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Article

Impact of Teacher Empowerment on Innovation Capacity

Alfonso J. Gil [1]*, Beatriz Rodrigo-Moya [2] and Jesús Morcillo-Bellido [3]

[1] Universidad de La Rioja; alfonso.gil@unirioja.es
[2] Universidad Nacional de Educación a Distancia UNED; brodrigo@cee.uned.es
[3] Universidad Carlos III de Madrid; morcillo@ing.uc3m.es
* Correspondence: alfonso.gil@unirioja.es; Departamento de Economía y Empresa. Universidad de La Rioja, Logrono Spain Tel.: +34941299574

Abstract: This paper has two objectives: the first, to analyze the mediating effect of teacher empowerment between innovation culture and innovation capacity, and between inclusive leadership and innovation capacity; the second, to analyze the moderating effects of the school context on the innovation capacity. Data were collected in a representative sample of secondary schools in Valencia, Spain. The research model adopted is structural equation modeling, using the partial least squares (PLS) technique. The model has confirmed that teacher empowerment mediates between innovation culture and innovation capacity and between inclusive leadership and the innovation capacity. It is found that the educational context does not moderate the relationships in the proposed analysis model. This paper emphasizes the role of teacher empowerment in educational innovation and extends the knowledge of culture and leadership in the school organization.

Keywords: empowerment; innovation culture; inclusive leadership; innovation capacity; school

1. Introduction

Concerning educational organizations, innovation takes on special importance, as it is critical to improving teaching and learning processes [1]. In addition, innovation has been linked to the process of change [2] and thus to the educational development of schools [3]. Therefore, the sustainability of educational innovation is considered a critical factor for the development of a school open to change in a society in constant evolution [4]. The sustainability of educational innovation is related to the ability of organizations to generate and maintain innovation processes, which has been identified as the development of innovation capacity [5] : "innovation capacity is defined as a set of conditions that supports innovation or provides a supportive infrastructure" [6, p. 3].

Among these conditions that support innovation, the empowerment of people in organizations has been highlighted [7], and especially in educational institutions [8]. Teachers who feel supported in their innovation initiatives respond positively to the challenges of change in educational organizations. Furthermore, some intangible aspects of the strategy have been pointed out as key to the development of innovation [9], such as culture [10, 11] and leadership [12, 13].

The general aim of this research is to analyze the influence of the three mentioned aspects: the empowerment of the teaching staff, the culture of innovation, and inclusive leadership in the capacity for innovation. The first specific objective of this work is to analyze the mediating effect of teacher empowerment between innovation culture and the capacity for innovation, and between innovation leadership and innovation capacity. In addition, the influence of the organizational context of the innovation process is pointed out [14, 15]; thus, the second objective is to analyze the effect of the moderation of organizational context in the proposed relationships in our analysis

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model (innovation culture and teacher empowerment; inclusive leadership and teacher empowerment; teacher empowerment and innovation capacity).

The results of this work will allow knowledge of how culture and leadership impact the innovation capacity of educational organizations and how teachers' empowerment behaves in this process. Empowerment, culture, and leadership have been considered critical in the development of innovation. However, the influence of these three aspects on the capacity of innovation is hardly addressed in the field of educational organizations. This paper also presents a contribution to the literature on educational innovation: it is about evaluating the effect of organizational context on the strategy that leads to innovation [16], a subject less studied in the environment school.

2. Theory and Hypotheses

Innovation in education refers to the introduction and development of new advanced methods and ideas in the teaching process [17]; in the words of [18, p. 40], "An innovation, on the other hand, refers to the introduction of an existing process, program, or way of doing things that offers new capabilities to users".

The innovation capacity in an educational organization refers to the practices and processes that establish educational organizations' innovation and evaluate innovation. This capacity for innovation is related to the degree to which teachers experience improvement in education, the degree to which the school management facilitates innovation actions, and the degree to which the school supervises and evaluates the quality of the innovation processes [19].

It is possible to promote the sustainability of innovations in educational organizations through the development of the innovation capacity [20]. On the other hand, one could also talk about behavior towards innovation when the individual carries out the innovation initiative [21]. In this sense, individual behavior towards innovation at work refers to the creation, introduction, and intentional application of new ideas within the role of labor, group, or organization, with the purpose of improving the performance of the function of the group, the organization, or the individual's work [22]. Individual behavior as to innovation is based on the personal generation of new ideas and approaches in the workplace [23]. This behavior is fundamental because it contributes to the individual performance [24] and so to the improvement of the groups and the organization. In the case of educational organizations, reference should be made to the attitude of teachers toward innovation, which in turn can be driven by leadership and by the development of a school environment towards innovation.

