AGORA International Journal of Economical Sciences, http://univagora.ro/jour/index.php/aijes
ISSN 2067-3310, E-ISSN 2067-7669
Vol. 18, No. 2 (2024), pp. 218-244

HOW DOES THE (DE)CENTRALİZATİON OF SECONDARY EDUCATİON AFFECT İNDİVİDUAL İNNOVATİVENESS? EVİDENCE FROM AZERBAİJAN

E. NURALIZADE

Ehtiman Nuralizade
Doctoral School of Public Administration Sciences, National University of Public Service, Budapest, Hungary.
https://orcid.org/0009-0005-3822-3685, E-mail: nuralizade.ehtiman@stud.uni-nke.hu

Abstract: *This paper explores the relationship between centralization of decision-making in secondary education and individual innovativeness in developing countries, specifically within the context of Azerbaijan. The research examines to what level centralized decision-making can hinder or promote individual innovativeness, utilizing secondary data and quantitative analysis. The outcomes of this study, even if a significant difference was not found, indicate the need for a broader lens that considers various factors affecting individual innovativeness. This bears significant implications for politicians, policymakers, and other stakeholders in Azerbaijan and other developing countries to reconsider their current form of decision-making structure in educational systems.*

Keywords: *centralization, secondary education, individual innovativeness, Azerbaijan*

INTRODUCTİON

The education system plays an important role in the overall development of a country. It not only shapes the future of individuals but also influences the economy and society as a whole (Hanushek & Woessmann, 2015). It is a known fact that education can impact an individual's cognitive abilities, attitudes, and overall well-being (Binder, 2013). In recent decades, there has been an increasing interest in the role of innovation in education. *Innovativeness* is the ability to generate and implement new ideas and is seen as a critical driver of economic growth and social development (Jukneviciene, 2019).

Innovation as a desired attribute significantly triggers the development of society, and often challenges norms and inspires new ideas (Rogers, 2003). Yet, a crucial question arises when innovation encounters centralized decision-making systems. Current research delves into this dynamic, focusing on its effect on people's innovative capacities. Particularly, I assume that individuals educated under a centralized system may demonstrate lower levels of innovativeness than their counterparts from decentralized educational structures. To test this hypothesis, we need to explore how creativity, problem-solving skills, and ultimately innovation were influenced within certain educational contexts due to centralized decisions (Tarman, 2016).

This research underscores the urgent need to scrutinize whether top-down policy formulations stifle creativity in contrast to bottom-up structures. Both of these frameworks are prevalent worldwide, and assessing their effect on innovation will yield significant insights

(Caldwell, 2009). Many developing countries are under research on this theme due to their significant educational reforms (World Bank, 2010). Such reforms often involve a transition from centrally-administered to decentralized education administration at different levels (Winokur, 2014). To properly evaluate these changes, our inquiry will also touch on the educational background of these developing countries. This exploration involves understanding why certain countries prefer highly-centralized education systems while others adopt more decentralized models. Furthermore, this raises a relevant question: which system is more conducive to student success, and is there any correlation between the chosen system and the students' creative capacities?

1. Concepts

1.1. Individual innovativeness

Individual innovativeness is defined as "developing, adopting, or implementing an innovation" (Yuan & Woodman, 2010). Rogers (2003) states that "in individual innovativeness theory, there is always new information within the social system and that this new information is processed by adopters". Put simply, innovativeness is the ability to generate and implement new ideas, which is seen as a key driver of economic growth and social development. The question is under what circumstances can this innovation, which encompasses new ideas and knowledge, emerge and serve as a key driver of economic growth and social development?

Hayek (1945) argues that knowledge is decentralized. In his essay "*The Use of Knowledge in Society*" Hayek (1945) discusses the concept of decentralization of knowledge, which refers to the idea that individuals in a society are better equipped to make decisions and solve problems than a centralized authority. This is because individuals have access to unique and local knowledge that a centralized authority may not have, and they can use this knowledge to make decisions that are better suited to their particular circumstances.

Studies indicate that various factors contribute to individual innovativeness, including individual traits, cultural norms, resource availability, and institutional environment (Scott & Vincent-Lancrin, 2014). Current study will focus on a particularly influential aspect – the centralization of decision-making within educational settings which could potentially stifle or foster innovativeness. Analyzing the implications of centralized decision-making on innovativeness can shed light on how best to structure educational institutions to promote individual innovativeness. (Rubalcaba, 2022)

The focus on secondary education, specifically high schools, in this case study is purposeful for multiple reasons. First, high school is the stage where students begin to develop advanced cognitive and creative skills that are instrumental to individual innovativeness. This period of education often includes exposure to a wider range of subjects and more complex problem-solving activities, fostering critical thinking and creativity. Secondly, secondary education is the final compulsory stage of schooling in many countries, including Azerbaijan. Therefore, it represents the educational experiences of most individuals in the population, providing a more generalized perspective on the effects of the education system. Lastly, the centralization of decision-making is particularly salient in secondary education where curriculum, teaching methodologies, and assessment strategies are often dictated by a central authority. Thus, high schools provide an excellent unit of analysis to study the impact of centralized decision-making on individual innovativeness (Hofman et al., 2013).

1.2. Centralization of Decision-Making in Education

One of the well-known principles of the modern administrative system is centralization. Simply, centralization is the concentration of power and authority in one center. According to White (1965, p.41), centralization is "the process of transfer of administrative authority from a lower level to a higher level of government is called centralization".

The concept of decision making is the major element of centralization. It is very important to define who has authority to make decisions in the administrative system. It is the process by which choices are made to change (or leave unchanged) an existing situation and to choose the most appropriate course of action to achieve the desired goal while minimizing risk and uncertainty to the extent possible. (Carvalho, 2013)

In this modern and rapidly changing world, education has evolved beyond the mere imparting of knowledge on specific subjects or skills. The focus now lies on cultivating students' abilities and knowledge to prepare them for success in their future lives (Hendarman & Cantner, 2018). However, with an ever-growing population, providing high-quality education to every individual presents a significant challenge. A crucial issue among these challenges is related to the decision-making process employed in the education system (Caldwell, 2009). The decision-making process within the educational sector can either be centralized or decentralized, depending on who holds power over it. Many centralized countries across the globe, particularly developing countries face centralization-related obstacles throughout its decision-making procedures (Hawkins, 2000). Analyzing this relationship's dynamics provides valuable insights into countries grappling with similar dilemmas concerning educational matters that require critical decisions. It is essential that we delve deep into this matter because centralizing control over pivotal aspects of education may streamline processes but also stifle innovation and creativity emanating from both individual learners as well as educators (Caldwell, 2009).

The standard method for making decisions in education has long been the top-down approach (Moe, 2003). Nevertheless, this style of decision-making has elicited criticism due to its negative impact on creativity and critical thinking within the educational system. Relying exclusively on a top-down approach can limit the progression of a well-rounded education system (Mok, 2004). One crucial component that is often disregarded in top-down decision-making is student involvement. When teachers and administrators neglect the voices and opinions of students, they forfeit important insights into what works best for individual learners (Yilmaz et al., 2014). Ultimately this lack of consideration toward students stifles their creative expression while hindering their capacity to think critically. Moreover, when decisions are made from just one perspective without considering diverse viewpoints or alternative ideas, there remains little space for innovation or experimentation with new methods or techniques. As a result, this restrains not only student creativity but also teacher ingenuity as they may feel restricted by strict guidelines imposed by the administration. To create an effective education system that stimulates growth across all areas - including creativity and critical thinking - educators must embrace more comprehensive approaches to decision-making that value diversity of thought inside classrooms as well as outside them (Amalia et al., 2020).

1.3. (De)centralization and individual innovativeness

The form of decision-making in education has its upsides like better efficiency, consistency, equity of outcomes, streamlined processes and more opportunities for collaboration among stakeholders. However, it also carries potential drawbacks such as reduced flexibility to respond to local needs, loss of local autonomy, increased bureaucracy and an augmented chance for the misuse of power. (Nurakhir, 2021) This research scrutinizes the impact that centralizing decisions can have on two primary areas – improved equity of outcomes and streamlined procedures. However, before delving into these topics we need to grasp how centralization influences internal functioning; whether positively or negatively depending on multiple factors mentioned above. This study contends that while certain aspects may improve through centralization initiatives in the right decision-making structure - such as streamlining procedures or boosting equity - proper planning must take place beforehand if these improvements are going to outweigh any negative externalities caused by them over time such as lost local autonomy (Welsh & McGinn, 1999).

