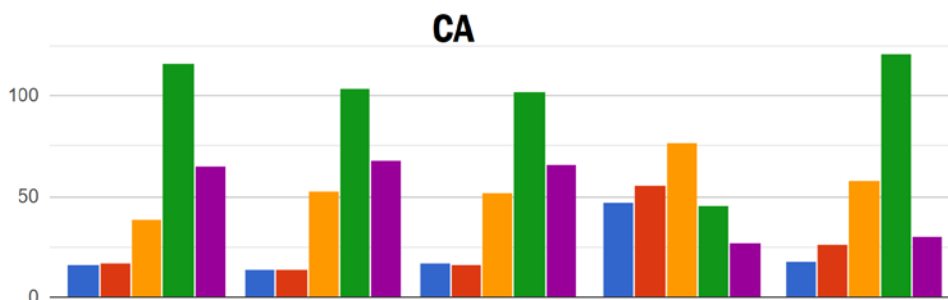


Figure 3: Response distribution in the open collaboration dimension.

Figure 4 shows the descriptive data of the fourth dimension towards goal M (M1: *Do you believe that the CETPRO supports the achievement of personal and group goals*, M2: *Students are encouraged to seek new opportunities and ways of doing things to achieve their goals*, M3: *Do you believe that the CETPRO community participates in decision making*, M4: *Significant changes in a working and learning community bring improvements to studies*).

The results indicate that *yes* the respondents predominantly *agree* with questions M1, M2, M3 and M4.

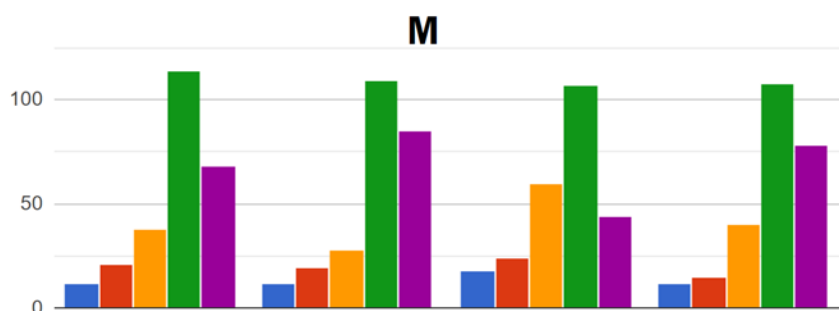


Figure 4: Response distribution in the towards the goal dimension.

Figure 5 shows the descriptive data of the fifth dimension of competence and pleasure CP (CP1: *Students' abilities are recognised and they have the opportunity to take advantage of their strengths in the CETPRO*, CP2: *There is a feeling that students can positively influence the results of others*, CP3: *Students evaluate whether objectives have led to results*, CP4: *Continuous evaluation supports the achievement of goals during studies and promotes a feeling of satisfaction*).

The results indicate that *yes* the respondents predominantly *agree* with questions CP1, CP2, CP3 and CP4.

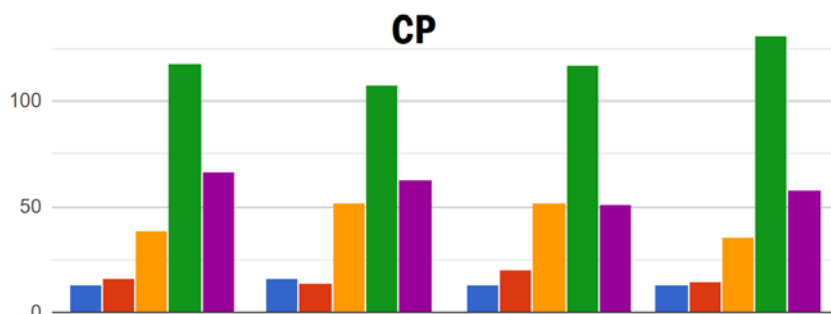


Figure 5: Response distribution in the competence and pleasure dimension.