2.1. The influence of empowerment of teacher on the innovation capacity

Empowerment has been defined as the perception that team members have concerning their authority and responsibility for the results of their work [25]. Empowerment is used to express the appreciation and support of the organization leaders for their employees [26]. In the school context, the empowerment of teachers is related to the power that teachers have to participate in decision-making related to teaching and learning processes in school [27].

The current context of change linked to new technologies and increasingly complex societies represents a challenge for education. Empowerment is becoming a necessity to respond to these changes. Empowerment leads people toward decision-making and guides how they face the future [28]. Therefore, the empowerment of employees is recognized as an essential contributor to the development of innovation capacity of organizations [29].

2.2. The influence of innovation culture on empowement of teacher

In general, organizational culture is defined "as a set of shared values that help organizational members understand organizational functioning and thus guide their thinking and behavior" [30]. The organizational culture has different acceptances that correspond to groups of values that identify and stimulate certain behaviors in organizations. Consequently, an innovation culture, or the culture of support for innovation, can be spoken about as a set of values that guide innovation

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[31]. In particular, [32, p. 43] define an innovation-supportive culture as a firm's "social and cognitive environment, the shared view of reality, and the collective belief and value systems reflected in a consistent pattern of behaviors among participants". In the school context, an innovative culture is reflected in the improvement of the school system and particularly in the advancement of the teaching and learning process [33].

Highlighted among the values leading to innovation are [34, 35] clarity in information transmission; openness to change; consideration of different perspectives for problem-solving; and opening up towards the search for critical assumptions that affect the resolution of issues. In short, in an organization with an innovation culture, there is a receptive attitude to take into account a wide range of proposals for solving problems and in which a trusting climate is generated, wherein any person feels capable of making innovative proposals.

For this reason, the culture that creates confidence in innovation also impacts on the behavior of people towards their empowerment, as it generates autonomy and recognition for people and, with this, people can contribute directly to the decision-making process [36]. Innovative cultures promote open minds and encourage people to accept new ideas [37]; thus, "employee empowerment is less likely to meet resistance in an innovative organization" [38, p. 576].

2.3. The influence of inclusive leadership on empowement of teacher

It has been distinguished that school leadership facilitates teachers´ empowerment towards innovation in the classroom, which positively affects the teaching and learning process [39]. Also, authors such as [40] have found that there is a positive and statistically significant relationship between teachers' sense of empowerment and their perceptions of professional development. For all these reasons, leadership is considered key in the development of teacher empowerment.

Inclusive leadership positively impacts people empowerment [41]. An inclusive leader has been defined in terms of "words and deeds exhibited by a leader or leaders that indicate an invitation and appreciation for others' contributions" [42, p. 947], which affects the empowerment of people and work teams. [43, p. 191] indicate the characteristics that identify inclusive leadership:

Facilitates belongingness: (1) supports individuals as group members; (2) ensures justice and equity; (3) shares decision-making.

Values uniqueness: (1) encourages diverse contributions; (2) helps group members fully contribute.

Therefore, the inclusive leader manages to bring out the maximum potential of each person by developing the different competencies of all people in create effective teams. The type of inclusive leadership is especially essential in the school teaching environment for two broad reasons: firstly, because, in teaching, the team is the critical element of work both in the classroom and in the organization of the teaching centers; and secondly, due to the diversity of opinions and visions of educational policies expressed by the teaching staff [44].

2.4. The mediating effect of the teacher empowerment

In general, it has been said that culture affects innovation in both industrial organizations [45] and educational organizations [46]. It is mainly about eliminating the fear of failure and change [47] and encouraging innovation [48]. In particular, in a culture of innovation, collaboration and openness to new ideas are highly valued, along with an environment in which people are comfortable expressing their thoughts [49]. Thus, the culture of innovation positively affects the capacity for innovation [50].

Also, for the values to be assumed by the members of the organization, there must be some empowerment of people by the organization—or, in other words, power in the form of decision-making [51, 52]. In fact, levels of innovativeness in an organization are associated with cultures that value participative decision-making [53]. From this proposal, we draw the first hypothesis.

Hypothesis 1. The empowerment of teachers mediates the innovation culture and innovation capacity.

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Many authors have highlighted the importance of leadership for innovation [54]. Leaders play an essential role in innovation processes through the development of favorable contexts for innovation and change [55]. Literature has indicated that leadership affects innovation positively [56], and specifically in schools' capacity for innovation [57].