Centralization offers significant benefits, one of them is amplified efficiency that results from having a distinct chain of command. (Bray, 1999) This ensures everyone knows who is in charge of making decisions, which simplifies communication across departments and mitigates the possibility of errors or misunderstandings. Another key advantage to centralization is consistency. All choices are made using the same set of criteria leading to an approach that's more standardized. Notably, collaboration becomes more productive when decision-making power resides in one place since it promotes teamwork among employees with shared objectives. Caldwell argues that centralizing decision-making may enhance efficiency, consistency, and collaboration" (2009). Providing clarity on roles and responsibilities within an organization's hierarchy through centralized-decision-making policies can help people see how their contributions fit into overall objectives while also promoting synergy between teams working towards shared goals. In sum, centralizing decision-making not only leads to better communication but also promotes trust among team stakeholders by ensuring transparency in organizational operations - ultimately resulting in higher-quality work output and greater satisfaction levels among stakeholders.

Organizations may suffer significant drawbacks when decision-making is centralized. One downside is the loss of local autonomy which can lead to decreased creativity and innovation at lower levels. Central decision-making leaves lower-level employees feeling disconnected from their work, resulting in reduced morale and productivity (Nurakhir, 2021). Moreover, centralization restricts flexibility as it neglects regional differences or changes in circumstances that require unique solutions. This rigidity causes suboptimal outcomes when enforcing universal policies across varying geographical regions or situations. Ultimately, there's a risk of power misuse by those who possess decision-making authority; centralizing power offers little oversight on how decisions are executed at lower levels where actual implementation takes place. Given these negative consequences for organizational performance and dynamics, leaders must explore alternatives that balance centralized directives with devolved responsibilities concerning planning, budgeting, and staffing among others depending on specific organizational needs (Bray, 1999).

The centralization of decision-making could lead to streamlined procedures while improving the equity of outcomes. This is because when decisions are made by a centralized

body, they're consistent across the organization, creating uniformity in rules and regulations for everyone. However, on the other hand, such an unvarying organizational structure could stifle innovation at lower levels of management. To support this assertion further, Caldwell (2009) defended that centralized decision-making can be essential for some functions that require tight control or coordination, but it also may restrict employees' discretion. Thus while there may be advantages to centralizing decision-making in specific situations, weighing them against likely downsides becomes mandatory. Let us consider an illustration where a retail chain decides to hoard its purchasing decisions for all stores nationwide. While this would result in more consistent pricing and inventory levels across locations - thereby improving equity of results - it could as well hinder each store's ability to cater quickly enough to local customer needs or preferences, which ultimately reduces overall efficiency. Therefore, organizations must critically evaluate potential benefits before implementing any centralized decision-making structure. In conclusion, evaluating the impact of centralizing decision-making requires carefully weighing out pros against cons since rushing into such structures without giving due consideration might end up curtailing employee discretion even though doing such might be essential for achieving strict controls over corporate operations, as highlighted by Caldwell (2009).

To draw to a close, the form of structure in education may offer numerous advantages and disadvantages. It's crucial to weigh both sides before deciding whether or not your organization should adopt centralization policies. Evaluate how much autonomy you're willing to sacrifice when considering the impact on streamlining processes and improving equity of outcomes. Ultimately institutions need to make sure any decisions made relating to centralization align with their mission and values because there are bound to be tradeoffs involved during this process. Careful consideration will allow institutions more effective methods that result in better overall effectiveness levels within their organizations.

Literature review indicates that centralization in decision-making processes plays a crucial role in shaping individual innovativeness within the educational sphere, with both direct and indirect factors contributing to its impact. Direct factors (Table 1), such as curriculum development, teacher training, assessment and evaluation, may have a more immediate influence on the design and delivery of educational content, thereby directly affecting the innovative capabilities of students (Stevenson & Baker, 1991).

Table 1. Centralization vs individual innovativeness

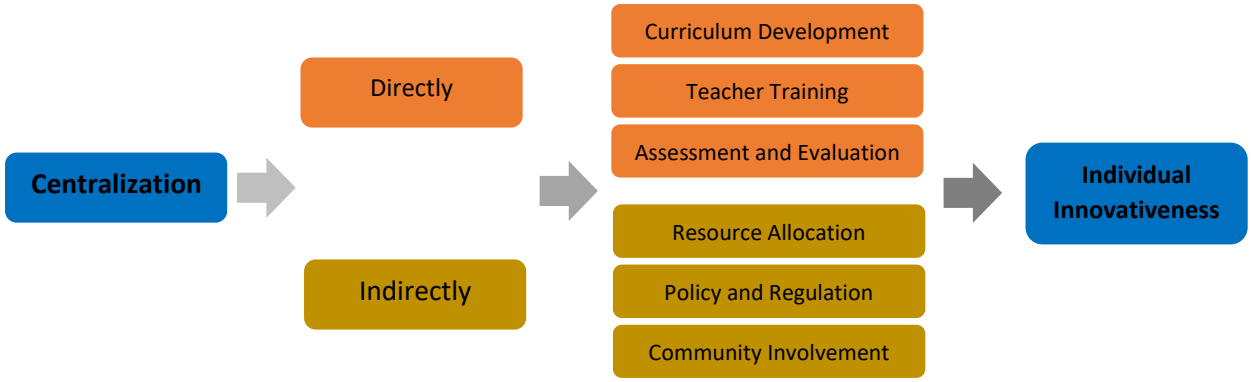
Form of centralization	Description	Effect on individual innovativeness
Direct effects		
Centralization of Curriculum Development	A centralized curriculum means that decisions about what is taught are made by a single authority, usually the government or a national organization.	This may limit teachers' and students' ability to adapt and innovate based on local needs or unique situations, as they are required to follow a standardized curriculum.
Centralization of teacher training	Teacher training is directed by a central authority, with uniform standards and methods applied to all teachers in the system.	With standardized training methods, teachers may have limited exposure to diverse teaching styles or innovative practices,

		reducing their potential for innovation in the classroom.
Centralization of Assessment and Evaluation	A centralized authority designs and implements standardized assessments and evaluations for teachers and students, which may include testing, grading, and performance reviews.	This may discourage individual innovativeness, as teachers and students might focus on meeting standardized criteria rather than exploring new and creative ways of learning and teaching.
Indirect effects		
Centralization of resource allocation	A centralized authority determines how resources, such as funding, materials, and personnel, are allocated to schools and districts.	Centralized resource allocation may limit the flexibility for individual schools and teachers to pursue innovative projects or ideas, as they must rely on the centralized authority for resources.
Centralization of policy and regulation	Centralized policies and regulations are established by a single authority that all schools and districts must adhere to.	Strict adherence to centralized policies and regulations may hinder innovation by discouraging experimentation and the development of localized solutions to unique challenges.
Centralization of parents and community involvement	A central authority oversees and directs the extent and nature of parents' and community members' involvement in schools.	By limiting the autonomy of local communities and parents, this centralization can hinder the exchange of diverse ideas and grassroots innovation that could otherwise benefit schools and students.

Source: Author's own completion.

In contrast, indirect factors (Table 1), including resource allocation, policy and regulation, as well as parents and community involvement, may not have an immediate bearing on individual innovativeness but still hold a significant effect on the overall educational environment, indirectly on individual innovativeness (Ragmoun & Alfalih, 2021). A full understanding of this process is essential to fostering a more innovative and adaptable educational landscape, which can, in turn, enable dynamic teaching and learning experiences for all involved (Model 1).

Figure 1. (De)centralization and individual innovativeness



Source: Author's own creation

2. Literature Review

How (de)centralization in education affects individual innovativeness

Innovation in education systems cannot always be achieved through centralized decision-making. Instead, as Amalia et al. (2020) point out, this style of leadership structure may pose a significant obstacle to those who seek to innovate and expand their horizons within their respective fields. The rigidity inherent in centralized decision-making limits opportunities for experimentation or exploration by creative thinkers seeking fresh solutions to complex problems. Decentralized approaches offer a more effective framework for fostering innovation among educators. By empowering teachers with autonomy and agency over curriculum development and implementation, administrators encourage them to experiment with new methodologies that can enhance student outcomes while remaining true to their areas of expertise. In essence, educational leaders must recognize the crucial importance of cultivating an environment where creativity flourishes without fear of retribution from central authority figures. Only then will teachers and students alike have greater opportunities for learning while pushing our education system forward toward greater effectiveness and success as a whole.

