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A multivariate examination of critical success factors for education finance in Somalia

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ABSTRACT

This study examines the critical factors of education finance and its impact on education finance performance via a comprehensive analysis of the Education Finance Performance Index (EFPI) in the context of Somalia. The research employs multiple regression analysis to investigate the relationships among Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD). The results reveal that these factors collectively account for a significant proportion of the variance in the EFPI scores, highlighting their influential roles. GRC emerges as a crucial determinant, emphasizing the pivotal role of governmental dedication in fostering an environment conducive to educational excellence. FRM and the GA also have notable impacts, highlighting the importance of efficient resource allocation and transparent decision-making. HCD underscores the value of investing in educators' skills and motivation. The findings emphasize the need for strategic policies that prioritize government commitment, efficient financial management, transparent governance, and investment in human capital. These insights offer valuable guidance for educational policymakers and practitioners seeking to enhance educational finance practices and overall system performance. Ultimately, this study serves to bridge the gap between theoretical frameworks and practical applications, offering empirical insights within the knowledge domain.

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Introduction

Effective management of education financing is crucial for ensuring equitable access to education (Bush, 2008). It involves allocating financial and nonmonetary resources to support educational endeavors (Murray et al., 1998). Despite Somalia's efforts to increase access, low gross enrollment rates and high out-of-school child ratios remain. This highlights the need for a robust and efficient education finance system that channels resources to areas of utmost necessity. A transparent and reliable mechanism for allocating, spending, and accounting for education funds is essential for ensuring quality education for every Somali child. Attaining universal access to education is pivotal for societal progress and the promotion of equality in today's diverse world (Swargiary & Roy, 2023). It guarantees an equitable opportunity for learning and personal development to individuals across varying social classes, races, genders, sexual orientations, ethnic backgrounds, and abilities. (Capsada-Munsech, 2020). This principle not only dismantles systemic barriers but also unlocks a society's collective strength and potential. In the face of global challenges such as economic disparities and cultural divides, there exists a collective commitment among policymakers, economists, and social service providers to ensure that no individual is left behind.

Somalia's education history has been shaped by its rich tradition of learning, notably Islamic teachings. During colonial rule, Somalis exhibited diverse responses to education, with some embracing English- or Italian-language education and others resisting the colonial education system (Cassanelli &

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Abdikadir, 2007). Despite independence, Somalia's education policies remained unchanged, emphasizing urban education and elite training. Challenges included integrating colonial school systems, ensuring qualified teachers, and transforming an elitist system into an accessible system. During Siyaad Barre's regime, significant changes were made, including the establishment of an official Somali script in 1972, national literacy campaigns, the nationalization of private schools, and the introduction of Somali language textbooks (Cassanelli & Abdikadir, 2007). However, these reforms witnessed a lack of sustainability through the 1980s due to natural disasters, war, and corruption, leading to a decline in educational quality. The Somali education system had already deteriorated prior to the state's collapse in 1991, and the subsequent collapse severely affected the education system, leading to schools being looted, displaced, and turned into graveyards (Cassanelli & Abdikadir, 2007). During the 1990s, regional efforts in Puntland and Somaliland established their own systems; however, the overall education system remained fragmented. Presently, Somalia's education sector grapples with the challenges of fragmentation, diverse curricula, and language selection. Quranic schools, or 'dugsis', are foundational but often lack modern resources. Access to education remains a formidable challenge, particularly in rural and conflict-affected areas, with gender disparities impeding girls' enrollment. While international NGOs play a role in bridging gaps, the absence of centralized governance complicates coordination efforts. The sector faces insecurity, inadequate funding, insufficient teacher training, and a relevant curriculum. Comprehensive reforms and investment are urgently needed to address these challenges.

Many children worldwide are denied the transformative power of education due to various barriers, including poverty (O'Connor, 2021). In regions such as Somalia, where 70% of the population lives below the international poverty line, education takes a backseat to more fundamental needs such as food, shelter, and healthcare. This cycle of disadvantage impedes the aspirations of young people, making it difficult to escape the long-lasting effects of poverty (Harper et al., 2003). Therefore, addressing these challenges and promoting education as a means of overcoming poverty are crucial. In Somalia, poverty and economic instability have a profound impact on education, making it difficult for families to afford tuition fees (Al-Ahmadi & Zampaglione, 2022; Chaudhry & Ouda, 2021). This financial strain often leads to the sacrifice of educational opportunities for survival. The lack of access to education perpetuates a cycle of limited opportunities and diminished prospects across generations. Economic fragility, conflict, political instability, and natural disasters also undermine children's educational prospects, often preventing them from learning and engaging in personal development (Assefa et al., 2023). Prolonged conflicts can leave a trail of destruction beyond physical infrastructure, reducing the number of schools and erasing access to education for generations.

Adversity in Somalia increases barriers to education, as children face additional obstacles due to distance from schools (Gerbaka et al., 2021). The treacherous journey between villages and towns deters many households, leaving children without safe access to formal education. This perpetuates limited opportunities and exacerbates existing inequalities, particularly affecting vulnerable groups such as girls and children with special needs. The struggle for education in Somalia persists as families decide whether to expose their children to perilous conditions or deprive them of education (Karawita, 2019). Access to quality education is often impeded by daily life challenges such as hunger, illness, or household responsibilities, which hinder students' ability to fully participate and benefit from lessons (Dryden-Peterson, 2015). This highlights the need for comprehensive support systems to address educational deficiencies within existing socioeconomic factors. The global digital divide further exacerbates educational inequities, especially in Somalia, where 70% of school-aged children lack internet access at home. This digital disparity deprives young learners of necessary tools and resources, emphasizing the imperative for concerted efforts to ensure a more equitable educational landscape (Oyedemi, 2012).