It has been pointed out that inclusive leadership is a good predictor of innovative behavior [58, 59] and it is proven that inclusive leadership is positively related to innovative work behavior. The inclusive leader, by involving team members and inviting them to participate and make decisions, generates a structure of shared understanding and provides an environment for the achievement of optimal results [60].

Leadership towards innovation focuses on the promotion of individual initiatives, makes the individual responsible for their actions, emphasizes the accomplishment of tasks, and creates organizational environments where confidence is fostered [61]. But all this is possible thanks to empowerment; people perceive that decision-making is participatory and they have enough power to carry out innovation and change initiatives. In fact, works like those of [62] have proven that leadership is positively related to business behavior only when the psychological empowerment is high. Therefore, the second hypothesis is:

Hypothesis 2. Teacher empowerment mediates between inclusive leadership and innovation capacity.

2.4. The mediating effect of school context

In general, it has been pointed out that the context intervenes in the innovation process, and this circumstance is especially vital in the school context, in which the relationships established between the agents are differentiated according to the learning context in which innovation occurs [63]. However, aspects such as the commitment to innovation, which is crucial in the school innovation process [64], can be present in all innovation environments [65]. For these reasons, the influence of context on the process of school innovation is studied.

In the particular case of this research, two types of context are proposed that are related to the educational level that is taught in the school—on the one hand, schools in which primary education and secondary education are taught; on the other, schools in which secondary education and high school are taught. The educational level of schools or educational centers can be essential in the innovation process and in the variables that indicate innovation.

Both for the different types of student (children and adolescents in the schools that provide primary and secondary education and mostly adolescents in secondary and high school centers) and for teachers (primary school teachers and high school teachers in high school), there is a need to fulfill an educational requirement—for example, the baccalaureate that leads students to university.

It has been highlighted that school culture impacts on the creation of a structure that develops empowerment and facilitates the breaking of barriers to the transmission of information among the teaching staff [66]. However, the adoption of a culture of innovation can be mediated by the context in which innovation occurs—for example, between countries with different school structures [67] or between centers according to the levels of education that are taught [68]. Therefore, the following hypothesis is proposed.

Hypothesis 3. The educational context moderates the relationship between the innovation culture and teacher empowerment.

As noted, the establishment of a leadership influences the empowerment of people [69]. Likewise, the literature indicates that the exercise of leadership is mediated by the context in which it is exercised [70].

As [71] point out for the Chinese case, the influence of leadership towards empowerment and teacher participation in decision-making is limited by the hierarchical context of the Chinese education system. Also, leadership can be moderated by other factors, such as the teachers' perception of the school climate [72]. Therefore, the following hypothesis is indicated.

Hypothesis 4. The educational context moderates the relationship between inclusive leadership and teacher empowerment.

The participation of teachers in decision-making, as a characteristic of the structure of a school organization, has been seen as a critical variable in the development of the innovation capacity of an educational center [73].

However, the relationship between empowerment and innovation can be mediated by the context in which empowerment is exercised: for example, innovation in public service is little known, as social innovators must navigate between the norms, practices, and logics of the public sector itself [74]. More specifically, the importance of the educational level of schools in the relationships that are established between teacher decision-making processes and the development of innovation has been pointed out [50]. For these reasons, the following hypothesis is proposed.

Hypothesis 5. The educational context moderates the relationship between teacher empowerment and innovation capacity.

3. Method

3.1. Data and sample collection

The empirical study was carried out in a sample of 17 schools in the province of Valencia in Spain. A random sampling was carried out conveniently according to the different regions of the province, and information was gathered in six of them, which we considered representative of the entire province. From these 17 educational centers, 221 teachers were asked about the characteristics of their respective organizations relating to the objectives of the present study. As for the sample of teachers, it is noticed that the percentage of women in the sample is slightly higher than that of men (53.4 percent vs. 46.6 percent). As for the employment situation resulting from the types of contract, 86.4 percent are career employees, 2.3 percent do not have the status of employee but their contract is fixed, and 11.3 percent are on a temporary contract, which means that their contract is conditioned for a specific time. As for the type of school, the typology is identified by the educational level of the school, so, there are educational centers that offer primary education and secondary education (55.6 percent), while others provide secondary education and higher education (44.4 percent).