In today's world, education systems are trending toward decentralization. The reason for this shift is rooted in the belief that it can lead to better educational outcomes and promote innovation at an individual level. That’s why many developed countries have joined this trend by implementing various policies aimed at granting schools more autonomy in their decision-making processes (Payne, 2008). Research indicates that such decentralization can indeed have a positive impact on innovativeness levels among individuals. A study conducted by Pollock (2008) found that decentralized school management positively influences teachers' innovative behavior. This discovery should not come as a surprise since people tend to take ownership of their responsibilities when given more authority over their work environment, making them more likely to experiment with new ideas.

However, some experts caution against embracing this change too quickly without weighing its consequences fully. Critics argue that there may be downsides to education system decentralization, too - such as disparities between regions or schools within countries- which could harm students' learning outcomes overall (Fiske, 1996). Therefore, policymakers must be careful not to tip the scale too far in either direction when considering these changes. They need to balance centralized power enough so all students receive a quality education while still providing decentralized autonomy for schools where experimentation might be beneficial. The research concludes that educational decentralization promotes innovativeness amongst teachers and individuals alike; however, policymakers must consider all implications before implementing any significant changes because they can have both positive and negative effects on society as a whole if not done correctly (Brown & McIntyre, 1981).

Additionally, studies such as Winokur (2014) indicate that centralization of decision-making in education can have a positive impact on individual innovativeness if they consider innovativeness as an important element in the curriculum, but it is not the sole determinant. Other factors, such as adequate resources and support for teachers, also play a crucial role in fostering innovation in the education sector. If the necessary conditions are met, centralization of decision-making in the education system may enhance individual innovativeness among

students (Winokur, 2014). However, more research is needed to understand the underlying mechanisms and the potential limitations of this approach.

3. Data and research methodology

3.1. Research question and hypothesis

The main aim of this study is to investigate the relationship between the centralization of decision-making in the education system and the level of individual innovativeness, with a specific focus on Azerbaijan. This research has the potential to contribute to our understanding of how educational systems can foster or hinder individual innovativeness. By examining the case of Azerbaijan, this research can provide insights into how centralized decision-making in education affects individual innovativeness in a specific context (Guliyev, 2016). The findings of this research have implications for educational policy and practice, as well as for our understanding of the relationship between educational systems and individual innovativeness more broadly.

The main research question of the study is as follows:

How does the centralization of decision-making in secondary education affect the level of individual innovativeness?

In the study, I hypothesize that:

H: Individuals who have received education in a system with centralized decision-making will have lower levels of innovativeness compared to those who have received education in a system with more decentralized decision-making.

Through this study, I hope to contribute to the ongoing debate on the role of education in fostering individual innovativeness. By providing empirical evidence on the relationship between the centralization of decision-making in education and individual innovativeness, this research can inform discussions on how educational systems can best support the development of innovative individuals (Goldsmith & Foxall, 2003). Ultimately, this research aims to provide insights that can help improve educational systems and support the development of innovative individuals. Briefly, this study has two main ambitions. The first is to test the proposed hypothesis, while the second is to generate new hypotheses that can guide subsequent exploration of this topic.

3.2. Case selection

The unit of analysis in the case is high schools (public and private) in terms of individual innovativeness. The population of the case mainly covers Azerbaijan, but also this case can be applied as an example for former SOVIET member countries and other developing countries in which similar situation are experienced. The case to explain the effectiveness of centralization of decision-making in education system is Azerbaijan as a developing country. If we consider that it has gained its independence since 1991 and had a transition period from the SOVIET management system to the education system, it will be useful to investigate the centralization of decision-making in the education system and its effectiveness in terms of individual innovativeness in Azerbaijan during its independence (1991-2022).

The other factor which makes this case unique is Baku, the capital city of Azerbaijan remains the only capital city in the Council of Europe area with no directly elected governance (’’Council of Europe”, 2021). Baku is not the only city in Azerbaijan that experiences this, but

also other big cities of Azerbaijan remain the same. In Azerbaijan, only small areas like villages and settlements have municipalities and directly elected officials but they have no competences to intervene any issue of local education. This also demonstrates that there is no possibility for decision-making in education at local government level. There is a centralized education system in this case which makes it specific enough to be investigated.

In terms of innovation, Azerbaijan holds the 93rd position among the 132 economies featured in the Global Innovation Index (GII) 2022, reflecting a need for improvement in fostering a culture of innovation within the nation. Interestingly, the country performs better in innovation inputs (79th) than innovation outputs (110th), although both rankings have seen a decline since 2021 and 2020. This disparity suggests that while resources and infrastructures for innovation are present, the country is facing challenges in translating these inputs into tangible results. As Azerbaijan seeks to strengthen its position in the GII, it becomes essential to harness individual innovativeness and inspire a national mindset that encourages creativity and risk-taking to boost the translation of innovation inputs into successful outputs (Table 2).

Table 2. World Intellectual Property Organization, 2022

Rankings for Azerbaijan (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	82	76	86
2021	80	74	91
2022	93	79	110

The focus on secondary education, specifically high schools, in this case study is purposeful for multiple reasons. First, high school is the stage where students begin to develop advanced cognitive and creative skills that are instrumental to individual innovativeness. This period of education often includes exposure to a wider range of subjects and more complex problem-solving activities, fostering critical thinking and creativity. Secondly, secondary education is the final compulsory stage of schooling in many countries, including Azerbaijan. Therefore, it represents the educational experiences of most individuals in the population, providing a more generalized perspective on the effects of the education system. Lastly, the centralization of decision-making is particularly salient in secondary education where curriculum, teaching methodologies, and assessment strategies are often dictated by a central authority. Thus, high schools provide an excellent unit of analysis to study the impact of centralized decision-making on individual innovativeness.

Regardless of the result, whether centralization of decision-making in the education system negatively affects individual innovativeness or not, it is worth investigating the case of high schools in Azerbaijan. Briefly, the case will help us to observe a proper example of a highly centralized system looking to improve its contribution to innovativeness.

3.3. Data collection and variables

This data is the result of a survey on innovativeness and entrepreneurship potential among high school students in Azerbaijan (Gasimov et al., 2021). It is an unpublished dataset that is being used as secondary data. Dataset includes high school students selected from private and public schools. Gasimov et al. (2021) have been cautious while choosing public schools to

maintain public-private balance in quality of staff and target audience. Such homogeneity is required to reveal actual difference due to (de)centralization.

Individual Innovativeness Index (***III***) is a scale developed by Hurt, Joseph and Cook (1977) to evaluate how innovative people generally are.The original model of the scale contains 20 statements (Annex 1) that describe the features of people in five different classes, from highly innovative to very traditional. Each statement related to individual innovativeness was initially scored using a 7-point Likert scale, from "Strongly Disagree" to "Strongly Agree". The final version of the scale uses a 5-point Likert scale. There are 12 positive (1, 2, 3, 5, 8, 9, 11, 12, 14, 16, 18, 19) statements and 8 negative (4, 6, 7, 10, 13, 15, 17, 20) statements in the scale. The innovativeness score is determined by adding 42 points to the difference between the total positive and negative scores. The lowest possible score is 14, and the highest is 94. It is calculated as follows:

1. Calculate sum of numbers for positions 4, 6, 7, 10, 13, 15, 17, and 20.
2. Calculate sum of numbers for positions 1, 2, 3, 5, 8, 9, 11, 12, 14, 16, 18, and 19.
3. Use the following formula to find II:

II = 42 + total sum from stage 2 - total sum from stage 1

Individuals can be classified according to their innovativeness on the basis of their scores. They can be considered as "Innovators" if their II score is above 80, "Early Adopters" if the II score is between 69 and 80, "Early Majority" if the II score is between 57 and 68, "Late Majority" if the II score is between 46 and 56, and "Laggards/Traditionalists" if the II score is below 46. These scores can also be used to provide an overall evaluation of a person's level of innovativeness. In general, individuals who score above 68 are considered as highly innovative, whereas those who score below 64 are considered as low in innovativeness. (Hurt, Joseph & Cook, 1977)