Inadequate access to high-quality education has significant consequences beyond the classroom, impacting children's future prospects and societies (Branson & Zuze, 2012). It hampers employment opportunities, reduces economic mobility, and increases vulnerability to health consequences. The absence of education also diminishes individuals' capacity to participate in decisions that influence their lives and communities, depriving them of agency and impeding their ability to contribute meaningfully to a promising future (Anderson, 2023). This cycle of disadvantage persists over time, leading to perpetual recurrence of disadvantage (Cadenas et al., 2023).

Despite commendable efforts to improve access to education over the past decade, the challenges in Somalia persist, and grim statistics reveal the gravity of the situation. With the region's lowest gross enrollment rate (GER), Somalia's education landscape is marked by glaring disparities (Osman & Abebe, 2023). The meagre 14.3% gross enrollment rate for lower primary education, which accommodates only 170,594 out of 1,196,188 children, represents a daunting challenge ahead. A parallel narrative unfolds in upper primary education, where the GER stands at 14.4%, falling short of reaching the vast majority of eligible students. The trend cascades similarly to secondary education, where a mere 14.3% of secondary school-age children have access, leaving nearly 900,000 teenagers without the opportunity for further learning (Table 1).

In Somalia, the pursuit of universal access to quality education faces multifaceted challenges stemming from economic fragility, conflict, political instability, and natural disasters. Despite the recognized importance of equitable educational opportunities for all children, a substantial portion of the population, including approximately 3 million children, remains without access to education. This dire situation is exacerbated by a lack of resolute political commitment, insufficient funding, and persistent barriers related to gender, disability, language, and socioeconomic status. Concurrently, securing adequate funding for educational systems poses a formidable challenge worldwide. The government's allocation of a mere 3.28% of its budget to education in 2022, significantly below the regional average, underplays the urgency of addressing education financing deficiencies in the country. As Somalia endeavors to build an inclusive, well-educated population and promote socioeconomic growth, a comprehensive examination of the education finance ecosystem is imperative to identify and rectify the underlying factors contributing to inadequate education funding at various levels.

The literature on education access and financing, particularly in challenging contexts such as Somalia, lacks a comprehensive understanding of the dynamic relationships among the factors that influence Education Finance Performance. While some studies have explored the global significance of education and its relationship with poverty, there is a dearth of research that quantitatively examines critical factors for education finance in Somalia. Hence, the purpose of this study is to examine the critical determinants of education finance in Somalia. This quantitative gap in understanding the complex dynamics of these critical determinants and their impact on education finance performance paves the way for the formulation of evidence-based policies and interventions necessary to enhance universal education access, especially in challenging environments such as Somalia. This study is organized as follows: Section 2 provides a summary of the literature review. Section 3 outlines the study materials and methods. Section 4 presents the study results. Section 5 discusses the implications of the study. Finally, in Section 6, the conclusions and limitations are presented.

Literature review

The present research offers valuable insights into the complex relationships among different explanatory variables and the Education Finance Performance Index (EFPI). However, it is important to recognize certain limitations that require careful consideration. These identified limitations present potential opportunities for future research and improvements in the approach that was employed.

1. Sample representativeness and generalizability:
   The characteristics and make-up of the study sample used for analysis have an impact on its findings. The results may not be generalizable if the sample is not sufficiently representative of the larger population or of particular contexts. To increase the findings' external validity and enable more thorough generalizations, future research could benefit from the use of larger and more diverse samples.

Table 1. Somali school enrollment statistics.

School-age Children				Children with access to School			
Lower Primary	Upper Primary	Secondary	Total	Lower Primary	Upper Primary	Secondary	Total
1,196,188	1,022,209	888,482	3,106,879	170,594	147,139	126,768	444,501
38.50	32.90	28.60	100.00	38.38	33.10	28.52	100.00
Out-of-School Children (%)				Gross Enrollment Rate (GER) (%)			
Lower Primary	Upper Primary	Secondary	Total	Lower Primary	Upper Primary	Secondary	Total
85.74	85.61	85.73	85.69	14.26	14.39	14.27	14.31

Source: FGS Ministry of Education.

2. Causality and Directionality
   Because the current study is cross-sectional in nature, it is inherently difficult to determine the causal connections between the variables. Although regression analysis can identify associations between variables, it does not provide conclusive evidence of causation. Subsequent investigations may benefit from incorporating longitudinal designs or experimental methodologies to investigate causal relationships and ascertain the temporal order of variables, thereby enhancing comprehension of the interaction among the variables under evaluation.
3. Measurement and Operationalization
   The study relies on precise measurements and operationalization of variables, which could result in measurement biases or constraints. The variables employed to measure Government Recognition and Commitment, Financial Resource Management, Governance and Accountability, and Human Capital Development may not comprehensively encompass their multifaceted aspects. Subsequent investigations may consider examining alternative or supplementary metrics to strengthen the reliability and validity of the constructs being studied.
4. Nonlinear Relationships
   The study assumes that the predictors and the EFPI have linear relationships. Nevertheless, it is probable that certain associations may demonstrate nonlinear patterns. Future studies could look into polynomial regression or nonlinear models to find more complex relationships that the current analysis may have overlooked.
5. Contextual specificity:
   The results of this research are situated within a specific educational and geographical context. Different regions and nations have different educational policies, so the relationships that have been observed may not hold true in other contexts. Subsequent investigations may explore the extent to which these findings can be applied in various settings to establish the cross-cultural credibility of the observed associations (Figure 1).