Figure 6 shows the descriptive data for the sixth dimension of work life and entrepreneurship VLE (VLE1: 19. *The CETPRO supports the development of understanding of different fields and professions, and the creation of networks and partnerships with work/professional life and the surrounding society*, VLE2: 20. *The CETPRO encourages further development of ideas, solutions, services or business ideas for clients or other target groups*, VLE3: 21. *Understanding and interest in entrepreneurship is shared by CETPRO students*).

The results indicate that *yes* the respondents predominantly *agree* with questions VLE1, VLE2 and VLE3.

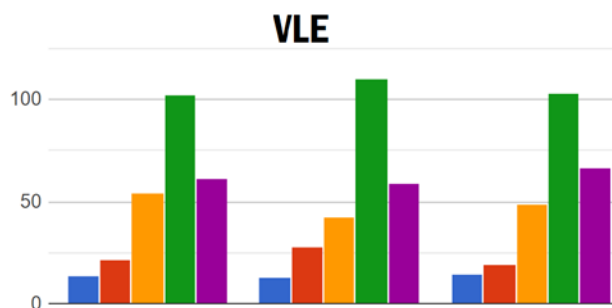


Figure 6: Response distribution in the working life and entrepreneurship dimension.

## DISCUSSION

There are proposals to provide leadership to entrepreneurship education [5], but in the absence of political will it cannot be put into practice. Despite its appropriate human resources, the institution cannot act independently of the guidelines imposed by higher policy makers within the education sector. In this situation, it appears that a framework should be created with data on educational programmes for corporate entrepreneurship enabling the comparison of results from different institutions according to the scope of application [6]. Through such a comparison, certain deficiencies in educational programmes - represented by a very low average in assessment - could be identified, and the relevant institution should be encouraged to implement curricular changes to enhance corporate entrepreneurship training.

Initiatives in corporate mentoring can have direct positive and negative aspects [10], but emphasis should be placed on the student and the positive aspects of corporate mentoring, which cannot cause any economic damage. The mental models of collaboration are a fundamental support tool for the student as he/she is used to having only one teacher and is limited to the exchange of ideas, planning and participation with the teacher who acts in the administrative support and pedagogical training for the entire academic community [11].

It has been evidenced that short, intensive and practical training worked well for European university students who have had numerous opportunities to present, and be engaged in, various types of entrepreneurial projects; however, this training achieved better effects for Master's students, but it was not the same in doctoral studies [14]. Moreover, family support is very important for the student's growth as an entrepreneur. A prosperous job, entrepreneurial spirit and service provision to society can bring happiness and a sense of achievement of one's goals [15].

It is suggested to implement entrepreneurial competence training in university environments so that the graduates could survive and prosper in the competitive labour market [19]. For an institution that has already implemented entrepreneurial competence training, to become a model within the higher or productive technical centre sector, it is necessary to provide continuous support for the teacher and especially the student to obtain better results at the local, national and international level. It is required that technical universities deepen and integrate education with industry to provide industry-oriented development, as well as to change paradigms to form leaders of change in business incubation platforms, and also to form student-teacher teams and participate in academic events as they do in China [22].

The immediate and significant effects have been observed in small to medium enterprises managing to guide in an entrepreneurial way in regard to sustainable management [23]. There are also effects in the municipal funds management, but with less participation, as the same managers who attempted to raise the entrepreneurial spirit in their workers, had to carry forward the entrepreneurial competencies in relations with their own customers. New research findings on corporate learning can assist in improving the performance of university students in the classroom [28], including findings on the obstacles and advantages in on-line learning, analysed from different perspectives [34].

Understanding the importance of entrepreneurial skills studies can help not only the student but also the institution, as the latter may have a diagnostic tool for curricular improvement often leading to drastic decisions to improve the quality of education. The curricular changes are important for both the student and teacher, and they may result in new research studies on the effects of the new curriculum, the effects of entrepreneurial skills, and the new knowledge assessment and its applicability in the companies where graduates commence their work.

## CONCLUSIONS

The results of the study outlined in this article show that it is beneficial to provide entrepreneurial education at the CETPRO level and motivate students to become sound entrepreneurs. The courses offered at that level could become pedagogical models to be further improved, and be replicated for even better results.