Table 3. Summary of data

Variable name	Abbreviation	Meaning	Measure	Source
Individual Innovativeness (II) Index	Score_All	It is a scale to evaluate how innovative people (students) generally are.	Continuous	Own calculation
II Index of public school students	ScoreC	It represents the II index of students from centralized public schools.	Continuous	Own calculation
II Index of private school students	ScoreD	It represents the II index of students from decentralized private schools.	Continuous	Own calculation
Type of schools (public or private)	School_Type	It represents the type of schools either it is public or private.	Nominal	Survey
All schools (public and private)	School_ALL	It represents both centralized public schools and decentralized private schools.	Nominal	Survey
Public schools	SchoolC	It represents centralized public schools.	Nominal	Survey
Private schools	SchoolD	It represents decentralized private schools.	Nominal	Survey
Gender	Gender_All	It represents the gender of students from both public and private schools.	Nominal	Survey
Family income	Income_All	It represents the family income of students from both public and private schools.	Ordinal	Survey
Family business	Business_All	It represents whether families of students have a business or not.	Nominal	Survey

3.4. Data analysis

In the process of data analysis, quantitative methods were employed to assess the research outcomes.

a) One-way Analysis of Variance (ANOVA)

ANOVA was utilized to assess the variations between and within different school groups. The dependent variables "ScoreC" and "ScoreD" denoting centralized public schools and decentralized private schools respectively were investigated. The results of the ANOVA test displayed key statistics such as the sum of squares, degrees of freedom (df), mean square, F-value, and significance (Sig.). The F-value, a statistic used to interpret the significance of the group differences, and the significance value, which shows the statistical validity of these differences, were particularly instrumental in the analysis.

There are the mean differences between different pairs of schools using a Tukey HSD post-hoc test. This test is useful in comparing all possible pairs of means to understand significant differences between group means after conducting an ANOVA. These tables present statistics such as mean differences, standard error, significance, and 95% confidence intervals for each pair of schools, which were analyzed to understand the relative performance of the schools.

By observing these quantitative measures, the significance level of the results, and comparing this with the conventional threshold of 0.05, an understanding of the statistical significance of the differences between the school groups was derived. This led to the conclusion that while most schools performed at similar levels, certain significant outliers existed that require more focused examination.

b) Multiple regression

Multiple regression is a statistical method used to analyze the connection between one dependent variable and several independent variables. In this case, this method was used to predict an outcome (innovativeness score of students) based on various predictor variables (such as family business, gender, type of school, and family income). It creates a model to estimate how these variables collectively influence the dependent variable. The method includes assessing the strength of the relationship, measuring how much variability in the outcome can be explained by the predictors, adjusting for the number of predictors, checking the model's overall significance, examining the contribution of each predictor individually, evaluating model assumptions, and diagnosing issues such as multicollinearity (high correlation among predictors). It's a comprehensive process aimed at accurately forecasting the outcome variable using the selected predictors.

4. Results

The Republic of Azerbaijan sees education as a strategic priority and the Constitution guarantees the right of all citizens to education. The state plays a significant role in controlling the education system, setting minimum educational standards, and providing free compulsory secondary education. All decision-making processes for secondary education take place at the central level mainly by the Ministry of Education in Azerbaijan. This body is responsible for setting educational standards and curriculum, managing teacher training, and regulating the establishment and operations of schools. This centralized system allows for a unified

educational framework across the country but may also present challenges, such as potential lack of local autonomy and flexibility. An example of central decision-making is the government's strategy to realign the country's education system with global standards by improving the quality of skilled workers and providing equal opportunity in education at all levels. As part of the country's National Development Strategy 2020, the government's strategy is to extend primary and secondary education to 12 years, making attendance obligatory for students up to the age of 16. The central government's decision-making and policy-making in secondary education highlights the centralization of the education system in Azerbaijan (Asian Development Bank, 2015).

4.1. Descriptive statistics of variables

In the year 2021, an online survey was conducted with the participation of 335 respondents who were all high school students from the capital city of Baku (Gasimov et al., 2021). Those students were studying in the 10th and 11th grades from both public and private schools. However, the distribution of students was somewhat skewed from these schools, with 252 students, or 75.2% of the total, attending public schools, while the remaining 83 students, representing 24.8% of the total, came from private schools (See Table 4).

Table 4. School_Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	public	252	75.2	75.2	75.2
	private	83	24.8	24.8	100.0
	Total	335	100.0	100.0	

Source: Author's own completion

The gender distribution of the respondents is nearly balanced, 183 of the participants, accounting for 54.6% of the total, are males, while females make up the remaining 152 participants, or 45.4% of the total (See Table 5).

Table 5. Gender_All

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	183	54.6	54.6	54.6
	female	152	45.4	45.4	100.0
	Total	335	100.0	100.0	

Source: Author's own completion

Table 6 provides a distribution of income levels of families of 335 students. The largest proportion, 36.1%, earn between 0 to 500, while 15.8% earn from 501 to 1000. The next income bracket, 1001 to 2000, constitutes 20.3% of the population. Those earning between 2001 to 3000 make up 13.7% of the total, followed by 7.2% earning 3001 to 5000. The smallest group

is individuals earning over 5000, representing 6.9% of the population. The cumulative percentage column reflects the growing total proportion as each income group is sequentially added, reaching 100% by the final group.

Table 6. Income_All

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-500	121	36.1	36.1	36.1
	501-1000	53	15.8	15.8	51.9
	1001-2000	68	20.3	20.3	72.2
	2001-3000	46	13.7	13.7	86.0
	3001-5000	24	7.2	7.2	93.1
	5000+	23	6.9	6.9	100.0
	Total	335	100.0	100.0	

Source: Author's own completion

Table 7 shows the distribution of "Business_All" which represents whether students' families possess their own business or not. Out of a total of 335 students, 119, or 35.5% responded with "Yes", while 216, which is 64.5% of the respondents, answered "No".

Table 7. Business_All

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	119	35.5	35.5	35.5
	No	216	64.5	64.5	100.0
	Total	335	100.0	100.0	

Source: Author's own completion

4.2. Comparative statistics of public or private schools

Table 8 provides insights into the key differences between public and private schools. In terms of gender demographics, public schools appear to have a higher proportion of female students compared to private schools. It's also noteworthy that a larger percentage of students attending private schools come from families owning a business and those with higher income brackets. Additionally, both school types exhibit some differences in the II index, but they are relatively close in their mean, median, and standard deviation values.

Table 8. Comparative statistics of public or private schools

	Public	**Private**
No. of observations	252	83
Females (%)	48.8	34.9

Family business (%)	25.4	66.3
Family income (%) (low [0-500 AZN], high [2000+ AZN])	45.6; 16.7	7.2; 61.5
II Index (mean, median, Std. dev, [min-max])	67.57; 68; 9.001 [37-90]	65.06; 65; 8.45 [38-85]

Source: Author's own completion

4.3. ANOVA

The analysis (See Table 9) displays the results of the ANOVA test conducted on the dependent variable, ScoreC, which represents centralized public schools. The test is used to examine the differences between group means and their associated procedures. It is organized into three sections: between groups, within groups, and total. The 'Between Groups' section represents the variance between different groups, while the 'Within Groups' section represents the variance within each group. The 'Total' section represents the sum of these variances.

H0: There is no significant difference between and within public schools.

H1: There is a significant difference between and within public schools.

Based on the table, the variability in the 'ScoreC' variable is not significantly explained by the group variable, as the p-value (.117) is greater than the commonly used significance level of .05. This suggests that the means across the different groups are not significantly different from each other. The F-value is 1.865, but due to the high p-value, the null hypothesis of equal group means is accepted.

Table 9. Public Schools' Group Means (ANOVA)

ScoreC

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	596.089	4	149.022	1.865	.117
Within Groups	19737.625	247	79.909		
Total	20333.714	251			

Source: Author's own completion

Table 10 shows the results of the Tukey HSD post-hoc test for the dependent variable "ScoreC", which represents centralized public schools, across five different schools (SchoolC 1-5). It indicates that none of the mean differences between the schools' scores reached statistical significance, as indicated by the Significance (Sig.) values all exceeding the typical threshold of 0.05. For example, the mean score difference between School 1 and School 2 is -2.295 with a Sig. of .716, showing no significant difference. This pattern is consistent across all school comparisons. Consequently, the conclusion from this data is that there are no statistically significant differences in ScoreC between the five schools based on this analysis.