Construct development

A fundamental aspect of empirical research is construct development (Guiora, 1972). It involves conceptualizing, operationalizing, and validating key constructs that form the basis for theoretical frameworks

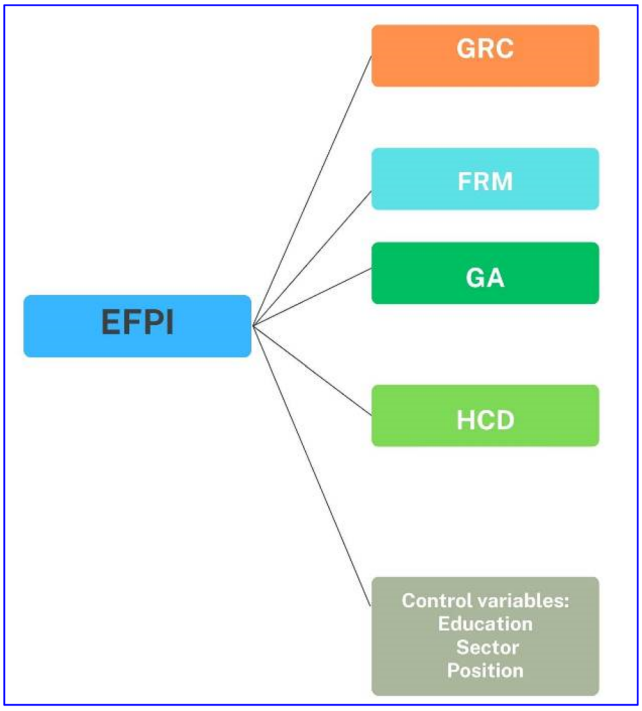

Figure 1. Research framework. | PartLabel-upper.

(Hillmann & Guenther, 2021). This study focuses on construct development in empirical research and focuses on the development of constructs related to interrelated variables such as the Education Finance Performance Index (EFPI), Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD). These constructs provide a comprehensive understanding of the educational system's operation, results, and effectiveness. The EFPI measures education finance effectiveness and quality, encompassing academic achievement, holistic student development, and effectiveness and quality. The study provides a methodologically strong framework for exploring these constructs for education finance excellence.

The selection of independent variables in this study draws upon both theoretical foundations and empirical insights from the existing educational finance literature. These variables include Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD).

The theoretical construct of Government Recognition and Commitment (GRC) aligns with established principles, emphasizing the pivotal role of governmental policies and commitment in influencing adequate funding and support for education—a proposition substantiated by numerous empirical studies (Chalmers, 2011; Friedman, 1955; Shaturaev, 2021). Financial resource management (FRM) is in accordance with the foundational principles of financial management theory. It recognizes the crucial significance of prudent resource allocation, vigilant expenditure oversight, and financial transparency in attaining favorable educational outcomes. This perspective is consistent with prevailing scholarship on financial management within the education sector. (Baker, 2021; Odide et al., 2022). Governance and accountability (GA) draws upon the extensive literature on public sector accountability and governance, which acknowledges that transparency, accountability, and effective governance mechanisms are vital components for optimizing resource utilization in educational settings, a perspective firmly rooted in prior research (Amaghouss & Zouine, 2022; Dao, 2015; Shattock, 2006)). Human capital development (HCD) is grounded in a rich body of literature emphasizing the crucial role of well-trained and adequately supported education professionals in enhancing the quality and efficiency of educational systems, as substantiated by empirical investigations (Fernández & Rogerson, 1999; Little & Bartlett, 2010; Zhou et al., 2018). In summary, the selected independent variables in this study align harmoniously with existing theoretical frameworks and empirical evidence, establishing a robust foundation for a comprehensive examination of the multifaceted determinants of financial performance in the education sector.

A priori expectations are hypothesized effects of independent variables on a dependent variable, such as the Education Finance Performance Index (EFPI). These expectations are formulated before the examination of actual data, providing a theoretical framework for the anticipated relationships between variables. The a priori expectations encompass anticipations that higher levels of government recognition and commitment to education will positively correlate with the EFPI. Efficient and effective financial resource management is expected to have a positive effect on the EFPI, given that sound budgeting, spending practices, and monitoring are anticipated to optimize resource utilization and enhance financial outcomes in education. Strong governance and accountability mechanisms within the education sector are hypothesized to positively influence the EFPI, as transparent, accountable, and well-governed systems use resources more effectively. Investments in human capital, such as training and development, are expected to positively impact the EFPI. The premise is that well-trained personnel are crucial for efficient education delivery and financial performance. The study aims to validate, quantify, or challenge these expectations on the basis of the data collected (Table 2).

Methods and materials

Research design

The study uses a quantitative research design to investigate the factors affecting Education Finance Performance in Somalia's unique education system. Multiple regression analysis is employed to explore the interactions between the dependent variable, the Education Finance Performance Index (EFPI), and several independent variables. The key factors include government recognition, financial resource management, governance and accountability, and human capital development. The study also incorporates

Table 2. Construct development.

No	Variable (construct)	Definition	Survey items	Rationale	Scale and meaning
1	Education Finance Performance Index (EFPI)	A composite measure assessing the overall quality, access, and sustainability of education finance in Somalia. It evaluates student outcomes, enrollment rates, educational facilities, and teacher–student ratios.	8, 11, 12, 13	Reflects the overall impact of education finance-related factors on the effectiveness of the education system.	**Likert Scale (1–5):** 1 = Strongly Disagree (very poor performance), 2 = Disagree (below average), 3 = Neither Agree nor Disagree (neutral), 4 = Agree (above average), 5 = Strongly Agree (excellent performance).
2	Government Recognition and Commitment (GRC)	Indicates the level of acknowledgment and prioritization given by the Somali government to education finance in its policies and actions.	1, 2	Captures the extent to which the government values education finance.	**Likert Scale (1–5):** 1 = Strongly Disagree (low commitment), 2 = Disagree (below average), 3 = Neither Agree nor Disagree (neutral), 4 = Agree (high commitment), 5 = Strongly Agree (very high commitment).
3	Financial Resource Management (FRM)	Evaluates the allocation, utilization, and management of education funds in Somalia, as well as the presence of effective systems and institutions for fund management.	3, 4, 5, 6, 7	Reflects the efficiency and effectiveness of financial resource management in the education sector.	**Likert Scale (1–5):** 1 = Strongly Disagree (inefficient and ineffective), 2 = Disagree (below average), 3 = Neither Agree nor Disagree (neutral), 4 = Agree (efficient), 5 = Strongly Agree (highly efficient).
4	Governance and Accountability (GA)	Measures the quality of governance, integrity, and accountability in education fund management. Considers corruption, mismanagement, and adherence to established protocols.	6, 9, 14	Captures the degree to which governance and integrity impact education finance management.	**Likert Scale (1–5):** 1 = Strongly Disagree (poor governance), 2 = Disagree (below average), 3 = Neither Agree nor Disagree (neutral), 4 = Agree (strong governance), 5 = Strongly Agree (very strong governance).
5	Human Capital Development (HCD)	Indicates the efforts by the Somali government to develop the competence and capacity of public servants involved in education finance management, including incentives, remuneration, and capacity-building initiatives.	15	Reflects the focus on enhancing human capital for effective education finance management.	**Likert Scale (1–5):** 1 = Strongly Disagree (low focus), 2 = Disagree (below average), 3 = Neither Agree nor Disagree (neutral), 4 = Agree (high focus), 5 = Strongly Agree (very high focus).

control variables such as Education, Sector, and Position of the respondents. The aim is to identify the subtle relationships and causal links that govern Somalia's education finance performance.