3.2. Mesaurement of variables

To measure the study variables, a seven-point Likert scale was designed, in which respondents would show their level of agreement or disagreement with the summarized proposals [75]. The whole work is composed of 19 items that collect information on the motivation for school innovation. Six items measure the innovation culture that is identified with the management (collection and transfer), along with information analysis and communication [76, 77]. Empowerment is considered from three items: these three items collect the three key characteristics that identify and enable empowerment: participation in decision-making, delegation in decision-making [50], and the organizational structure which facilitates involvement and delegation in decision-making [78]. Inclusive leadership is measured through seven items that, as noted, collect the five characteristics that identify this type of leadership [43]. Moreover, the capacity and behavior of teachers towards innovation are measured from three items [79] (see Appendix A).

4. Analysis and Results

4.1. Analysis of data

To investigate the relationship between the theoretical constructs empirically, we used structural equation modeling (SEM). According to [80], the importance of SEM derives from the possibility of modeling and estimating parameters for the relationships between theoretical constructs and of testing theories of behavioral science. Following [81, p. 2], "SEM distinguishes between theoretical constructs and their empirical measurement by multiple observable variables." It is true that the analysis of factors, analysis of trajectory, and regression represent individual cases of SEM [82]. [83] calls SEM the second generation of multivariate analysis.

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The proposed research model was tested using a structural equation model, the partial least squares (PLS) technique, and SMARTPLS version 3.0 software [84]. This technique is based on the analysis of variance, in which the measurement model and the structural model are evaluated simultaneously [85]. In this study, the direction of causality between the constructs and their indicators is produced reflexively, considering that the indicators are manifestations of the construct, in which the measure is determined by the construct itself [86].

4.1. Results

Although the PLS simultaneously estimates the measurement and structural parameters, the analysis is performed in two stages: the measurement model and the structural model.

4.1.1. Measurement model

Analysis of the measurement model requires four fundamental stages: (1) individual reliability of the indicators; (2) reliability of the constructs; (3) convergent validity; and (4) discriminant validity.

Firstly, the standardized root mean square residual (SRMR) was analyzed as a goodness of fit measure (model) for PLS-SEM. The value of 0.09 found is considered adequate for the model [87].

The reliability of the model was also analyzed; the reliability of the indicators must be examined through their loads (λ). In this case, all factorial loads were found to be no less than 0.4 [88]; so, they remained in the model, resulting in a final set of scales with 12 items (see Table 1).

(Insert Table 1 about here)

Secondly, the reliability of the constructs was examined through the Cronbach's alpha index and the composite reliability index (CRI). Thirdly, the existence of convergent validity was confirmed through the average variance extracted (AVE). As shown in Table 2, the CRI alpha value exceeded the critical value of 0.8 in all variables [89] and the AVE value is higher than 0.5 [90] (see Table 2).

(Insert Table 2 about here)

Finally, the analysis of the measurement model involves verifying the existence of discriminant validity. A new approach to assess the discriminant validity in SEM-based variance is the heterotrait-monotrait (HTMT) ratio of proposed correlations, strongly recommended by [91], in whose work the HTMT criteria are fully explained. Technically, the new HTMT criteria provide advantages over other types in determining discriminant validity, because HTMT does not require factorial analysis to obtain factorial loads, nor does it require the calculation of constructive scores. In addition, it effectively identifies a lack of discriminant validity, such as high sensitivity rates. Based on HTMT criteria 0.90, no discriminant validity problems were found for correlations between constructs (0.85 or less), as shown in Table 3.

(Insert Table 3 about here)

4.1.2. Structural model

To determine the statistical significance of the model's path coefficient, a bootstrap resampling technique was used in 5,000 subsamples [82]. The structural model evaluates the magnitude and significance of the relationship between the different variables. It is a question of analyzing the explained variance of the endogenous variables (R^2) and the standardized trajectory or regression weight coefficient (ß) [92].

In the evaluation of the structural model, we estimated the trajectory coefficients, their significance through the bootstrap tests, the R^2 values, and the Q^2 tests for predictive validity.

The three main paths are significant (Figure 2), with the following results: (1) innovation culture and teacher empowerment (ß = 0.319***); (2) inclusive leadership and teacher empowerment (ß = 0.567***); and (3) empowerment and innovation capacity (ß = 0.633***). Moreover, the dependent variable teacher empowerment achieved an R^2 of 0.710, and the other dependent variable, innovation capacity, an R^2 of 0.401, which is why it is considered high predictive values [93].

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The examination of redundancy indices with cross-validity (Q^2) [94] confirms that the model has satisfactory predictive relevance for the endogenous variables (organizational structure and capacity for innovation).