Table 10. Public Schools' Multiple Comparisons

Dependent Variable: ScoreC

Tukey HSD

(I) SchoolC	(J) SchoolC	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
1	2	-2.295	1.822	.716	-7.30	2.71
	3	2.085	1.527	.650	-2.11	6.28
	4	2.089	1.518	.643	-2.08	6.26
	5	2.580	2.412	.822	-4.05	9.21
2	1	2.295	1.822	.716	-2.71	7.30
	3	4.380	2.001	.187	-1.12	9.88
	4	4.384	1.994	.184	-1.10	9.86
	5	4.875	2.737	.387	-2.65	12.40
3	1	-2.085	1.527	.650	-6.28	2.11
	2	-4.380	2.001	.187	-9.88	1.12
	4	.005	1.728	1.000	-4.75	4.75
	5	.495	2.550	1.000	-6.51	7.50
4	1	-2.089	1.518	.643	-6.26	2.08
	2	-4.384	1.994	.184	-9.86	1.10
	3	-.005	1.728	1.000	-4.75	4.75
	5	.491	2.544	1.000	-6.50	7.48
5	1	-2.580	2.412	.822	-9.21	4.05
	2	-4.875	2.737	.387	-12.40	2.65
	3	-.495	2.550	1.000	-7.50	6.51
	4	-.491	2.544	1.000	-7.48	6.50

Source: Author's own completion

Table 11 presents the results of an ANOVA (analysis of variance) test conducted on the dependent variable, ScoreD which represents decentralized private schools.

H0: There is no significant difference between and within private schools.

H1: There is a significant difference between and within private schools.

The test shows the difference between the groups is statistically significant. The sum of squares between groups is 1159.478, resulting in a mean square of 165.640, while the within groups sum of squares is 4695.221, with a mean square of 62.603. The F statistic is 2.646, and the significance level (p-value) is .017. Because the p-value is less than .05, the null hypothesis is rejected, meaning the differences between the groups are not due to chance, and there are significant differences in scores between the groups.

Table 11. Private Schools' Group Means

ScoreD

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1159.478	7	165.640	2.646	.017
Within Groups	4695.221	75	62.603		
Total	5854.699	82			

Source: Author's own completion

The Table 18 shows the results of the Tukey HSD post-hoc test conducted on the dependent variable, ScoreD, to analyze the mean differences between various public schools (SchoolD). The majority of pairwise comparisons showed non-significant differences, with p-values above 0.05. However, one comparison stood out with a statistically significant

difference: School 6 had a higher ScoreD compared to School 3 (mean difference = 14.247, p = .009). This suggests that students at School 6 scored significantly higher than students at School 3. All other comparisons did not reveal significant differences in scores across the schools (See Annex 3).

Table 12 displays the results of the ANOVA test conducted on the dependent variable, ScoreALL which represents both public and private schools.

H0: There is no significant difference between and within schools (both public and private).

H1: There is a significant difference between and within schools (both public and private).

The test shows that the observed F-value is 5.006 with a significance level (p-value) of .026. This means there is a statistically significant difference between the groups being compared, as the p-value is less than the common threshold of 0.05. Thus, the alternative hypothesis (H1) is accepted which means there is a difference between groups. The high between-groups sum of squares relative to the within-groups sum of squares further supports this conclusion. Briefly, we can see a significant difference between schools.

Table 12. All schools' group means

ScoreALL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	393.724	1	393.724	5.006	.026
Within Groups	26188.413	333	78.644		
Total	26582.137	334			

Source: Author's own completion

4.4. Multiple regression

Table 13 is a summary output of a multiple regression analysis, where the dependent variable 'Score_All' represents the individual innovativeness score of students and independent variables 'Business_All', 'Gender_All', 'School_Type', and 'Income_All' represent accordingly family business, gender, type of the school and family income of students. The model provides a weak fit for the data. The multiple correlation coefficient (R) is low at .146, suggesting a weak correlation between the predicted and observed values of the dependent variable 'Score_All'. The coefficient of determination (R Square) is .021, indicating that a mere 2.1% of the variability in 'Score_All' can be explained by the independent variables 'Business_All', 'Gender_All', 'School_Type', and 'Income_All'. The adjusted R Square further reduces to .009, pointing towards the potential presence of irrelevant predictors in the model. The standard error of the estimate stands at 8.879, which measures the variability of the predictions, and appears high. On a positive note, the Durbin-Watson statistic is 1.888, showing no significant autocorrelation in the model, a desirable attribute. However, the overall model's lack of statistical significance is evidenced by the Sig. F Change value of .129, which exceeds typical significance levels such as .05. Hence, based on these results, the model in its current form seems insufficient to accurately predict 'Score_All' using the chosen independent variables.

Table 13. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.146[a]	.021	.009	8.879	.021	1.796	4	330	.129	1.888

a. Predictors: (Constant), Business_All, Gender_All, School_Type, Income_All

b. Dependent Variable: Score_All

Source: Author's own completion

Table 14 represents an Analysis of Variance (ANOVA) for a multiple linear regression model which shows that the set of predictors - 'Business_All', 'Gender_All', 'School_Type', and 'Income_All' - may not significantly predict the dependent variable 'Score_All'. The sum of squares for regression, which measures the variation explained by the model, is 566.421, while the residual sum of squares, indicating the variation is quite high at 26015.717. The F statistic, a measure used to determine if the model significantly explains more variance than residuals, is 1.796. However, the p-value, which estimates the likelihood that the observed data could have occurred if there were no relationship between the predictors and dependent variable, is 0.129. This value is greater than the commonly used threshold of 0.05, indicating that we cannot reject the null hypothesis at this significance level. In other words, this set of predictors may not significantly predict the 'Score_All' based on these results.

Table 14. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	566.421	4	141.605	1.796	.129[b]
	Residual	26015.717	330	78.836		
	Total	26582.137	334			

a. Dependent Variable: Score_All

b. Predictors: (Constant), Business_All, Gender_All, School_Type, Income_All

Source: Author's own completion

Table 15 presents the results from a multiple regression analysis, focusing on the variable Score_All as the outcome. The Unstandardized Coefficients section provides the change in Score_All for each unit increase in the predictor variables. However, none of these predictor variables - School_Type, Gender_All, Income_All, and Business_All - showed a significant association with Score_All, as indicated by p-values greater than 0.05 in the Sig. column. These p-values reflect the probability that the observed relationships could have occurred by chance. The t-values in the table, calculated as the ratio of departure of an estimated parameter from its notional value to its standard deviation, were used to derive these p-values. Comparatively, the Standardized Coefficients (Beta) show the relative importance of each predictor when the variances of dependent and independent variables are standardized to 1. Lastly, the Collinearity Statistics (Tolerance and VIF) suggest that there is no significant issue

of multicollinearity among the predictor variables, meaning they are not highly correlated with each other. This is further confirmed by the fact that all VIF values are below 5, which means there is no serious issue of multicollinearity.

Table 15. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	72.880	3.514		20.743	.000		
	School_Type	-2.172	1.301	-.105	-1.669	.096	.746	1.341
	Gender_All	.266	.988	.015	.269	.788	.973	1.028
	Income_All	-.495	.394	-.088	-1.256	.210	.608	1.644
	Business_All	-1.409	1.215	-.076	-1.159	.247	.695	1.438

a. Dependent Variable: Score_All

Source: Author's own completion

The collinearity diagnostic table (Table 16) presented represents a test of multicollinearity, which is the statistical phenomenon where predictor variables in a model are highly correlated. The table shows that the model contains five predictors: School_Type, Gender_All, Income_All, and Business_All, all used to predict the dependent variable Score_All. The condition index is greater than 5 for dimensions 2, 3, 4, and 5, which may indicate potential issues with multicollinearity. More specifically, the predictor "Business_All" shows high variance proportions on the 5th dimension with a condition index of 17.819, signifying it might be the source of high multicollinearity in the model. This could impact the reliability of the model, as it suggests that Business_All might be linearly predictable from the other predictors, thus potentially inflating the variance of its estimated regression coefficient.