This study examines the relationships among four independent variables—Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD)—to understand their combined impact on the Education Finance Performance Index (EFPI). Education finance plays a pivotal role in shaping the quality and accessibility of education, impacting students' opportunities and the overall efficiency of educational systems. The GRC is a measure of the government's commitment to education through financial prioritization and policy support, influencing the EFPI by shaping resource allocation and policy frameworks. FRM assesses the efficiency of financial resource management within the education sector, implying that effective management can enhance financial performance. The GA encompasses processes and structures responsible for responsible resource use, transparency, and adherence to regulations in education finance, directly influencing the performance index. HCD emphasizes the importance of investing in and nurturing educational personnel, which is crucial for delivering high-quality education and affects the efficiency and effectiveness of financial resource utilization in education.

Moreover, this study meets ethical standards to ensure transparency and privacy in survey data collection. It adheres to the principles of informed consent principles, anonymization, and secure storage measures to safeguard participants' information. The study also prioritizes data quality through robust data acquisition, cleansing processes, and statistical software tools such as SPSS and EViews. By adhering

to these ethical and methodological standards, this study aims to contribute valuable insights to the academic field while respecting participants' autonomy and privacy.

Data source and sampling strategy

This study focuses on the intricate aspects of education finance within the Somali education system. A survey conducted in July 2023 collected responses from a diverse group of participants from various sectors and educational backgrounds. This study adopts a comprehensive stratified sampling approach, dividing the population into four sectors—Government (30%), private sector (40.91%), nonprofit/NGO (18.18%), and other (10.91%)—on the basis of their relevance to the research objectives. Proportional allocation was applied to determine the sample size for each stratum (Government: 48, Private Sector: 65, Nonprofit/NGO: 29, Other: 17), ensuring representativeness while accounting for nonresponses and practical constraints. The total sample size of 160 participants was determined via proportional allocation, ensuring that each stratum reflected its relative size within the estimated population of 800 individuals. Specifically, the sample included 48 participants from the government sector, 65 from the private sector, 29 from the nonprofit/NGO sector, and 17 from the other sector. Adjustments were made to accommodate practical constraints such as budgets, time, and potential nonresponses. Within each stratum, participants were randomly selected to ensure that the sample accurately represented each subgroup, thereby enhancing the study's representativeness and reliability.

Model estimation

Model estimation is a critical process in data analysis and predictive modeling, ensuring robust insights and predictions. It encompasses several key steps, including model specification, parameter estimation, goodness-of-fit assessment, and performance validation. Model specification involves defining the model's structure, variables, and the form of relationships within it. Parameter estimation is the process of determining the model's coefficients via techniques such as maximum likelihood estimation, least squares estimation, or gradient descent. Validation ensures the model's ability to generalize effectively to new data and mitigates issues such as overfitting or underfitting that could compromise the model's predictive capacity.

Model specification: multiple regression analysis

In this study, multiple regression analysis was employed to examine the relationships between the independent and dependent variables. The utilization of multiple predictors allowed for a nuanced exploration of patterns, providing a deeper understanding of the intricate relationships at play. By quantifying the specific impacts of individual variables while considering potential confounding factors, the study can reveal hidden causal relationships and patterns. The analysis revealed the intricate relationship between the EFPI and multiple independent variables, providing a comprehensive understanding of the study's findings. Furthermore, the study rigorously examined assumptions to ensure the credibility of regression outcomes, including linearity, residual independence, homoscedasticity, normality, and multicollinearity, demonstrating a strong commitment to methodological rigor and enhancing the reliability of the results. The regression model is presented below:

$$\mathrm{EFPI} = \beta 0 + \beta 1(\mathrm{GRC}) + \beta 2(\mathrm{FRM}) + \beta 3(\mathrm{GA}) + \beta 4(\mathrm{HCD}) + \beta 5(\mathrm{education}) + \beta 6(\mathrm{sector}) + \beta 7(\mathrm{position}) + \varepsilon$$

where:

$\beta 0$ = Intercept
$\beta 1 - \beta 7$ = Slopes
EFPI = Education Finance Performance Index
GRC = Government recognition and commitment
FRM = Financial resource management

GA = Governance and accountability
HCD = Human Capital Development

Parameter estimation, goodness of fit assessment, and validation

Parameter estimation, goodness of fit assessment, and validation constitute fundamental steps in the process of developing and evaluating a regression model, which is essential for ensuring its robustness and reliability. In the parameter estimation phase, the theoretical assumptions are transformed into quantifiable measures by determining the values of the β coefficients through regression analysis. This process is essential for quantifying the magnitude and direction of each variable's impact on the EFPI, providing a quantitative foundation for understanding the relationships between variables. The goodness-of-fit assessment, particularly the use of the R-squared value and residual analysis, is commendable and enhances the reliability of the study. A high R-squared value is indicative of strong explanatory power, suggesting that the model effectively captures the variation in the EFPI. Examining residual plots and patterns is crucial for detecting potential model inadequacies, helping researchers refine and improve model accuracy. Validation, encompassing various checks such as linearity, residual independence, homoscedasticity, normal distribution of residuals, and multicollinearity, demonstrates a rigorous approach to confirming the model's reliability and applicability. Ensuring that the model's assumptions hold true strengthens its validity and bolsters confidence in its predictive capabilities. Overall, these well-structured steps in parameter estimation, goodness-of-fit assessment, and validation collectively enhance the rigor and robustness of the study's regression model, making it a valuable and reliable contribution to empirical research in the field.