The student perceptions on entrepreneurial competencies in two CETPROs in the district of Cusco, Peru are at a medium to high level, their average is higher than 3.5. This result indicates that the students have some entrepreneurial knowledge

which they apply in their activities. However, they have to be aware that the hands-on knowledge and skills need to be supplemented by some theoretical points.

The entrepreneurial competence in regard to collaboration among them is in a high range, because they support each other and can form a compact group and undertake joint tasks until they have adequate experience to put into practice their knowledge both theoretically and experimentally reinforcing the weak points they had at the beginning.

In their working life, students are dedicated to improving and strengthening their business skills and to enhancing their own business through their experience. However, in doing so, they rely on support from their families, otherwise they have to find ways to obtain adequate financial help to carry out their plans.

Moreover, every student appears to have the entrepreneurial spirit, but sometimes their plans are truncated due to the lack of support from an advisor (teacher, institution), lack of experience and bureaucratic procedures of the municipality in which they want to open a business. Therefore, it is a good idea to form a group and together to start a group business in order to gain experience and put into practice everything they have learned.

This study contributes to the theoretical framework of entrepreneurial education by providing some theoretical insights and sound practical experience in relation to the development of entrepreneurial competencies and the development of the collaborative spirit in CETPROs. It is suggested to include more practical hours in business entrepreneurship courses to provide entrepreneurs that would be competitive at the international level.

Finally, more studies similar to the one presented here are needed to make comparisons between students from different parts of Peru, and thus generate a proposal to the government with recommendations for changes in the curricula at the national level.

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APPENDIX 1

Table 2: Correlation between elements.

	CR1	CR2	TE1	TE2	TE3	CA1	CA2	CA3	CA4	CA5	M1	M2	M3	M4	CP1	CP2	CP3	CP4	VLE1	VLE2	VLE3	
CR1		0.622	0.596	0.646	0.646	0.642	0.590	0.638	-0.002	0.501	0.593	0.687	0.597	0.654	0.642	0.602	0.591	0.606	0.617	0.615	0.590	
CR2			0.662	0.611	0.631	0.631	0.613	0.601	0.135	0.556	0.600	0.653	0.597	0.624	0.632	0.621	0.541	0.635	0.592	0.639	0.546	
TE1				0.716	0.665	0.654	0.678	0.645	0.139	0.547	0.636	0.684	0.630	0.666	0.637	0.612	0.582	0.587	0.619	0.639	0.603	
TE2					0.649	0.662	0.679	0.752	0.081	0.549	0.668	0.750	0.682	0.684	0.697	0.691	0.607	0.642	0.667	0.681	0.674	
TE3						0.716	0.698	0.578	0.050	0.533	0.649	0.727	0.627	0.618	0.676	0.568	0.616	0.544	0.609	0.616	0.596	
CA1							0.760	0.700	0.154	0.581	0.653	0.742	0.635	0.740	0.702	0.670	0.659	0.711	0.673	0.644	0.660	
CA2								0.722	0.155	0.606	0.626	0.768	0.613	0.690	0.689	0.651	0.664	0.633	0.581	0.619	0.665	
CA3									0.132	0.587	0.628	0.727	0.632	0.660	0.636	0.691	0.622	0.612	0.604	0.612	0.662	
CA4										0.315	0.196	0.132	0.179	0.164	0.153	0.168	0.163	0.269	0.100	0.166	0.185	
CA5											0.583	0.619	0.612	0.608	0.573	0.597	0.565	0.544	0.542	0.561	0.532	
M1												0.755	0.684	0.688	0.728	0.626	0.624	0.665	0.678	0.703	0.674	
M2													0.737	0.792	0.755	0.746	0.704	0.703	0.715	0.713	0.748	
M3														0.692	0.703	0.670	0.639	0.642	0.701	0.731	0.696	
M4															0.765	0.736	0.696	0.759	0.696	0.673	0.728	
CP1																0.748	0.748	0.738	0.729	0.777	0.747	
CP2																	0.725	0.690	0.653	0.671	0.731	
CP3																		0.708	0.671	0.676	0.697	
CP4																			0.752	0.753	0.704	
VLE1																				0.803	0.715	
VLE2																						0.774
VLE3																						