Table 16. Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	School_Type	Gender_All	Income_All	Business_All
1	1	4.522	1.000	.00	.00	.00	.01	.00
	2	.305	3.852	.00	.01	.04	.32	.04
	3	.090	7.091	.00	.12	.72	.04	.11
	4	.069	8.098	.00	.66	.05	.45	.16
	5	.014	17.819	.99	.20	.19	.18	.68

a. Dependent Variable: Score_All

Source: Author's own completion

Table 17 represents residuals and predicted values for a model with a dependent variable "Score_All". With a sample size (N) of 335, the predicted value ranges between 63.01 and 69.34 with a mean of 66.95 and a standard deviation of 1.302. The residual values vary

between -29.928 and 22.072 with a mean of 0 and a standard deviation of 8.826. The standardized predicted values and residuals exhibit similar characteristics; they both center around 0 with standard deviations close to 1. These data suggest a reasonably well-fitted model with some outliers.

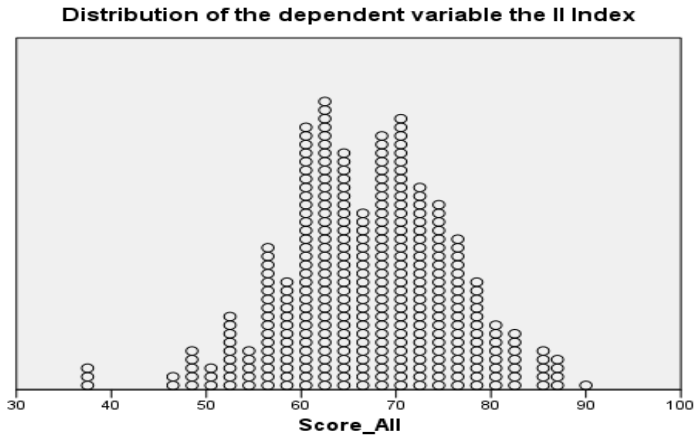
Table 17. Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	63.01	69.34	66.95	1.302	335
Residual	-29.928	22.072	.000	8.826	335
Std. Predicted Value	-3.022	1.833	.000	1.000	335
Std. Residual	-3.371	2.486	.000	.994	335

a. Dependent Variable: Score_All

Source: Author's own completion

From the plot for the distribution of the dependent variable "Score_All" which represents the II index (See Graph 1), it seems it is fairly close to normal distribution which can allow to continue with a simple OLS regression.



The simple OLS (Ordinary Least Squares regression) model can be as follows in this case:

Score_All = β0 + β1*Business_All* + *β2*Gender_All + β3*School_Type* + *β4*Income_All + ε

Where:

- Score_All is the dependent variable.
- Business_All, Gender_All, School_Type, and Income_All are the independent variables.
- β0 is the y-intercept (the value of Score_All when all independent variables are 0).
- β1, β2, β3, and β4 are the coefficients of the independent variables, which represent the expected change in the dependent variable for a one-unit change in the corresponding independent variable, holding all other independent variables constant.
- ε represents the error term (residuals), which captures the variation in Score_All not explained by the independent variables.

To summarize, the analysis indicates that the residuals of the regression model are quite normally distributed. This is a positive outcome as it suggests that the model adequately captures the underlying patterns in the data. Additionally, the absence of high VIF scores indicates that multicollinearity is not a significant issue, which strengthens the reliability of the results.

The p-value of 0.129 for the overall model suggests that the model's explanatory power is not considered statistically significant. This means that the model doesn't explain the amount of the variance in the dependent variable, individual innovativeness, but it cannot be considered statistically significant at the conventional significance level (e.g., $p < 0.05$).

One possible explanation for the lack of significant results could be the small sample size of 335. With a small sample, the statistical power to detect significant effects may be limited. Therefore, caution should be exercised when interpreting the overall significance of the model.

Moving on to the independent variable 'School_Type,' its p-value is just below 10%, which indicates that there may be a marginally significant relationship between school type and individual innovativeness. Although it does not meet the conventional threshold for significance, this result suggests that the type of school attended by students might have some influence on their level of innovativeness.

Furthermore, the negative beta parameter associated with the 'School_Type' variable indicates that there is a negative relationship between school type and individual innovativeness, which contradicts the initial hypothesis. This finding suggests that students attending a certain type of school (as represented by the 'School_Type' variable) may exhibit lower levels of innovativeness compared to other types of schools.

In essence, the multiple regression analysis shows that the overall model explains a moderate amount of variance in individual innovativeness but is not statistically significant. This lack of significance may have different reasons; it may occur because more variables would explain more of the dependent's variance or the small sample size of 335 may not be sufficient to predict the dependent variable.

5. Discussion

The development and success of individuals are inextricably linked to education. But, as educational systems become increasingly centralized, questions arise about their impact on creativity and problem-solving skills (Tether et al., 2005). Centralized decision-making is a top-down approach where higher authorities make decisions instead of grassroots-level participation. This type of decision-making can have lasting impacts on how people perceive the challenges they face in their lives. Research conducted by Topsakal et al. (2022) shows that people prefer autonomy when it comes to seeking new information or taking risks for greater creativity. When decision-making processes are centralized, this ability may be limited, leading to rigid thinking patterns which stifle innovation. Moreover, homogenization across different regions or countries could result from centralized decision-making in education settings. This would mean students receive similar educational experiences irrespective of their background or location - hindering diversity and cross-pollination of ideas among learners. Policymakers should seek the balance between centralization and decentralization for consistency while preserving unique learning environments where diverse ideas breed excellence among all levels

of society regardless of jurisdictional differences. (Hanson, 1998) In essence, understanding the effects centralized decision-making has on human development requires an investigation into its influence on individual creativity and problem-solving abilities. Policymakers should create balanced policies that cater towards consistency whilst nurturing unique learning environments for fostering creative expression amongst learners at all levels within varied contexts without impeding upon academic standards.

The literature review demonstrated a correlation linking the centralization of decision-making in education to individual innovativeness. Exploring the effects of centralized decision-making on student creativity and problem-solving skills has considerable consequences for policymakers, educators, parents, and other stakeholders involved in creating educational policies. It indicates that delegating control over decisions is beneficial since it can lead to greater inventiveness and imagination as well as improved problem-solving abilities among pupils (Brown & McIntyre, 1981). Moreover, this highlights the requirement for future studies to understand how different forms of decentralization impact student results across varied cultural contexts. More investigation needs to be conducted so we may better understand how choices are made within schools and their effects on academic achievements. To sum up - whilst there may be some upsides when it comes down to uniformity or standardization practices within regions or areas, some studies indicate its negative influence on children's creative reserves must not be disregarded either. Therefore, it is vital educators find effective ways they can create safe spaces for kids where innovative ideas are encouraged without restraint - something which could potentially stimulate greater levels of innovative thinking with time (Amalia et al., 2020).

Whereas the results of this study did not show a significant difference in individual innovativeness between public (centralized) and private (decentralized) schools, and the outcome of the multiple regression which analyzed the innovative innovativeness by considering several independent variables including the type of school, gender, family income, and family business, cannot be considered statistically significant, the study can be considered useful for further investigation.

One possible explanation for the lack of a significant difference between public and private schools is that despite the differences in governance, there might be different factors such as student selection, family income, etc, leading to similar outcomes in terms of individual innovativeness. (Yilmaz et al., 2014) It is also possible that the measures of innovativeness used in the study were not sufficiently sensitive or comprehensive to capture the other factors affecting individual innovativeness.

Even if the study's findings do not provide definitive evidence for the hypothesis, they do contribute to a broader understanding of the complex interplay between centralization, decentralization, and individual innovativeness in education. Future research might benefit from a more in-depth investigation of the specific factors that influence individual innovativeness in different educational contexts, as well as the potential mediating or moderating variables that could be impacting the relationship between centralization and individual innovativeness. For instance, researchers could explore how the degree of autonomy granted to teachers and school administrators, the flexibility of curricula, and the availability

of resources for experimentation and creativity vary across different systems, and how these factors might interact with centralized or decentralized decision-making structures.