Results of the study

Descriptive analysis

Summary Statistics

The data analysis revealed diverse demographic compositions among the participants. The mean age is 34.52 years, with a significant standard deviation of 8.22. The gender distribution is predominantly male, with some female participants. The most common qualification is a master's degree, with a diverse range. The mode sector is 2.00, with a standard deviation of 0.96, indicating diverse sectoral representations. The average participant position or status is approximately 3.00, reflecting diverse occupational or social strata. Regionally, participants mainly come from Benadir, but a standard deviation of 1.30 suggests geographical diversity. Overall, the analysis highlights a diverse cohort with diverse ages, gender representations, qualifications, sectors, positions, and regional origins (Table 3).

The provided descriptive statistics offer insights into the distributional characteristics of the investigated variables. For the variable EFPI, its mean score of 3.71 and standard deviation of 0.87 indicate a relatively narrow dispersion around the mean. A negative skewness of -1.15 suggests a departure from normality with a longer tail toward lower scores, whereas a positive kurtosis of 1.30 hints at potential outliers on both extremes of the distribution. Similarly, the variable GRC has a mean of 2.97 and a larger standard deviation of 1.14, indicating a wider scattering of scores. A slightly leftward skewness (-0.14) suggests a minor accumulation of lower GRC scores, whereas negative kurtosis (-1.13) implies a flatter distribution with possible outliers.

For the variable FRM, the mean score is 3.55, with a standard deviation of 0.95. A negative skewness of -0.85 points to a left-skewed distribution with low FRM scores, and positive kurtosis (0.25) indicates some deviation from a normal distribution with slightly accentuated peakness and tails. The variable GA has a mean of 3.59 and a standard deviation of 0.99, with negative skewness (-0.67) indicating a tendency toward lower scores, whereas negative kurtosis (-0.30) suggests less peakedness and thinner tails, implying a more uniform distribution with fewer extreme values. The HCD variable, with a mean score of 3.68 and a standard deviation of 1.10, displays a negative skewness of -0.91, indicating an asymmetric distribution with a tail of lower scores. Positive kurtosis (0.29) indicates a moderate deviation from normality in terms of peakedness and tails, suggesting the presence of outliers (Table 4).

Table 3. Summary statistics.

	Age	Gender	Education	Sector	Position	State
Mean	34.52	1.14	3.57	2.10	3.30	5.29
Median	34.00	1.00	4.00	2.00	3.00	6.00
Mode	32.00[a]	1.00	4.00	2.00	3.00	6.00
Std. Deviation	8.22	0.34	0.63	0.96	1.33	1.30
Skewness	1.47	2.15	−0.26	0.56	0.81	−1.60
Kurtosis	3.54	2.66	−0.11	−0.59	0.78	1.32
Range	44.00	1.00	3.00	3.00	6.00	5.00
Minimum	21.00	1.00	2.00	1.00	1.00	1.00
Maximum	65.00	2.00	5.00	4.00	7.00	6.00

Table 4. Summary statistics.

	EFPI	GRC	FRM	GA	HCD
Mean	3.71	2.97	3.55	3.59	3.68
Median	4.00	3.00	3.80	4.00	4.00
Mode	4.00	4.00	4.00	4.00	4.00
Std. Deviation	0.87	1.14	0.95	0.99	1.10
Skewness	−1.15	−0.14	−0.85	−0.67	−0.91
Kurtosis	1.30	−1.13	0.25	−0.30	0.29
Range	4.00	4.00	4.00	4.00	4.00
Minimum	1.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00

Table 5. Reliability statistics.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.909	.912	15

Reliability analysis (for predictor variables)

The study used Cronbach's alpha, a psychometric measure that ensures the internal consistency and reliability of scales with multiple items, for reliability testing. This method helps validate scales by quantifying the internal coherence among their constituent items. The evaluation of a 15-item education finance scale demonstrated its utility in establishing the interconnectedness and consistent measurement of the education finance domain. The Cronbach's alpha coefficient of 0.909 demonstrates high internal consistency, indicating strong agreement and coherence among the diverse items and enhancing the instrument's credibility and dependability in examining complex dimensions of education finance (Table 5).

Regression analysis

The study used multiple regression analysis to investigate the impact of various explanatory variables on education finance performance in Somalia. These variables include Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD). The analysis also included three control variables: education, sector, and position of the participants. The results revealed that the combination of predictors explained approximately 70% of the variation in the EFPI scores. GRC was found to be a significant predictor, with a positive coefficient, indicating the role of government commitment in fostering education finance performance. Financial resource management (FRM) was identified as a consequential determinant, indicating a positive connection between effective financial resource allocation and enhanced learning outcomes. Governance and accountability (GA) played a crucial role, emphasizing the importance of governance structures and accountability mechanisms in fostering an environment conducive to superior education finance performance. Human capital development (HCD) has a significant influence on EFPI, emphasizing the importance of investing in human capital to improve education finance performance. The control variables, such as Education and Sector, also had positive influences, whereas Position had a modest negative effect. Overall, the analysis revealed the complex dynamics of education finance and its multifaceted influence on the education system in Somalia.

Table 6. Regression results.