(Insert Figure 2 about here)

To test the proposed hypothesis concerning mediation, we applied the proposal put forward by [95]. Figure 3a shows the total effects of innovation culture processes and inclusive leadership in innovation capacity. These total effects can be reached through a variety of indirect forces [96].

Specifically, Figure 3b shows the total effect that the innovation culture has on innovation capacity, which can be expressed as the sum of the direct effect (d') and the indirect effect (a*c). Thus, d = d' + a*c [97]. This view has the advantage of isolating the indirect effect (a*c), as described in hypothesis 1. Analysis of the relationship between d and d', although not hypothesized, includes confirmation of the presence of direct and indirect relations [98]. The same procedure applies to the total effect of empowerment processes in the learning culture, e = e' + b*c, where b*c is the indirect effect postulated in hypothesis 2.

(Insert Figure 3 about here)

Table 4 shows the results of this evaluation. The innovation culture affects the capacity for innovation (d = 0.363, t = 3.815) (Figure 3a). When the empowered teacher is introduced as a mediating element between the innovation culture and the innovation capacity, the direct effect on the innovation culture is reduced and the significance is reduced (d' = 0.238, t = 1.943) (Figure 3b), while the indirect effect through the innovation structure reaches an estimate of 0.118 (a*c) (Table 4). Through these results, we want to know the degree of mediation effect; for this, we calculate the variance accounted for (VAF), which gives 0.25. Therefore, it can be said that a partial mediation effect has been found, since VAF is between 20 percent and 80 percent [82]. Taking into account that the reliability interval does not contain zero, the indirect effect is significant. Therefore, hypothesis 1 is supported, and teacher empowerment mediates the relationship between innovation culture and innovation capacity.

Table 4 shows the results of this evaluation. Inclusive leadership significantly affects innovation capacity (e = 0.302, t = 3.237) (Figure 3a). When the innovation structure is introduced as a mediating element between leadership and innovation capacity, the direct effect on innovation capacity is reduced and no longer significant (e' = 0.091, t = 0.798) (Figure 3b), while its indirect effect through the structure reaches an estimate of 0.358 (b*c) (Table 4). With these results, we sought to understand the degree of the moderation effect; for this, the VAF was calculated, giving a result of 0.51. It can therefore be seen that a partial mediation effect has been found, because the VAF is again between 20 percent and 80 percent [82]. However, if we take into account that the reliability interval does not contain zero, the indirect effect is significant. Hence, hypothesis 2 is supported, and the empowered teacher mediates the relationship between inclusive leadership and innovation capacity.

Finally, Table 5 presents the multi-group analysis, which analyses hypotheses 3, 4, and 5. As moderation is addressed through a categorical variable, a bootstrap is applied to test potential differences between groups [99].

(Insert Table 5 about here)

As shown in Table 5, the hypothesis 3, hypothesis 4, and hypothesis 5 are rejected. The organizational context does not moderate any of the proposed relationships.

5. Discussion

The results of this work indicate that, as the literature points out, certain non-tangible aspects of strategy have an impact on the development of innovation [100]. As has been proven, both the innovation culture and inclusive leadership affect the capacity for innovation. In consequence, educational innovation would be sustained, first of all by the development of innovation cultures, cultures open to change and in which ideas are confronted and different perspectives are analyzed to solve problems; and secondly, by the advance toward a type of leadership that accepts and enhances diversity, school managers who encourage teachers to express their opinions and challenge teachers in the search for new solutions to teaching problems.

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It has been pointed out that empowerment is key to developing subordinates' potential and to increase the effectiveness of the organization [101]. This proposition has been proven in this work; on the one hand, empowerment directly affects the capacity for innovation in educational organizations; on the other hand, it moderates the relationship between the innovation culture and the capacity for innovation and between inclusive leadership and the capacity for innovation. This latter result has particular importance in the educational field, since a large part of school innovation is related to the interest of the teaching staff in innovation: although the material means are important, the main tool of school innovation is the attitude of the teaching staff in the face of new educational challenges.

The analysis of the moderating effect reveals that the educational context does not affect the proposed causal relationships, contrary to the set of proposals hypothesized; the educational level taught in the school does not affect the relationship with educational innovation.

Although the literature indicates that the educational context intervenes in the organizational culture [102], as shown in hypothesis 3, it could suggest that the values that identify the innovation culture are present in a similar way in the different types of school, and this type of culture is generalized towards empowerment in different school contexts [103].

Hypothesis 4 has also not been tested; contradicted; the result may have some consistency with the measurement result, where the structure did not mediate entirely, which would confirm the strength of the leadership in different educational contexts. In this sense, [104] also did not find a moderating effect of the school context in the leadership.