Additionally, longitudinal and cross-national comparative studies could be conducted to examine the long-term effects of centralization or decentralization on individual innovativeness, as well as to explore the generalizability of the findings to other countries and contexts. Such research could provide further insight into the potential benefits and drawbacks of different governance models in education, helping policymakers and practitioners make more informed decisions regarding the design and implementation of education systems that best foster innovation and creativity.

In light of the findings from this study, it is clear that the relationship between centralization of decision-making in education and individual innovativeness is not straightforward, and that further research is needed to fully understand the complex dynamics at play. However, the expert opinions gathered in this research suggest that decentralized systems may hold promise for fostering greater individual innovativeness, by allowing for more flexible, adaptive, and context-specific educational experiences. As the world continues to evolve and the need for innovative, adaptable individuals grows ever more critical, it is essential for education systems to adapt and evolve as well, fostering the skills and mindsets needed to thrive in a rapidly changing global landscape. This research contributes to the ongoing conversation around the best ways to achieve that goal, highlighting the importance of considering the impact of governance structures on the development of individual innovativeness within education systems.

6. Limitations

The present study is subject to a number of limitations that should be considered when interpreting the findings. These limitations pertain to the data sources, sample size, and generalizability of the results. The subsequent paragraphs detail these limitations and their potential impact on the study.

Firstly, this study relies on a secondary dataset collected in 2021 by independent researchers. The use of this data poses several limitations. For one, it covers only students in the 10th and 11th grades, which may not be representative of the broader student population. Additionally, the data is limited to the best schools in Azerbaijan, and was collected exclusively in the capital city, Baku. This geographical constraint may limit the generalizability of the findings to other regions or types of schools within the country.

Secondly, the cross-sectional nature of the data poses another limitation. As the data was collected only once from the students, it is not possible to compare their innovativeness before and after joining the schools in question. This precludes any conclusions about the causal effects of the school environment on individual innovativeness, and may lead to an over- or underestimation of the relationship between centralization of decision-making and innovativeness. Future research would benefit from a longitudinal study design, which could provide insights into the temporal dynamics of this relationship.

Consequently, the limitations of this study should be acknowledged when interpreting the findings. The reliance on a secondary dataset with a restricted scope and the cross-sectional nature of the data may all have implications for the generalizability and validity of the results. Despite these limitations, the study provides a valuable starting point for future research on the

relationship between centralization of decision-making in education and individual innovativeness in Azerbaijan. Further investigation, employing longitudinal data and more diverse samples would contribute to a deeper understanding of this important issue.

CONCLUSİONS

This research paper aimed to explore the impact of the centralization of decision-making in education on individual innovativeness, specifically focusing on the case of Azerbaijan. While my hypothesis suggested a greater level of innovativeness in individuals educated within a decentralized system, our quantitative analysis did not yield a significant distinction between students from centralized and decentralized schools in Azerbaijan. This discrepancy, however, does not detract from the value of the research but rather illuminates the intricacies that underlie the relationship between centralization and individual innovativeness. The difference between the hypothesis and findings demonstrates the need for a broader lens that takes into account the various factors that influence individual innovativeness. It underscores the necessity of more in-depth, longitudinal, and cross-national comparative studies, which might reveal the long-term and far-reaching consequences of centralization versus decentralization in education. This research, although not affirming the initial hypothesis definitively, contributes to a nuanced understanding of the complexities between educational governance and individual innovativeness, which is invaluable for future exploration and decision-making. It sets the stage for ongoing dialogue about how education systems can best foster the innovativeness required in our rapidly changing global society. There are some hypotheses driven by this study that can be investigated in the future:

H2: Decentralization of decision-making in education might have a positive impact on individual innovativeness in rural areas. This study is primarily urban-centric, focusing on schools in the capital, Baku. There might be significant differences in rural areas that were not accounted for in this study.

H3: Decentralization of decision-making on individual innovativeness might have a positive impact in the long term. A longitudinal study might reveal that the impact of centralization or decentralization on individual innovativeness becomes more evident over time. The cross-sectional nature of this study may have limited its ability to detect the long-term effects of the educational system on innovativeness.

H4: The centralization of decision-making might have a more significant effect on the innovativeness of the educators rather than the students. Teachers and administrators who have more autonomy might be more innovative themselves, which could indirectly affect the innovativeness of their students.

H5: The level of resources available to a school could mediate the impact of centralization or decentralization on individual innovativeness. Schools with more resources might be better able to foster innovativeness regardless of the degree of decision-making autonomy.

H6: The effects of centralization or decentralization on individual innovativeness might be less significant than the effects of other factors, such as teaching quality or curriculum relevance. This study did not find a significant difference in innovativeness between centralized and decentralized systems, suggesting other factors might be more important.

H7: Centralized decision-making might lead to less innovation in the short term but provide a solid foundational knowledge base that enables greater innovation in the long term. It's possible that a more structured, centralized approach initially provides a solid base of knowledge upon which students can later innovate.

Additionally, the measures of individual innovativeness might be more sensitive to changes in the education system in different cultural contexts. This study focused more on the individual innovativeness index, but the relationship between centralization and innovativeness might look different in Azerbaijan or countries with different cultural attitudes toward innovation and education. Thus, it can be beneficial studying the interaction between cultural aspects and institutional aspects of the innovation ecosystem.

REFERENCES

1. Amalia, K., Komariah, A., Sumarto, S., & Asri, K. H. (2020). Leadership in Education: Decision-Making in Education. *Atlantis Press*. https://doi.org/10.2991/assehr.k.200130.155
2. Asian Development Bank. (2015, May 25). *Regional Education Forum in Baku to Discuss Azerbaijan's K-12 Transition* [Press Release]. Retrieved from https://www.adb.org/news/regional-education-forum-baku-discuss-azerbaijan-s-k-12-transition
3. Binder, M. (2013) Innovativeness and Subjective Well-Being. *Soc Indic Res* **111**, 561–578. Retrieved from https://doi.org/10.1007/s11205-012-0020-1
4. Bray, M. (1999). Control of education: Issues and tensions in centralization and decentralization. *Comparative education: The dialectic of the global and the local*, *1999*, 207-232.
5. Brown, S., & McIntyre, D. (1981). An Action-Research Approach to Innovation in Centralized Educational Systems, *European Journal of Science Education*, 3:3, 243-258. Retrieved from http://dx.doi.org/10.1080/0140528810030302
6. Caldwell, B.J. (2009). Centralisation and Decentralisation in Education: A New Dimension to Policy. In: Zajda, J., Gamage, D. (eds) Decentralisation, School-Based Management, and Quality. Globalisation, Comparative Education and Policy Research, vol 8. *Springer, Dordrecht*. https://doi.org/10.1007/978-90-481-2703-0_3
7. Carvalho, E.D. (2013). Decision-making in the public administration: a dialogue of rationalities. *Sociologia, Problemas e Praticas Jurnal*. No.73.
8. Council of Europe. (2021). Local self-government in Azerbaijan: few improvements observed, limited powers and weak financial position of municipalities must be urgently addressed. Retrieved from https://www.coe.int/en/web/congress/-/local-self-government-in-azerbaijan-few-improvements-observed-limited-powers-and-weak-financial-position-of-municipalities-must-be-urgently-addressed
9. Fiske, E.B. (1996). Decentralization of Education: Politics and Consensus. Washington, D.C.: The World Bank.
10. Gasimov, I., Ismayilov, A., Aliyev, K., & Gasimov, I. (2021). *A survey on innovativeness and entrepreneurship potential among high school students in Azerbaijan*. Unpublished dataset.

11. Goldsmith, R. E., & Foxall, G. R. (2003). The measurement of innovativeness. In L. V. Shavinina (Ed.), *The international handbook on innovation* (pp. 321–330). Oxford: Elsevier Science.
12. Guliyev, F. (2016) The Quality of Education in Azerbaijan: Problems and Prospects. *Caucasus Analytical Digest*, No. 90. Retrieved from https://ssrn.com/abstract=2885112
13. Hanson, E.M. (1998). Strategies of Educational Decentralization: Key Questions and Core Issues. *Journal of Educational Administration*. 36 (2): 111–128.
14. Hawkins, J.N. (2000). Centralization, Decentralization, Recentralization: Educational Reform in China. *Journal of Educational Administration*. 38 (5): 442–454.
15. Hayek, F. A. (1945). The Use of Knowledge in a Society. *The American Economic Review*, Vol. 35, No. 4, pp. 519-530.
16. Hendarman, A.F., Cantner, U. (2018) Soft skills, hard skills, and individual innovativeness. *Eurasian Bus Rev* 8, 139–169. https://doi.org/10.1007/s40821-017-0076-6
17. Hurt, H. T., Joseph, K., & Cook, C. D. (1977). Scales for the measurement of innovativeness. *Human Communication Research*, *4*(1), 58-65.
18. Jukneviciene, V. (2019). Key Factors for the Successful Implementation of the National Innovation Policy: The Case of Lithuania. *Annals of Spiru Haret University. Economic Series*, *19*(2), 25-50, https://doi.org/10.26458/1921
19. Moe, T. M. (2003). The politics of centralization: Concentrating power in American education. In P. E. Peterson & M. R. West (Eds.), *No Child Left Behind? The politics and practice of school accountability* (pp. 47-76). Brookings Institution Press.
20. Mok, K.H. (2004). Centralization and Decentralization: Changing Governance in Education. In: Ka-Ho, M. (eds) *Centralization and Decentralization. CERC Studies in Comparative Education*, vol 13. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-0956-0_1
21. Nurakhir, A. (2021). Centralization and decentralization in education system: Advantages and disadvantages. International Journal of Educational Research and Reviews, 12(1), 32-44.
22. Payne, K. (2008). Centralization versus decentralization in education: A global perspective. *Journal of Education Policy, Planning and Administration*, *2*(1), 1-10.
23. Pollock, K. (2008). The Four Pillars of Innovation: An Elementary School Perspective. The Innovation Journal: The Public Sector Innovation Journal, 13(2), article 2. Retrieved from https://www.innovation.cc/scholarly-style/2008_13_2_2_pollack_4pillars-educate.pdf
24. Ragmoun, W., Alfalih, A.A. (2021) Sustainable Academic Innovativeness: Towards the Understanding of a New Construct and the Development of Scale. *J Knowl Econ* **12**, 695–715. https://doi.org/10.1007/s13132-021-00744-7
25. Rogers, E.M. (2003). Diffusion of innovation (5th ed.). New York: Free Press.
26. Rubalcaba, L. (2022). Understanding Innovation in Education: A Service Co-Production Perspective. Economies, 10:96. Retrieved from https://doi.org/10.3390/economies10050096
27. Scott, R., & Vincent-Lancrin, D. (2014). The human factor in innovation. In S. Dutta, B. Lanvin, & S. Wunsch-Vincent (Eds). The Global Innovation Index 2014. Cornell University, INSEAD, WIPO Fontainebleau, Ithaca.
28. Stevenson, D. L., & Baker, D. P. (1991). State control of the curriculum and classroom instruction. Sociology of Education, 64(1), 1-10.

29. Tarman, B. (2016). Innovation and Education. Research in Social Sciences and Technology, 1:1. Retrieved from https://www.learntechlib.org/p/187548/.
30. Tether, B., Mina, A., Consoli, D., & Gagliardi, D. (2005). A literature review on skills and innovation: how does successful innovation impact on the demand for skills and how do skills drive innovation? United Kingdom: Department of Trade and Industry.
31. Topsakal, İ., Altun Yalçın, S., & Çakır, Z. (2022). The Effect of Problem-based STEM Education on the Students' Critical Thinking Tendencies and Their Perceptions for Problem Solving Skills. Science Education International, 33(2), 136-145.
32. Welsh, T., & McGinn, N. F. (1999). Decentralization of education: why, when, what and how. UNESCO: International Institute for Educational Planning. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000120275
33. Winokur, I. K. (2014). From centralized education to innovation: Cultural shifts in Kuwait's education system. Education for a Knowledge Society in Arabian Gulf Countries (International Perspectives on Education and Society, Vol. 24, pp. 103-124). Emerald Group Publishing Limited. https://doi.org/10.1108/S1479-367920140000024013
34. World Bank. (2010). Innovation Policy: A Guide for Developing Countries. World Bank. https://openknowledge.worldbank.org/handle/10986/2460.
35. World Intellectual Property Organization. (2022). Global Innovation Index (GII): Azerbaijan. Retrieved from https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/az.pdf
36. Yilmaz, F., Spokesmen, G., Ayman, N., Tuna, S., Sancar, S., & Deniz, Y. M. (2014). İlköğretim bölümü öğretmen adaylarının mesleki yenilikçilik eğilimlerinin çeşitli değişkenler açısından incelenmesi. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 11*(27), 259–276.
37. Yuan, F. & Woodman, R.W. (2010). Innovative behavior in the workplace: The role of performance and Image outcome expectations. Academic Management Journal, 53 (2), 323-342

Appendix 1. Multiple Comparisons

Dependent Variable: ScoreD

Tukey HSD

(I) SchoolD	(J) SchoolD	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	.228	2.733	1.000	-8.29	8.75
	3	3.713	2.998	.918	-5.63	13.06
	4	-4.272	3.705	.942	-15.83	7.28
	5	-.748	2.787	1.000	-9.44	7.94
	6	-10.534	3.498	.066	-21.44	.37
	7	-6.705	3.977	.696	-19.11	5.70
	8	.395	3.705	1.000	-11.16	11.95
2	1	-.228	2.733	1.000	-8.75	8.29
	3	3.485	3.141	.953	-6.31	13.28
	4	-4.500	3.822	.936	-16.42	7.42
	5	-.976	2.940	1.000	-10.14	8.19
	6	-10.762	3.622	.073	-22.05	.53
	7	-6.933	4.086	.689	-19.67	5.81
	8	.167	3.822	1.000	-11.75	12.08

3	1	-3.713	2.998	.918	-13.06	5.63
	2	-3.485	3.141	.953	-13.28	6.31
	4	-7.985	4.016	.496	-20.51	4.54
	5	-4.461	3.188	.855	-14.40	5.48
	6	-14.247*	3.826	.009	-26.18	-2.32
	7	-10.418	4.268	.237	-23.72	2.89
	8	-3.318	4.016	.991	-15.84	9.20
4	1	4.272	3.705	.942	-7.28	15.83
	2	4.500	3.822	.936	-7.42	16.42
	3	7.985	4.016	.496	-4.54	20.51
	5	3.524	3.861	.984	-8.51	15.56
	6	-6.262	4.402	.844	-19.99	7.46
	7	-2.433	4.791	1.000	-17.37	12.51
	8	4.667	4.568	.970	-9.58	18.91
5	1	.748	2.787	1.000	-7.94	9.44
	2	.976	2.940	1.000	-8.19	10.14
	3	4.461	3.188	.855	-5.48	14.40
	4	-3.524	3.861	.984	-15.56	8.51
	6	-9.786	3.663	.148	-21.21	1.63
	7	-5.957	4.122	.833	-18.81	6.90
	8	1.143	3.861	1.000	-10.90	13.18
6	1	10.534	3.498	.066	-.37	21.44
	2	10.762	3.622	.073	-.53	22.05
	3	14.247*	3.826	.009	2.32	26.18
	4	6.262	4.402	.844	-7.46	19.99
	5	9.786	3.663	.148	-1.63	21.21
	7	3.829	4.633	.991	-10.62	18.27
	8	10.929	4.402	.219	-2.80	24.65
7	1	6.705	3.977	.696	-5.70	19.11
	2	6.933	4.086	.689	-5.81	19.67
	3	10.418	4.268	.237	-2.89	23.72
	4	2.433	4.791	1.000	-12.51	17.37
	5	5.957	4.122	.833	-6.90	18.81
	6	-3.829	4.633	.991	-18.27	10.62
	8	7.100	4.791	.815	-7.84	22.04
8	1	-.395	3.705	1.000	-11.95	11.16
	2	-.167	3.822	1.000	-12.08	11.75
	3	3.318	4.016	.991	-9.20	15.84
	4	-4.667	4.568	.970	-18.91	9.58
	5	-1.143	3.861	1.000	-13.18	10.90
	6	-10.929	4.402	.219	-24.65	2.80
	7	-7.100	4.791	.815	-22.04	7.84

*. The mean difference is significant at the 0.05 level.

Source: Author's own completion