Independent variables	Coefficient	t-statistic	VIF
(Constant)	0.018	0.051	n.a
GRC	0.195	3.261***	1.205421
FRM	0.194	1.766*	4.051820
GA	0.400	3.983***	3.384929
HCD	0.292	4.213***	1.607954
Education	0.116	2.017**	1.115240
Sector	0.100	1.705*	1.162804
Position	−0.114	−1.921*	1.186282
R-squared (R^2)	0.699		
Adjusted (Adj. R^2)	0.678		
Durbin-Watson	1.865		
F-statistics (*prob*)	33.534	0.00	
Heteroskedasticity test: White			
F-statistics (*prob*)	1.214	0.24	
Obs*R^2	40.108	0.25	
Normality test: Jarque–Bera	2.692	0.26	

Diagnostics

The study revealed acceptable variance inflation factors (VIFs), with each variable having a VIF below five, as detailed in Table 6, indicating minimal multicollinearity. This enhances the reliability of coefficient estimates and emphasizes the independence of predictor variables. Adhering to the VIF threshold allows for greater certainty in interpreting coefficients and minimizing the risk of inaccurate estimates due to multicollinearity. Assessing the normality of residuals in regression analysis is crucial, as it influences the credibility of conclusions. The residuals should ideally have a distribution resembling a normal bell curve. The results of the Jarque–Bera test indicate that the obtained p value of 0.26 is above the conventional significance level (often set at 0.05). This suggests that there is no substantial evidence to conclude that the residuals significantly deviate from a normal distribution. The study revealed a consistent spread of residuals across predictor levels via the White Heteroscedasticity Test, with insignificant F statistics (F statistics = 1.224, p value = 0.24) and Obs*R-squared values (OR = 40.11, p value = 0.25). Homoscedasticity, which is crucial for valid regression inferences, was also insignificant, indicating a constant variance assumption. In this analysis, both the F statistic and ObsR-squared were insignificant, implying that the constant variance assumption was met. The results support the absence of heteroscedasticity, reinforcing valid conclusions from the regression model. Independence evaluation in regression analysis is crucial for identifying correlations between residuals and predictors. The Durbin–Watson statistic, with a value of 1.865, confirms residual independence, enhancing model inference reliability by confirming minimal interdependencies among residuals. The linearity analysis revealed significant linear associations between independent variables (GRC, FRM, GA, HCD) and the dependent variable (EFPI). The findings show significant linear associations for each predictor: GRC with the EFPI ($F = 7.279$, $p = 0.08$), FRM with the EFPI ($F = 162.724$, $p = 0.00$), GA with the EFPI ($F = 136.305$, $p = 0.08$), and HCD with the EFPI ($F = 58.905$, $p = 0.00$). Nonlinear deviations are not statistically significant, confirming the assumption of linearity for all relationships.

Discussion

The aim of this study is to investigate the impact of Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD) on the Education Finance Performance Index (EFPI). The use of multiple regression analysis allowed for a comprehensive investigation into the relationships between Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD). The results showed that the amalgamation of predictors in the multiple regression model accounted for a substantial proportion of the variance within the EFPI scores. Approximately 70% of the observed variability in the EFPI scores could be attributed to the encompassed variables, highlighting the ability of these variables to understand the intricate tapestry of educational system performance.

The regression coefficients offer valuable insights into their unique impacts on the EFPI while maintaining the constancy of other influencing variables. Government recognition and commitment (GRC) emerged as a significant and positive predictor of EFPI, suggesting that higher levels of GRC are closely linked with elevated EFPI scores. This highlights the criticality of governmental dedication in fostering an environment conducive to the enhancement of educational outcomes. Financial resource management (FRM) also exerted a discernible and noteworthy influence on EFPI, suggesting a plausible and constructive link between adept management of financial resources and improvements in education finance performance. A well-executed strategy for the allocation and utilization of financial resources has the potential to yield favorable outcomes for education finance. Financial resource management (FRM) has a significant effect on education finance performance, with effective strategies focused on prudent allocation and utilization of funds. By enhancing financial transparency, accountability, and strategic resource allocation, educational institutions can better position themselves to achieve improved EFPI outcomes. FRM also contributes to creating enriched learning environments and better support for educators, underscoring the importance of financial decisions within the educational sector.

Moreover, governance and accountability (GA) have emerged as critical determinants of the Education Finance Performance Index (EFPI), with a significant positive association. The GA emphasizes the importance of well-structured governance frameworks and mechanisms of accountability in cultivating an environment conducive to fostering educational excellence. Clear lines of authority, transparent decision-making processes, and effective oversight mechanisms play crucial roles in shaping the financial dynamics and overall efficacy of educational institutions. A multifaceted approach to governance and accountability within the educational sphere, emphasizing transparency in financial dealings, robust mechanisms for tracking and reporting expenditures, and active engagement of relevant stakeholders can collectively contribute to a positive impact on the performance of educational systems. This highlights the need for educational policymakers and administrators to prioritize the establishment and maintenance of strong governance structures, laying the foundation for sustainable financial practices and improved educational outcomes.

Human capital development (HCD) is another significant contributor to the EFPI, with a substantial and statistically significant positive effect. HCD highlights the importance of investing in human resources within the education sector, recognizing the profound impact that a well-trained and motivated teaching workforce can have on the broader educational landscape. A proficient and enthusiastic teaching workforce not only enhances classroom instruction quality but also drives the adoption of innovative pedagogical techniques, fostering heightened student engagement and contributing to the overall advancement of the education system. In summary, investing in HCD not only supports the attainment of improved educational outcomes but also aligns with broader goals of educational excellence, innovation, and the nurturing of a capable future workforce.

The study was conducted in the context of Somalia, a nation with unique educational challenges, including limited resources, governance gaps, and the pressing need for educational reform. These contextual factors influence the observed relationships, as the nation's socioeconomic and political conditions significantly shape how variables such as GRC, FRM, GA, and HCD interact with EFPI. The findings are thus reflective of a broader need for tailored solutions in resource-constrained and transitional contexts.

Compared with other regions, the findings align with global trends that emphasize the importance of governance, resource management, and human capital in education finance. However, Somalia's unique challenges, such as political instability and limited financial resources, make the role of the GRC particularly pronounced. This highlights both universal and context-specific aspects of educational finance, suggesting that while general strategies may apply broadly, local adaptations are essential.