Hypothesis 4 has not been tested, and the context does not moderate the relationship between empowerment and innovation capacity. Well-trained and empowered teachers provide opportunities for innovation for all schools [105]; the education level offered at the school is not a feature that impacts this premise.

5.1. Limitation and future lines of research

This work has considered innovation capacity as a dependent variable. It has not considered specific classroom innovations—for example, those related to the incorporation of new technologies or new teaching methods and strategies, among others. For future research, we suggest the analysis of the proposed model considering this type of innovation in the classroom, which would also help to analyze and develop the innovation capacity construct for progress toward sustaining organizational change [106].

In this work, the school context has been analyzed as a moderating variable in terms of the educational level that is taught in the school. In future research, another type of school context can be examined—for example, urban schools versus rural schools [107]; one could also distinguish between different locations within urban schools.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Questionnaire: Innovation in an Educational Organization

Innovation culture

- In your school, the changes that directly affect you are efficiently communicated.
- In your school, crucial knowledge for decision-making is communicated quickly and accurately.
- In your school, in the work meetings, different perspectives are analyzed for problem-solving.

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- In your school, the underlying assumptions that affect key decisions are identified and analyzed (getting to the root of the problem).
- In your school, information is systematically collected from teachers, families, and students.

Inclusive leadership

- In your school, you feel comfortable talking about your problems and disagreements.
- In your school, the Principal carries out constructive criticism of issues that arise.
- In your school, the Principal lends an ear and listens with attention to your suggestions, problems, or proposals.
- In your school, the Principal encourages people to indicate their different points of view about problems or challenges.
- In your school, people's different opinions are well received.
- In your school, the management team provides time and resources for the identification of problems and challenges of the organization.
- In your school, opinions that do not coincide with the majority are valued.

Empowered teachers

- In your school, decision-making is carried out in a participatory manner.
- In your school, there is delegation in decision-making (decisions are made by the most prepared person or the one with the most significant responsibility).
- Do you consider that your school has a flexible organizational structure (we understand a flexible structure as being contrary to a hierarchical organization)?

Innovation capacity

- In your school, you are interested in trying different approaches to improve your work.
- In your school, you frequently carry out educationally innovative projects.
- Your school has a formal procedure for the evaluation of educational innovation.

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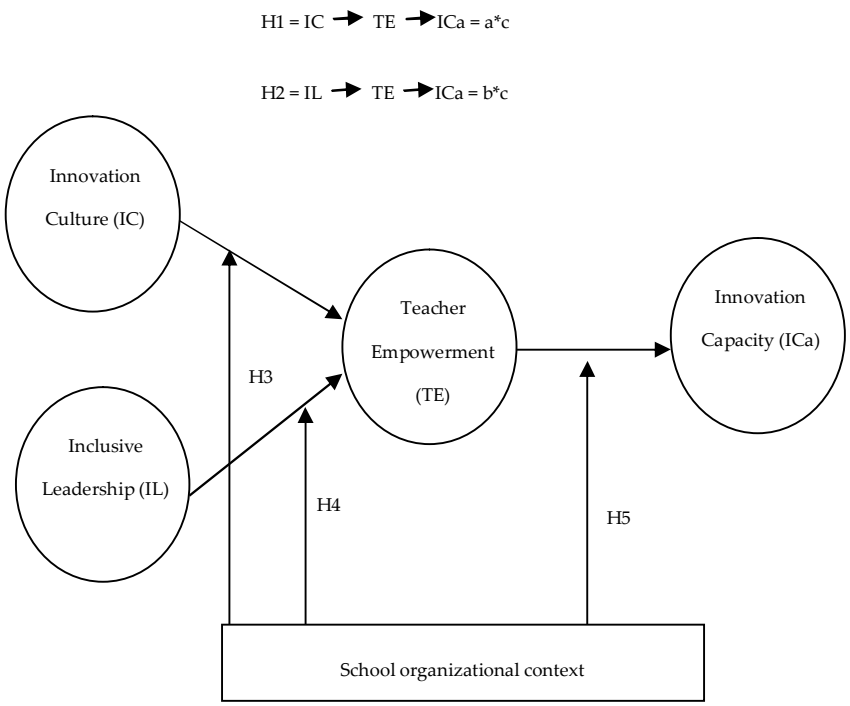

Figure 1 Research model and hypotheses

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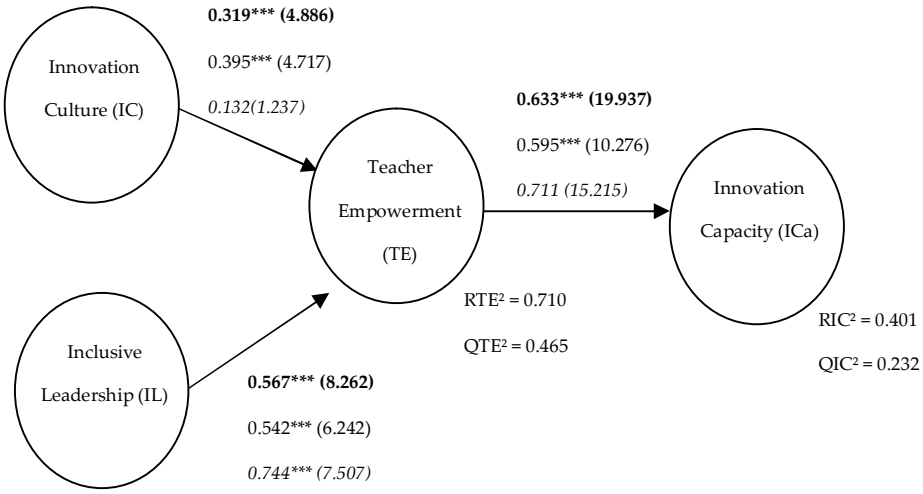

Note: **(bold) E = Entire sample**; (normal) P&S = Primary & Secondary School; (*italic) S&H = Secondary & High School* – (base on t (499), one-tailed test); (0.05;499) = 1.64791345, t (0.01;499) = 2.33843952; t (0.001;499) = 3.106644601

Figure 2 Structural model results

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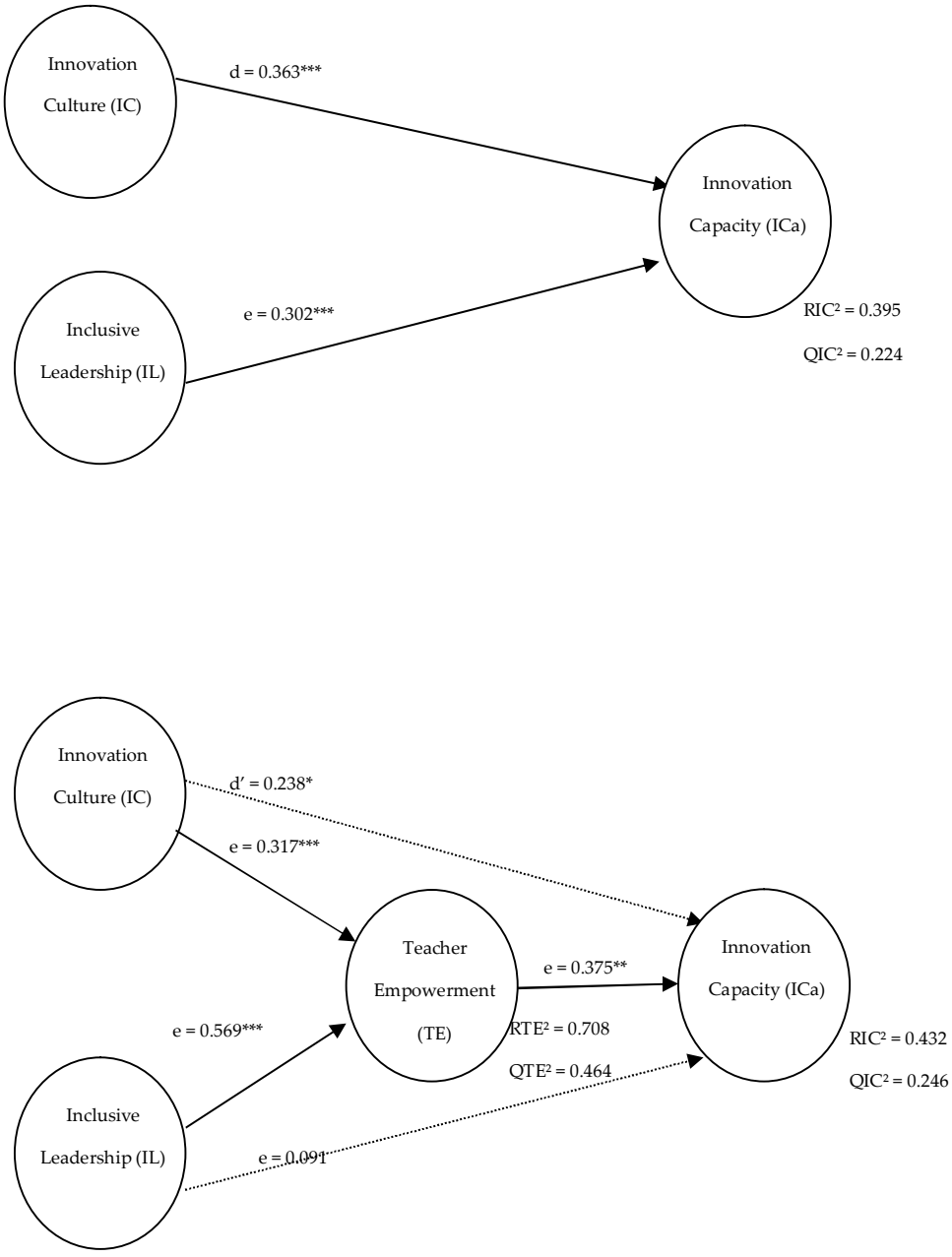

Note: (baed on t (4099), one-tailed test); (0.05; 499) = 1.64797345, t (0.01; 499) = 2.33384952; t (0.001;499) = 3.106644601

Figure 3 Research model and hypotheses

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803 **Table 1.** Measurement model: cross-loadings

Items	Innovation culture	Teacher empowerment	Innovation capacity	Inclusive leadership
Changes are communicated	0.798			
Knowlwedge is commmunicated	0.855			
Perspertives are analyzed	0.866			
Assumptions are identified	0.866			
Information is collected	0.764			
Decision-making is participatory		0.872		
Delegation in decision-making		0.748		
Flexible organizational structure		0.884		
Different approaches to improve			0.792	
Educationally innovative projects			0.785	
Evaluation educational innovation			0.770	
Confortable talking				0.864
Constructive criticism				0.908
Attention for suggestion				0.856
Encourages people				0.931
Diferent opinions				0.891
Identification problems				0.703
Opinions				0.871

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811 **Table 2.** Construct reliability and convergent validity

Items	Composite reliability	Cronbach α	AVE
Innovation culture	0.918	0.888	0.690
Teacher empowerment	0.875	0.787	0.701
Innovation capacity	0.826	0.702	0.612
Inclusive leadership	0.953	0.942	0.746

812 Note: AVE: Average Variance Extracted
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835 **Table 3.** Discriminant validity on heterotrait-monotrait ratio of correlations (HTMT)

Items	Innovation culture	Teacher empowerment	Innovation capacity	Inclusive leadership
Innovation culture	-			
Teacher empowerment	0.847	-		
Innovation capacity	0.751	0.850	-	
Inclusive leadership	0.847	0.839	0.731	-

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Table 4. Path coefficients and direct effect for mediation models

	Total effect	Direct effects		Indirect effects		
		TE	ICa	Estimate	Bootstrapping 95% confidence intervals	
					Percentile	
					Lower	Upper
IC→ICa	0.363*** (3.815)					
IL→ICa	0.302*** (3.237)					
IC		0.317*** (4.766)	0.238* (1.943)			
IL		0.569*** (8.207)	0.091ns (0.7982)			
TE			0.375** (3.063)			
IC→ET→ICa= a*c				0.118	0.053	0.174
IL→ET→ICa = b*c				0.213	0.095	0.338

Notes: IC: Innovation Culture; IL: Inclusive Leadership; ET: Empowerment Teacher; Ica: Innovation Capacity.

*p < 0.05; **p < 0.01; ***p < 0.001. ns Not significant; (based on t (499), one-tailed test); (0.05;499) = 1.64791345, t(0.01;499) = 2.333843952; t(0.001;499) = 3.106644601

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881 **Table 5.** Multi group analysis

Hypothesis	Path Coefficints	t value	*P* value	Supported
	Differences Primary&Secondary vs Secondary&High	Primary&Secondary vs Secondary&High	Primary&Secondary vs Secondary&High	
H3: IC→TE	0.235	1.909	0.058	No
H4: IL→TE	0.202	1.521	0.130	No
H5: TE→ICa	0.116	1.503	0.134	No

882 *p < 0.05; **p < 0.01; ***p < 0.001; not significant (based on t (499), one-tailed test); (0.05;499) =
883 1.64791345, t(0.01;499) = 2.333843952; t(0.001;499) = 3.106644601. IC: Innovation Culture; TE: Teacher
884 Empowerment; IL: Inclusive Leadership; ICa: Innovation Capacity

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