The findings of the present study align with and contribute to the literature in the field of education finance. The study's emphasis on multiple explanatory variables and their influence on the Education Finance Performance Index (EFPI) reflects a comprehensive approach, which is consistent with previous research that emphasized the multifaceted nature of educational finance. The findings of this study with respect to Government Recognition and Commitment (GRC) are in line with the literature. The observation that higher levels of GRC are positively associated with elevated EFPI scores corroborates the findings of many prior studies that often highlight the pivotal role of government commitment in providing

the necessary policy and financial support for the education sector (Bray, 1996; Chalmers, 2011; Friedman, 1955; Ndungu, 2017; Shaturaev, 2021). Likewise, the study's identification of financial resource management (FRM) as a significant predictor of EFPI aligns with previous research that emphasized the importance of efficient financial resource management in education. Scholars have consistently argued that prudent allocation and utilization of funds can lead to improved educational outcomes (Baker, 2021; Manu et al., 2019; Mestry & Govindasamy, 2013; Odide et al., 2022). Similarly, the study's emphasis on the critical role of governance and accountability (GA) in educational finance also corroborates the literature that stresses the need for transparent, well-governed education systems with strong accountability structures to ensure the effective use of resources (Amaghouss & Zouine, 2022; Asongu & Odhiambo, 2021; Dao, 2015; Gordon, 2012; Shattock, 2006). Finally, the study's identification of human capital development (HCD) as a significant contributor to the EFPI echoes prior research that underscores the importance of investing in human resources within the education sector. Studies have recognized a highly skilled and motivated teaching workforce as a key factor in improving educational quality (Darling-Hammond et al., 2017; Fernández & Rogerson, 1999; Ibrahim, 2018; Little & Bartlett, 2010; Paulsen, 2001; Zhou et al., 2018).

However, this study makes a significant and distinctive contribution to the literature on education finance by providing fresh and thorough insight into how Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD) interact within the context of the Education Finance Performance Index (EFPI). Although previous research has explored these factors individually, this study uniquely amalgamates them within a multifaceted analysis, offering a more holistic understanding of how they collectively impact educational finance performance. Furthermore, the study's identification of the specific proportion of variance in EFPI scores (approximately 70%) explained by these factors adds valuable quantitative insights to the field. By highlighting the importance of these variables in shaping educational finance, this research not only advances the theoretical understanding but also offers practical implications for policymakers and educational administrators aiming to improve the financial performance and quality of education systems worldwide.

The outcomes derived from this robust multiple regression analysis carry substantial policy and practical implications for the field of education finance. This investigation reveals crucial insights into the intricate factors influencing the Education Finance Performance Index (EFPI). The implications extend beyond the academic domain, encompassing the realms of policy formulation, educational management, and decision-making across various levels. The findings contribute valuable knowledge that can inform and guide policymakers, educational administrators, and decision-makers in refining strategies and approaches to enhance education finance practices and outcomes.

The findings confirm the indispensable role that Government Recognition and Commitment (GRC) plays in the process of cultivating educational system excellence from the point of view of public policy. The robust positive associations between Government Recognition and Commitment (GRC) and the Education Finance Performance Index (EFPI) suggest that a sustained commitment from governmental entities can serve as a catalyst for improvements in educational outcomes. Policymakers should be encouraged to direct resources and efforts toward bolstering government recognition and commitment. This could be accomplished by establishing supportive frameworks and policies that prioritize educational advancement. Such endeavors could include initiatives that enhance collaboration between educational institutions and governmental bodies, promoting an environment that is conducive to the overall improvement of the educational system.

In addition, the finding that financial resource management (FRM) is a critical determinant of the EFPI highlights the importance of the prudent distribution and utilization of financial resources within educational systems. It is strongly recommended that decision-makers and administrators implement efficient strategies for financial planning and resource management, with the end goal of maximizing the distribution of resources across educational programs, infrastructure, and learning materials. This may entail measures such as transparent budgeting practices, innovative funding mechanisms, and prudent investment in educational resources to facilitate improved educational outcomes.

The prominent connection between governance and accountability (GA) and EFPI highlights how important it is for educational systems to have effective governance structures and mechanisms of

accountability. Policymakers and education leaders are encouraged to prioritize the establishment of transparent governance frameworks, effective oversight mechanisms, and systems to promote stakeholder engagement. Policymakers have the ability to foster an environment of transparency, responsiveness, and continuous improvement when they ensure accountability at various levels of the education sector. This ultimately contributes to an improvement in the overall performance of the educational system.

The importance of investing in human capital within the education sector is highlighted by the finding that human capital development (HCD) significantly influences the Education Finance Performance Index (EFPI). The development of educators' professional skills should be a topmost priority for policymakers, who should also strive to improve programs that train teachers and cultivate environments that encourage the personal and professional development of educational staff. Educational institutions have the ability to create a positive ripple effect by cultivating a skilled and motivated workforce. This can lead to improvements in teaching quality, student engagement, and the overall performance of the educational system.

The study advances the theoretical understanding by integrating multiple determinants of EFPI into a cohesive framework. It demonstrates how GRC, FRM, GA, and HCD interact to influence education finance performance, highlighting the interconnectedness of governance, resource allocation, and human capital in shaping educational systems. This integrated perspective provides a robust foundation for future theoretical developments in education finance.

This study offers a unique contribution by quantifying the combined explanatory power of key determinants, accounting for 70% of the EFPI variance. Unlike previous studies that often examine these factors in isolation, this study integrates them into a multifaceted analysis, offering a holistic understanding of their interplay. This innovative approach enhances the field's ability to design comprehensive interventions for improving educational finance performance.

This research contributes to the literature by bridging gaps in understanding how multiple factors collectively influence EFPI. It extends previous studies by contextualizing findings in Somalia, providing both theoretical and practical insights. Additionally, the study's quantitative focus on the variance explained by these factors enriches discussions on the measurable impact of educational finance determinants.

Conclusion

The primary objective of this study is to investigate the dynamics of critical determinants of education finance in Somalia. The outcomes generated by the comprehensive multiple regression analysis yield a holistic comprehension of the combined impacts stemming from a spectrum of diverse variables on the Education Finance Performance Index (EFPI). The study identified GRC, FRM, GA, and HCD as significant contributors to EFPI, collectively explaining 70% of its variance. These findings shed light on potential avenues for informed policy interventions designed to cultivate and amplify enhanced educational outcomes. The established statistical significance of Government Recognition and Commitment, Financial Resource Management, Governance and Accountability, and Human Capital Development collectively provides stakeholders with a robust framework for making evidence-driven decisions. Consequently, this study makes a substantial contribution to the broader discourse on the augmentation of educational systems, providing pragmatic insights that resonate with stakeholders invested in the continual enhancement of educational quality and performance.

The study contributes to theoretical frameworks by demonstrating the interconnectedness of governance, resource management, human capital, and government commitment in shaping EFPI. This study provides a basis for further exploration of multifaceted approaches to education finance. Policymakers are encouraged to strengthen government commitment to education, implement transparent financial practices, and establish accountability mechanisms. Investments in teacher training and development should also be prioritized to maximize human capital potential. The findings serve as a guide for education administrators to enhance resource allocation, governance, and workforce development. These strategies can be tailored to address specific challenges in diverse educational contexts, fostering systemic improvements.

The study highlights the importance of adopting integrated approaches in educational finance, offering a robust framework for comprehending and addressing systemic challenges within education systems. Its findings carry significant implications for global conversations on promoting equity and enhancing quality in education. However, the study's limitations present valuable opportunities for future research. The cross-sectional design restricts the establishment of causal relationships, limiting insights into the temporal dynamics of the observed associations. Additionally, the context-specific focus on Somalia may affect the generalizability of the findings to regions with differing socioeconomic, political, and educational frameworks. The measurement of key variables, though methodologically sound, may not encapsulate their multifaceted dimensions entirely, raising questions about construct validity and reliability. The unexplored potential for nonlinear relationships between predictors and the Education Finance Performance Index (EFPI) suggests that complex patterns may have been overlooked. Furthermore, the modest explanatory power of the findings underscores the importance of employing advanced statistical techniques, such as exploratory factor analysis (EFA) for refining constructs, structural equation modeling (SEM) to explore direct and indirect effects, and panel data analysis to integrate longitudinal and cross-sectional dimensions, ultimately enhancing the depth, nuance, and applicability of future studies.

Future research should address the outlined limitations by adopting advanced methodologies and broader contexts to enhance the robustness and generalizability of findings. Longitudinal studies using **Panel Data Analysis** could better capture temporal dynamics and causality, providing deeper insights into how variables interact over time. Employing **structural equation modeling (SEM)** would allow for the exploration of both direct and indirect effects, offering a more comprehensive understanding of interrelationships among key determinants. Additionally, **exploratory factor analysis (EFA)** can refine construct validity, ensuring that variables adequately capture their multifaceted dimensions. Expanding the research to include diverse socioeconomic and geographical contexts would further validate the findings and explore their applicability across varying educational systems. Finally, investigating potential nonlinear relationships through advanced modeling techniques could reveal complex patterns, enriching the understanding of factors influencing education finance performance.

In conclusion, this study provides valuable insights into the factors influencing the Education Finance Performance Index (EFPI), emphasizing the critical roles of Government Recognition and Commitment (GRC), Financial Resource Management (FRM), Governance and Accountability (GA), and Human Capital Development (HCD). By highlighting the interconnected nature of these variables, this research offers a robust framework for understanding and addressing systemic challenges in educational finance. While the study's context-specific and cross-sectional nature presents limitations, it also underscores the need for further exploration using advanced methodologies and broader contexts to enhance the depth and applicability of findings. Ultimately, this study contributes to the global discourse on improving equity, quality, and efficiency in education, serving as a foundation for future research and practical interventions aimed at advancing educational outcomes in diverse settings.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix. Questionnaire: Critical success factors for education finance in Somalia

This questionnaire is designed to gather information and opinions on key factors that contribute to the successful management and allocation of funds in the education sector. Your time and willingness to participate in this survey are greatly appreciated. Please answer these questions honestly and accurately. Your responses will remain strictly confidential and will only be used for research purposes.

Section 1: Demographics

1. Age
   (Open response).

2. Gender
- Male
- Female

3. Education
- a) Less than high school
- b) High school diploma
- c) Bachelor's degree
- d) Master's degree
- e) Doctorate (Ph.D.)

4. Sector
- a) Government
- b) Private sector
- c) Non-profit/NGO
- d) Other

5. Position
- a) Entry-level (Less than a year)
- b) Mid-level (1-5 years)
- c) Senior-level (5-10 years)
- d) Executive/Management
- e) Self-employed
- f) Student
- g) Unemployed

6. State
- Puntland State
- Jubaland State
- Southwest State
- Galmudug State
- Hirshabelle State
- Banadir Region

Section 2: Opinions on Education Finance

Please indicate your level of agreement with the following statements:

1. Somalia's government recognizes the importance of education finance.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

2. The Somali government considers education finance when drafting public policies.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

3. The government does not allocate sufficient funds for education.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

4. Somalia's government uses education funds inefficiently.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

5. There is no effective system of allocating, spending, and accounting for education funds.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

6. Weak government institutions continue to pose an obstacle to securing sufficient education funding.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

7. The Somali government failed to integrate the existing multiple sources of education funding.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

8. Because of the government's poor performance, education financing remains one of the lowest in the region.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

9. Corruption and mismanagement in education finance.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

10. Strategic financial planning plays a vital role in effectively managing and allocating education finance.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

11. Access to education is closely linked to the availability and adequacy of education finance.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

12. Education quality is influenced by the allocation and effective utilization of education finance.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

13. Effective risk management in education is essential for maintaining sustainable and equitable educational opportunities.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

14. Education funds are poorly managed due to a deficit of integrity among public servants.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

15. Providing competitive incentives and remuneration is key to attracting and retaining competent and responsible public servants for effective education finance management.
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree