Leadership Roles in Innovation Management and School-Based Budgeting to Improve School Effectiveness

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ABSTRACT

This think about points to look at and analyze the part of authority in school-based development administration and budgeting to make strides school viability. Employing a quantitative approach and overview methods, information was collected through surveys disseminated to school principals, directors, and instructors over different schools in a chosen locale. The ponder included 400 respondents, decided through a stratified arbitrary testing strategy. Information investigation was conducted utilizing the PLS-SEM strategy to recognize the coordinate and circuitous impacts of administration on advancement administration, budget allotment, and by and large school viability. The comes about of the consider demonstrate that (1) authority emphatically impacts the viability of development administration, (2) school-based budgeting contributes to improved school execution, (3) the principal's authority plays a basic part in supporting inventive hones, (4) administration impacts budget assignment methodologies, and (5) compelling budgeting and advancement administration together contribute to moving forward by and large school viability. In this way, the discoveries recommend that solid authority, successful administration of development, and key budget arranging are fundamental for improving school execution.

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INTRODUCTION

Leadership determines the success of an organization, including schools. Silva (2016) states that leadership is the process of pushing, encouraged, and encouraging others to achieve a common goal. According to Benmira and Agboola (2021), leadership theory is constantly evolving, and leadership approaches must be adapted to changes in the organizational environment. In terms of education, Davies and Davies (2004) emphasized that strategic leadership is essential for setting goals, overseeing transformation, and achieving institutional effectiveness. Leadership, according to Kruse (2013), is an art that encourages a person to give the best of himself, not just the position. In addition, Nanjnudeswaraswamy and Swamy (2014) emphasize that many leadership styles are relevant, including

transformational and participatory. Methods like this can help increase innovation and efficiency in school management. School-based budgeting (SBB) is an approach that allows schools to manage their own finances. Hadderman (1999) emphasized that SBB allows school leaders and school communities to set priorities based on local needs. Chan (1997) developed a cost-benefit analysis model that shows how SBB can improve the efficiency of budget use. A study conducted in New York City by Iatarola and Stiefel (1998) showed that SBB increased school community participation and accountability in financial management. boots etc. (2003) added that performance-based budgeting initiatives implemented in New York City can improve academic performance.

In addition, Alahmadi and Tabrizi (2019) showed that effective budget planning in schools can improve resource allocation and strategic decision-making. In this highly changing era, innovation management has become critical to the sustainability and success of education. According to Appio et al. (2021), digital transformation accelerates innovation in the education system. In contrast, Leonidou et al. (2020) propose a collaborative framework that involves stakeholders who contribute to innovation. According to Adams, Bessant, and Phelps (2006), one important step in evaluating the success of innovative strategies is to assess innovation management. McCahren, Song, and Martens (2011) emphasized the relationship between organizational learning and creativity when driving school innovation. As stated by Tidd and Bessant (2014), an effective innovation strategy requires supportive leadership and an organizational culture that is open to change. School-based budgeting, innovation management, and leadership can be combined to achieve school efficiency goals. Salabi (2020) emphasized that the implementation of an effective curriculum is very important to get the best learning results. According to Nurpuspitasari et al. (2019), the role of school principals and school culture in creating a good learning environment was discussed. There is a strong correlation between school components and student learning outcomes, according to international research on school effectiveness (Teddlie 2000). According to Makita et al. (2023), student empowerment and a supportive school environment can improve system performance. Thomas and Collier (1997) emphasized that academic focus and students' ability to face global challenges are related to school effectiveness.

Literature Review
Leadership
Educational leadership faces more complex challenges that require leaders to quickly adapt to changes brought by technology and globalization. Ulfah, Supriani, and Arifudin (2022) show that effective educational leaders need innovative capabilities to overcome these challenges. Rahmat (2021) the transformational leaders can bring about the big changes needed to improve the quality of education. He emphasized that a good leader must be able to inspire and motivate staff and teachers and encourage innovation in teaching methods. Usman (2021) emphasized that successful instructive authority must be based on a exhaustive understanding of administration and administration. Salsavilla et al. (2022) distinguished different sorts and styles of administration that are fitting for instructive situations, counting law based, dictator, and participative styles. Agreeing to him, the sort of authority qualities a pioneer has impacts his inspiration to work at school.

Participative administration, which emphasizes discourse and active participation, is one of the foremost viable styles for driving instructive advancement. Agreeing to Seni (2021), instructive authority in schools does not as it were center on inside administration but moreover on how pioneers can construct great connections with the outside community. Hapudin, Praja, and ST (2023) emphasize that effective instructive administration is administration that centers on moving forward the quality of instruction. They propose that pioneers have to be actualize clear and quantifiable procedures as portion of nonstop advancement endeavors. Rahmawati (2021) in her book on instructive administration emphasizes the significance of visionary authority. Visionary pioneers have a clear long-term vision and can direct the school towards accomplishing these long-term objectives. Visionary leadership moreover incorporates creating advancement and utilizing innovation to extend the adequacy of the learning handle in schools.

Concurring to Musfah (2022), instructive authority does not as it were incorporate school administration but moreover building up approaches that bolster the accomplishment of instructive objectives. Instructive pioneers must be able to create information and research-based approaches and make choices that increment the adequacy and effectiveness of school operations. Ju'subaidi (2021) emphasized that instructive administration must be comprehensive and include the whole school community. Comprehensive administration makes a agreeable and compelling learning environment that impacts the quality of understudy learning. Hamid et al. (2023), in their inquire about on instructive authority and organizational behavior, They emphasize that pioneers who can illustrate keenness, candor, and a positive state of mind impact positive behavior in representatives and understudies. These pioneers can make a learning environment that energizes learning and makes strides execution all through the organization. Hamini (2020) emphasized that great instructive pioneers must have solid ethical character. He contends that instructive pioneers work not as it were as chairmen but too as ethical part models for instructors and understudies. Angolowati et al. (2021) discusses the importance of communication in educational leadership. They say that effective communication between school leaders and staff, students and parents is essential to building collaborative and productive relationships. Communicative leaders can more easily overcome challenges because they can maintain a clear and open flow of information within the school community. Nisa (2022) discusses leadership in the context of school management. He emphasized that school-based management provides schools with greater autonomy in decision-making to meet local needs. In this model, school leaders play a key role in managing resources and developing policies that increase school effectiveness and efficiency. Juhji (2020), highlighted that educational leadership is one of the key elements of educational success. This shows that effective leadership is characterized by the ability to influence and guide others as well as making decisions in a timely manner and based on facts. Successful educational leaders also have excellent communication skills necessary to manage social dynamics in the school environment.

H1: Is there an influence of the leadership (X1) on innovation management (Z)

H2: Is there an influence of the leadership (X1) on school based budgeting (Z)

H3: Is there an influence of the leadership (X1) on school effectiveness (Y)

Innovation Management

Teacher organization in common might be a handle of orchestrating, organizing, planning, administering, and studying. Educator endeavors in orchestrate to realize educator targets that have been set as of now. To predominant get it the meaning of instruction organization, it is basic to look at in significance the meaning of administration and instruction itself. Concurring to Koontz, O'Donnel and Weichrich, organization is the method of carrying out work through one or many people to encourage the works out of others to accomplish comes almost that cannot be fulfilled on the off chance that done by one person. Hasibuan (1984:3) fights that organization may be a standard handle comprising of orchestrating, organizing, mobilizing and controlling exercises that are carried out to decide and fulfill foreordained targets through the course of action of human resources and other resources. Within the cruel time, Terry (1986) characterizes organization as the capacity to arrange and fulfill needed comes approximately with the point of human endeavors and other sources (Ahmad, 2016:40) (Kristiawan et al., 2017:1). There are various suppositions of pros with regard to the meaning of instruction organization, among which Nurhadi gives a clear picture by depicting the characteristics of organization so that it can be called instruction organization, in this case his supposition around instruction organization is an activity or a course of action of works out inside the outline of a handle of managing the pleasant exchange of a accumulate of people who are people of an educator organization, to achieve the teacher destinations that have been set as of now, to be viable and capable. Teacher organization in common may be a plan of organizing, organizing, planning, managing, and studying. Teacher endeavors in organize to achieve teacher targets that have been set as of now. To prevalent get it the meaning of instruction organization, it is essential to look at in significance the meaning of organization and instruction itself.

Koontz, O'Donnel and Weichrich, organization is the strategy of carrying out work through one or a few individuals to organize the works out of others to accomplish comes approximately that cannot be fulfilled on the off chance that done by one person. Hasibuan acknowledges that organization may be a ordinary plan comprising of organizing, organizing, moving and controlling exercises that are carried out to choose and fulfill foreordained destinations through the circumstance of human resources and other resources. Within the intervals, Terry characterizes organization as the capacity to arrange and fulfill needed comes around with the goals of human endeavors and other sources (Ahmad, 2016:40) (Kristiawan et al., 2017:1). There are various suppositions of masters with regard to the meaning of instruction organization, among which Nurhadi gives a clear picture by delineating the characteristics of organization so that it can be insinuated to as instruction organization, in this case his supposition around instruction organization is an development or a course of action of works out inside the outline of a plan of supervising the pleasing commerce of a bunch of people who are people of an educator organization, to realize the educator destinations that have been set as of now, to be compelling and profitable. Inside the book by Kristiawan et al. (2018), Kingsley Price's conclusion roughly instruction is as a plan in which non-physical social wealth is kept up or made in raising children or raising grown-ups. Also, instruction concurring to KI Hajar Dewantara may be a get ready of overcoming issues as well as finding and making strides the quality of life of

people and communities that keeps going a lifetime. Based on the over definition, the maker concludes that instruction may be a cognizant effort of grown-ups in internalizing goodness or respectable morals to understudies with the point of developing behavior or changing loathsome behavior into great and actualized in behavior in presence (Kristiawan, 2016:92). Advancement in instruction organization is essential to advance the quality and practicality of teacher instruct. Ahmad (2016) communicated that the organization of school principals is an basic calculate for the triumph of educator teach which "preeminent organization quality" supports progression in instruction organization. Christiawan et al. (2018) included that educator advancement is the key to answering today's challenges and communicated that "educator progression must prioritize creative ability and aptitudes" related to the prerequisites of today's understudies. Besides, Srilaksmi and Indrayasa (2020) emphasized that "teacher improvement to move forward instruction quality methods" is especially basic to ensure perfect learning comes about. Phaedra et al. (2023) consider the portion of educator headway in understanding distinctive issues stood up to by educator teach and fight that "teacher advancement as a course of action to teacher issues" gives a cutting edge approach to overcome existing challenges. Hasanah (2020) moreover emphasized the importance of battle organization inside the world of instruction, especially in Islamic teacher educate, communicating that "battle organization to advance work quality" is especially imperative in making a concordant work environment. Nurjanah (2015) clarified the portion of progression organization in making strides the execution of teacher organizations: "Headway organization plays an imperative portion in building a responsive and flexible educator organization.

Baslini (2022) considers the parts, commitments and obligations of instruction. It is communicated that the "parts, commitments and commitments of instruction organization" must be consistent with the vision of the institution to realize its educator goals. Hack et al. (2023) assessed the organization of educator improvement from the point of see of effective schools and concluded that "organization of educator progression from the point of see of fruitful schools" contributes to making strides the quality of instruction. Vicea (2021) gives an examination of the concept and work of instruction organization which need to be pointed at building a viable instruction system. Shabana et al. (2024) analyzed the self-paced instructive programs as an teacher advancement and emphasized that the "teacher change" brought around by the self-paced instructive modules makes a space for versatile learning. Aryani and Fitriani (2020) talked almost creative learning improvements in instruction and communicated that "creative learning improvements in instruction" can make an inquisitively learning environment. Yusminar (2024) reviewed the utilization of instruction organization in assistant schools through improvement and found that "the utilization of instruction organization in assistant schools through progression" can move forward the capability of the learning handle. At long final, Julaeha et al. (2021) consider instructive programs headway organization, emphasizing that "instructive modules progression organization" is crucial to ensure a instructive programs that's in assention with the times and understudy needs.

H4: Is there an influence of the innovation management (X2) on school effectiveness (Z)

School Based Budgeting

Salcombe et al. (2023) assessed the impact of enhancement School-based budgeting is an imperative technique of money related organization inside the field of instruction since it gives autonomy to schools to supervise their budgets openly, in separate to the centralized budgeting system that's as a run the show utilized. School-based budgeting licenses money related choices to be made by neighborhood accomplices, such as teaches, understudies, and gatekeepers, who have made strides understanding of the needs of their communities. Wooldridge and Smith (2024) fight that by particularly counting communities inside the budget decision-making handle, the coming around courses of action can be more fair and comprehensive, and able to diminish incongruities in resource task. In development, this affiliation besides increases open duty since schools not because it were center on gathering operational needs, but too on endeavors to decrease social imbalance. School-based budgeting gives schools the master to assign budgets concurring to adjacent needs, checking mentoring programs that are considered basic. Martins et al. (2024) showed up that mentoring programs to help understudies move to the taking after level will be more effective within the occasion that schools have adaptability in resource organization.

Inside the framework of school-based budgeting, this approach licenses schools to be dependable for the task of saves gotten. Mauro et al. (2020) proposed that by applying the rule of performance-based budgeting, schools can center more on fulfilling quantifiable comes approximately, such as moving forward understudy achievement and teaching quality. This not because it were fortifies obligation, but in addition energizes progression in resource organization, as schools will be propelled to find cutting edge, more profitable ways to accomplish their teacher objectives. Performance-based budgeting emphasizes the centrality of the relationship between budget task and the comes approximately to be fulfilled, allowing educator teach to survey the ampleness of the utilize of stores. In school-based budgeting, this approach gives schools the adaptability to set budget task needs concurring to their adjacent needs and goals. Pratolo et al. (2020) emphasized that school-based budgeting gives schools the opportunity to supervise and allocate budgets concurring to their specific needs. School-based budgeting gives schools with the opportunity to supervise and allocate budgets concurring to their particular needs. Wampler (2021) emphasizes that participatory budgeting incorporates the energetic intrigued of accomplices, such as understudies, gatekeepers, teaches, and community people, inside the decision-making get ready with regard to resource task. This approach licenses for a wide expand of voices to be tuned in, so budget choices prevalent reflect wants and needs of the community.

Bartocci et al. (2023), participatory budgeting grants accomplices, tallying the community, to have an energetic portion in budget decision-making. Inside the setting of schools, this suggests that educates, understudies, and gatekeepers can allow input on contributing needs and budget assignments. Wampler, McNulty, and Touchton (2021) They point out that school-based budgeting gives a arrange for educates, gatekeepers, and understudies to contribute to choosing budget needs, so that asset allotment better reflects the prerequisites and wants of the instruction community. Cabannes (2015) showed up that

school-based budgeting that gets a participatory approach can increase community affiliation, straightforwardness, and duty in budget organization. By giving openings for communities to contribute to decision-making, school-based budgeting gets to be more responsive to neighborhood needs and in the long run contributes to moving forward the quality of instruction and crucial organizations gotten by understudies. Bogsnes fights that performance-based budgeting got to be results-oriented, where fundamental thought is centered on finishing goals and making strides execution. Inside the setting of schools, this implies that budgeting isn't because it were limited to numbers, but must additionally pay thought to the influence and comes almost fulfilled from each bolster assignment.

Performance-based budgeting can be a organized approach and centers on comes approximately and the accomplishment of instructor objectives. With this strategy, schools can facilitate their thought to the specified comes around, such as making strides understudy accomplishment and the in common quality of instruction. This approach enables the organize and utilization of budgets based on a clear examination of existing needs and needs, in this way permitting for more idealize assignment of assets. Khan uncovered that one of the key benefits of school-based budgeting is the expanded support of all accessories, counting teaches, guardians, and understudies, interior the decision-making handle. By counting distinctive parties, schools can make budget choices that are more clear and in assention with the prerequisites interior the field. This connection not since it were increments a sense of proprietorship among assistants, but additionally fortifies commitment interior the utilize of spares. Bartlett and Schugurensky clarify that school-based budgeting gives understudies, instructs, and guardians the opportunity to require parcel interior the decision-making handle with respect to asset errand. This approach not since it were increases straightforwardness in budget organization but other than makes space for exchange and collaboration between accessories. By tallying different voices interior the arrange, schools can guarantee that the distributed budget is in line with needs and needs of the community, in this way making a more comprehensive learning environment.

H5: Is there an influence of the school based budgeting (X3) on school effectiveness (Z)

School Effectiveness

Mariana (2021) highlights the basic portion of school principals inside the triumph of school programs that point to move forward the quality of direction. Compelling school pioneers can lead, induce, and advocate for crucial changes in teacher educate. Fikri and Nasution (2018) School pioneers who envision transformational administration can advance school execution by empowering staff and teaches. An reasonable imperative not because it were directs school operations, but in addition engages capable teachers headway and makes a school environment that engages learning. This makes a distinction advance school reasonability. Fadila et al. (2020) highlighted the significance of supervising school resources to create strides the quality of instruction. Well-managed schools can make solid learning circumstances where understudies and educates have get to to the resources they ought to get through. Hoy & Miskel (2014) describe school effectiveness as a measure of school performance based on an open social system model. This model includes internal learning systems in organizations that meet existing expectations, school structure, school

culture and climate, political forces, and individual work motivation. Agassi (2005) explains that school effectiveness is a measure of school performance which includes two things. First is the ability of school leaders to increase the number of graduates who continue their studies to a higher level and reduce school dropout rates. Both of these things have been proven to influence school effectiveness. Second, there are high expectations for students. This encourages collaboration between teachers and students, meets students' high expectations at school, and increases school efficiency (Setyaningsih et all, 2021).

Mulyasa (2004) states that effectiveness refers to an organization's ability to obtain and utilize resources to achieve organizational goals. It was also explained that effectiveness issues are often related to comparing the achievement of goals with previously prepared plans, and comparing actual results with planned results. In relation to educational institutions or schools, school effectiveness is the school's efforts to utilize school resources to achieve its goals (Setyaningsih & Souchyadi, 2021b). Suharsaputra (2013) effectiveness is a measure of the extent to which goals (both quantitative, qualitative and temporal) are achieved. This lets you compare your expectations with what was actually achieved. According to Saleem, Naseem, Ibrahim, Hussain & Azeem (2012), school effectiveness is closely related to student performance as a result of hard work. Students must receive a fair education, regardless of social status or economic background. All students have the right to acquire a minimum level of knowledge and skills. Nurhafifah, Djasmi, and Ambarita (2016) concluded that school principals play an crucial portion in building an effective execution culture in schools. The work culture of a school central impacts teacher execution, which in the long run impacts school capability. Ningrum, Asrori, and Syukri (2018) communicated that modify organization executed by school principals can increase school reasonability through classroom modify programs. School ampleness can be extended in case all components of the school, especially educates and understudies, have a strong commitment to alter to the changes that have been made.
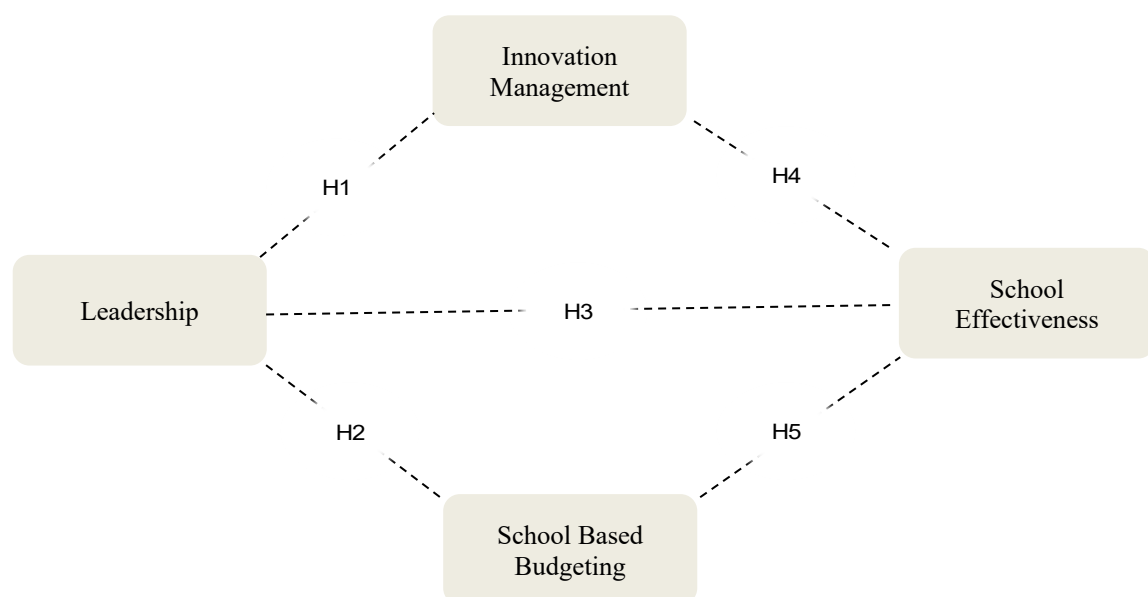

Figure 1. A Conceptual Model Proposed and Developed From The Original Model.

METHODS

A quantitative research approach is used in this study to investigate the roles of leadership in innovation management and school-based budgeting in enhancing school effectiveness. The SmartPLS (Partial Least Squares Structural Equation Modeling) technique was used to analyze the relationships among various factors and to assess the model's suitability. This is because the methodology allows estimation of complex models with multiple variables and latent constructs, which makes it ideal for understanding the dynamic interrelationships between leadership, innovation management, budgeting practices, and structural equation modeling (Hair, at all, 2017). Research on leadership in schools is conducted by consulting studies by García-Morales, Lloréns-Montes, and Verdú-Jover (2008), Kristiawan and Nur (2018). Osorio, at all (2009), who discuss school-based budget management and its impact on educational quality, and Martinez and McAbee (2020) who examine how well schools support student success.

Sample And Population

Before the questionnaire distribution, consent was thoroughly obtained from the ethical committee of Jambi University. This was based on an explanation that the data were only used for study purposes. Using an online questionnaire from September to Oktober 2024, the data collection instruments were subsequently distributed. Furthermore, the virtual filling-in of the data provided strong evidence that participation was highly voluntary. After completion, a total of 400 data were obtained, from 3 different high school in Jambi.

Table 1. Demographic Respondent Data

Respondent Data		N	%
SMA	SMAN 8 Sarolangun	67	33.00
	SMAN 2 Sungai PenuH	70	34.48
	SMAN 7 Tebo	66	32.51
Generation	2024	32	15.76
	2023	137	67.49
	2022	34	16.75

FINDINGS AND DISCUSSION

Data Normality Analysis

Some time recently entering the estimation demonstrate, it is essential to test the typicality of the information through the kurtosis and skewness values of each thing within the expressive insights table as in Table 2. Based on these criteria, all thing factors utilized have kurtosis and skewness values between 0.562 to 4.334 and 0.663 to 1.510, separately. In spite of the fact that the kurtosis values for a few things such as LD1, LD3, and LD5 surpass the edge of 2.2, other factors can still be considered to have ordinarily dispersed information, considering that the skewness values are in a moderately great run. From these comes about, it can be seen that most of these factors have ordinarily dispersed information.

Table 2. Research Limitations and Suggestions

	Mean	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
LD1	1.820	1.000	5.000	0.747	4.334	1.469
LD2	2.040	1.000	5.000	0.754	1.769	0.992
LD3	2.200	1.000	5.000	0.755	3.177	1.405
LD4	1.850	1.000	5.000	0.823	1.849	1.153
LD5	2.110	1.000	5.000	0.817	3.509	1.510
IM1	1.995	1.000	5.000	0.758	2.490	1.118
IM2	2.025	1.000	5.000	0.751	2.500	0.957
IM3	2.145	1.000	5.000	0.731	2.794	1.084
IM4	2.145	1.000	5.000	0.874	0.562	0.663
IM5	2.185	1.000	5.000	0.878	2.120	1.192
SBB1	2.160	1.000	5.000	0.851	2.639	1.402
SBB2	2.200	1.000	5.000	0.843	0.928	0.768
SBB3	2.135	1.000	5.000	0.792	1.085	0.728
SBB4	2.080	1.000	5.000	0.757	2.544	1.048
SBB5	2.120	1.000	5.000	0.810	1.083	0.801
SE1	2.045	1.000	5.000	0.796	2.714	1.299
SE2	2.150	1.000	5.000	0.798	2.156	1.029
SE3	2.175	1.000	5.000	0.812	2.694	1.174
SE4	2.150	1.000	5.000	0.811	0.930	0.738
SE5	2.090	1.000	5.000	0.901	1.624	1.143

Measurement Model

For the investigation of the estimation demonstrate, Hair (2014) recommended assessing focalized legitimacy, composite unwavering quality, and AVE values. Investigation of the estimation show with Savvy PLS assessed concurrent legitimacy (AVE > 0.5) and composite unwavering quality (over 0.7) to guarantee the consistency of the markers. Corroborative Figure Investigation (CFA) was conducted to look at the stacking variables (> 0.7) and discriminant legitimacy was tried with HTMT (< 0.85), which guaranteed the show was substantial and dependable.
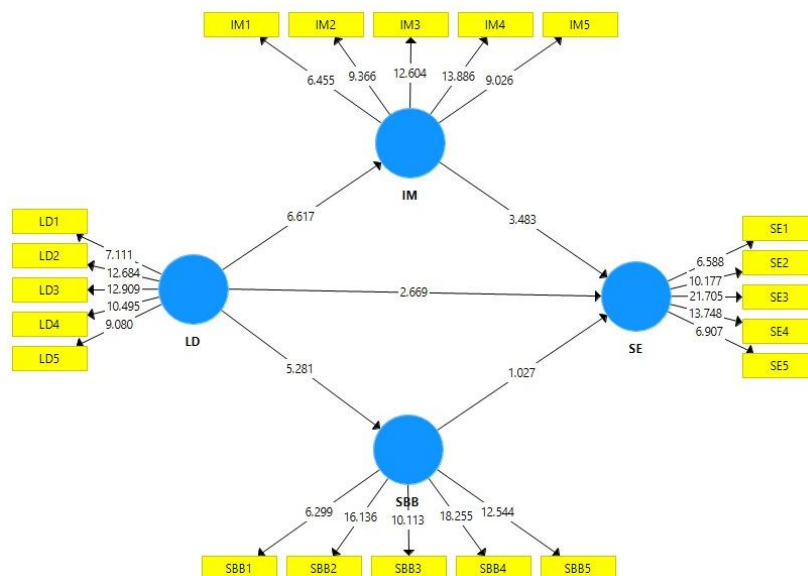
Figure 2. CFA and R-square values in PLS.

Consistency, Unwavering quality, and Inside Legitimacy

The CFA-based PLS calculation is utilized to analyze the outside stacking values on each estimation thing. In this examination, calculate values were gotten for all things considered, based on the comes around of realistic examination. The brutal (Brutal) of each thing ranges from 1.808 to 2.192, with a slightest regard of 1.000 and a most extraordinary of 5.000, illustrating extraordinary assortment among respondents. The kurtosis values gotten changed between 0.559 to 4.300, with LD1 and LD5 having kurtosis values higher than 2.2. In show disdain toward of the reality that this illustrates potential non-normality, the skewness values for all things are inside the amplify of 0.671 to 1.470, which illustrates that the information dissemination is still inside the palatable category. For interior consistency, Rho-A and Cronbach alpha values were utilized. Rho-A showed up gages higher than 0.700 for all things, appearing that all things had agreeable interior consistency. The foremost decreased Cronbach's alpha regard is 0.727, which as well meets the required criteria. In this way, all things show up awesome inward consistency, with values over 0.700. Based on these comes around, it can be concluded that all things in this think around show up palatable consistency and internal consistency. The data show up that in show disdain toward of the reality that there are many signs of non-normality in kurtosis, the modestly awesome dispersal of skewness supports the by and large interior authenticity of the estimation gadget utilized. he CFA-based PLS calculation is utilized to analyze the outside stacking values on each estimation thing. In this examination, calculate values were gotten for all things considered, based on the comes around of realistic examination. The brutal (Brutal) of each thing ranges from 1.808 to 2.192, with a slightest regard of 1.000 and a most extraordinary of 5.000, illustrating extraordinary assortment among respondents.

Table 3. Cronbach alpha, CR, AVE, and Rho-A values for internal consistency reliability and validity analysis.

Construct	Cronbach's Alpha	Rho-A	Composite Reliability	Average Variance Extracted (AVE)
LD	0.725	0.726	0.819	0.576
IM	0.774	0.784	0.791	0.532
SBB	0.749	0.766	0.833	0.502
SE	0.718	0.726	0.815	0.470

The another step emphasizes CV assessment (focalized realness) which is utilized to select the degree to which the concurrent build portrays thing modify concurring to Hair, where CV examination is watched from the AVE respect. Utilizing the PLS calculation, AVE gotten the preeminent diminished and most raised gages of 0.715 and 0.908 for respect and progress, independently. Customarily in assention with the Hair criteria, where the AVE respect must be more unmistakable than 0.5. For each develop, the Rho-A, CR, and AVE values demonstrate the accomplishment of insides consistency for a more include up to estimation illustrate, as seen in Table 3. The extraordinary step analyzes the weight of discriminant genuineness (DV), which is characterized as the degree to which each make is through and through specific. basic. observational from other makes. This was analyzed utilizing two procedures, especially the Fornell – Larcker degree and the heterotrait-monotrait degree (HTMT). This procedure was utilized since a few considers approximately considered DV examination to be less compelling in case since it were utilizing strategy one.

Table 4. The bold and diagonal values indicate the square root of AVE and the correlation between the respective constructs cannot exceed the square root of AVE

	IM	LD	SBB	SE
IM	**0.657**			
LD	0.498	**0.690**		
SBB	0.681	0.419	**0.708**	
SE	0.631	0.537	0.514	**0.685**

Based on the Fornell – Larcker criteria, the cross stacking respect (in strong) must be higher than the other progression stacking values. For diagram, the cross-loading respect for enhancement is 0.953, which is higher than the surveyed stacking builds for other stacking builds, to be specific information, PBC, seen regard, subjective standard, and respect of 0.526, 0.563, 0.657, 0.518, and 0.571, freely. Concurring to Hair, a more little HTMT respect leads to a more grounded discriminant. To meet the discriminant realness criteria, the HTMT respect must as well not be more than 0.900. Inside the unfeeling time, Henseler communicated that the HTMT respect ought to not outflank the upper edge, especially 1.00. In this condition, make genuineness gets to be less overwhelming when the HTMT respect beats the compel, since it contains a comparable concept. By utilizing bootstrapping of 5000 subsamples with Smart PLS computer program (Table 4), the HTMT respect gotten was lower than 0.900, illustrating that the discriminant genuineness has met the criteria and got to proceed to be analyzed interior the right hand modeling plan.

Table 5. Heterotrait–monotrait value (HTMT) untuk pengujian validitas diskriminan.

	IM	LD	SBB	SE
IM				
LD	0.693			
SBB	0.949	0.564		
SE	0.878	0.729	0.674	

Assistant Appear Concurring to Hair

The basic appear up examination organize starts by analyzing collinearity issues. This will be went with by examination of the relationship through the way coefficients of t and p values. To empower the quality of this appear up in clarifying organized teachers' states of judgment aptitudes towards STEM instruction, examination was at that point carried out on the coefficient of affirmation (R2), impact overview (F2), and prescient noteworthiness (Q2). In expansion, sexual introduction and age contrasts were analyzed utilizing ANOVA test.

Collinearity

The collinearity test between factors was at that point watched at the Fluctuation Expansion Figure (VIF) esteem. In this condition, the level of collinearity is higher with the more prominent the VIF esteem. Besides, a VIF esteem more noteworthy than 5.00 demonstrates a collinearity issue between auxiliary demonstrate factors [75,78]. Table 6 appears that all VIF values are underneath 5, which affirms that all variable models don't have collinearity issues. Figures 5 and 6 and Table 7 appear the comes about of the starting theory investigation, where 11 and 4 theories were upheld and not backed, individually. Based on these results, information features a relationship with teachers' behavioral eagerly, subjective standards, and PBC with respect to STEM instruction (H1, B = 0.130,: t

= 2.062, p-value < xss=removed xss=removed xss=removed xss=removed xss=removed xss=removed> 0.05). Esteem too impacts seen value, and contains a relationship with subjective standards and PBC (H5, B = 0.538, t = 7.070, p-value < 0.001; H6, B = 0.415, t = 5.637, p-value < 0.001; H7, β = 0.586, t = 9.159, p esteem < 0.001). Besides, propensities have a relationship and enormously impact the states of mind and behavioral eagerly of imminent instructors towards their individual STEM instruction (H8, B = 0.487, t = 7.646, p-value < 0.01; H10, B = 0.487, t = 7.646, p- esteem < 0.001).

Seen reassurance as well cements a relationship with subjective benchmarks and PBC (H7, B = 0.538, t = 7.070, p-value < xss=removed xss=removed xss=removed xss=removed xss=removed xss=removed xss=removed xss=removed> 0.05; H13, β = 0.045, t = 0.776, p-value > 0.05; H14, β = 0.080, t = 1.103, p-value > 0.05). Isolated from these conditions, advancement still contains a relationship with up and coming teachers' consider to apply instructor approaches (H15, β = 0.131, t = 2.045, p-value 0.05). Pulled back from these conditions, advance still wraps a relationship with pre-service teachers' think to execute educates approaches (H15, β = 0.131, t = 2.045, p-value < 0.05).

Table 6. Variance Inflation Factor (VIF) value.

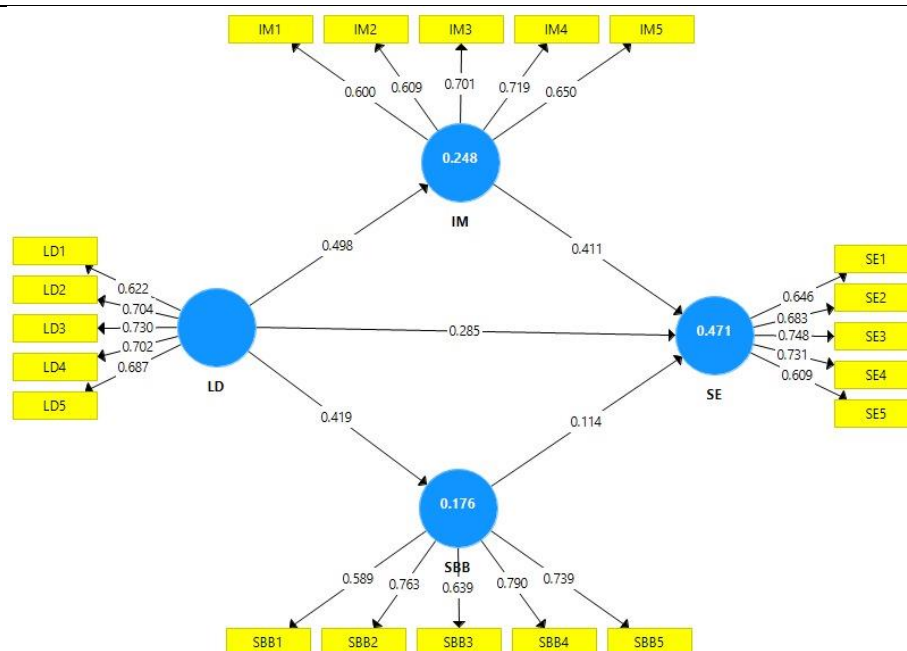| Construct	VIF Value	Construct	VIF Value
IM1	1.176	SBB1	1.290
IM2	1.238	SBB2	1.611
IM3	1.387	SBB3	1.333
IM4	1.223	SBB4	1.649
IM5	1.223	SBB5	1.435
LD1	1.202	SE1	1.218
LD2	1.273	SE2	1.295
LD3	1.509	SE3	1.379
LD4	1.360	SE4	1.448
LD5	1.368	SE5	1.254

Figure 3. Final model with R square and path coefficient.

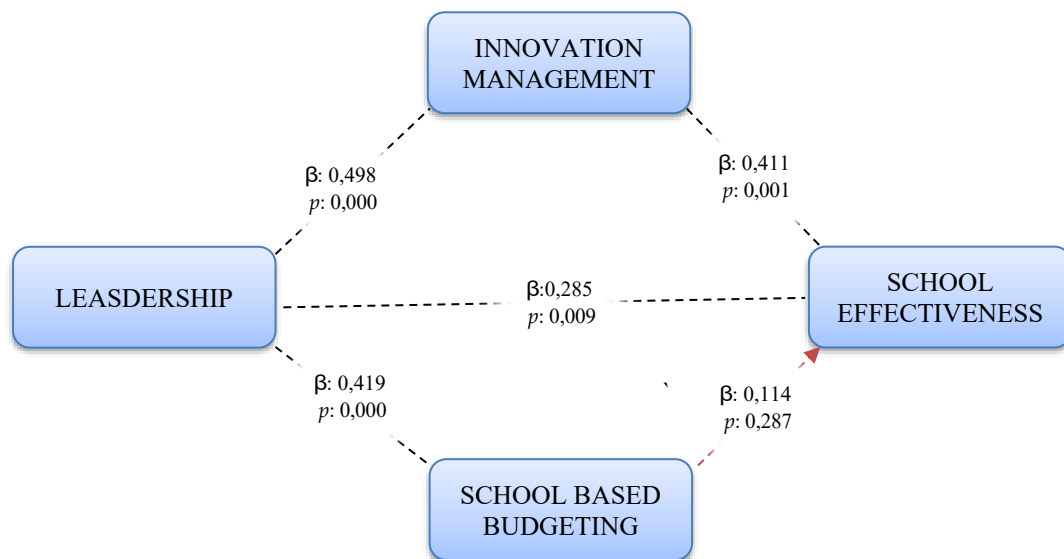**Figure 4.** The results of hypothesis testing. A dotted line in red indicates an insignificant relationship. Note: *p < 0.05, ** p < 0.01 *** p < 0.001.

Table 7. The results of the initial hypothesis test and path estimation.

	Hypothesis	β	Mean	STDEV	T Statistics	p-Values	Hypothesis Testing Results
H1	LD → IM	0.498	0.512	0.079	6.304	0.000	supported
H2	LD → SBB	0.419	0.440	0.083	5.075	0.000	supported
H3	LD → SE	0.285	0.289	0.109	2.606	0.009	supported
H4	IM → SE	0.411	0.414	0.120	3.438	0.001	supported
H5	SBB → SE	0.114	0.115	0.107	1.067	0.287	Not supported

Coefficient of determination (R2)

The coefficient of assurance (R2) is commonly utilized to assess auxiliary models since of the degree to which it predicts the relationship between subordinate and free factors. It ranges from to 1, with higher R2 values coming about in greater prescient precision within the ponder show. R2 values less than 0.25, between 0.5 and 0.75, and over 0.75 are categorized as powerless, direct, and significant, individually. Based on the keen PLS comes about, all subordinate factors of the show have great prescient exactness with direct R2 values, as seen in Table 8 and Figure 5, Table 8. Coefficient of assurance (R2).

Table 8. Coefficient of determination (R2).

Construct	R2	Interpretation
SBB	0.176	moderate
IM	0.248	moderate
SE	0.471	moderate

Predictive Relevance (Q2)

In expansion to the investigation of R2 esteem as a noteworthy basis, Hair too recommended the assessment of Stone–Geisser's Q2, which was utilized to evaluate the significant expectation stone. This appeared that the next Q2 esteem leads to particular expectation exactness of thing information focuses. The esteem of this build was too gotten through the blindfolding method in SmartPLS computer program. In expansion, Q2 was

utilized to evaluate cross-validated repetition measures for each subordinate build. Based on the endogenous inactive factors, a significant forecast show was accomplished since the Q2 esteem was more prominent than 0. The forecast significance was too considered little, medium, and expansive when underneath, rise to to, and over 0.02, 0.15, and 0.35, separately. Table 9 appears the Q2 esteem for five endogenous factors not less than 0.217, showing that the independent build (behavioral purposeful) encompasses a noteworthy forecast esteem on the subordinate determinant.

Table 9. Q2 Value.

Construct	SSO	SSE	Q2 (=1 − SSE/SSO)	Interpretation Q2 Value
IM	1000.000	903.956	0.096	small
SBB	1000.000	914.688	0.085	small
SE	1000.000	799.331	0.201	medium

Effect Size (F2)

Based on the evaluation of the collaborator show up, an F2 respect examination as well ought to be conducted. This make clarifies the exogenous influence on endogenous components to select the alter in R2 respect when certain exogenous determinants are removed from the outline. F2 values underneath, between, and over 0.15, 0.15 and 0.35, and 0.35 are categorized as little, medium, and wide impacts, autonomously. Based on these comes around, seen benefits have the most prominent F2 for states of judgment skills, as seen in Table 10.

Table 10. Value of effect size.

Relationship	F-Square	Effect Size
LD→ IM	0.329	medium
LD →SBB	0.213	medium
LD→ SE	0.113	small
IM→ SE	0.154	medium
SBB → SE	0.013	small

Discussion

The findings show that innovation management is much enhanced by leadership (H1: β = 0.498, p < 0.001), indicating that school administrators with strong leadership traits are more likely to foster an innovative environment. This is consistent with previous research by Tidd and Bessant (2014), who emphasize that good leadership is necessary to promote innovation in educational institutions. The results lend credence to the notion that increasing schools' capacity for innovation requires transformational leadership, in which leaders encourage, foster, and stimulate creativity (Rahmat, 2021). Fostering a school culture that is receptive to change, experimentation, and ongoing improvement can help us understand the role that leadership plays in innovation management. According to Appio et al. (2021), leaders who can steer their institutions through times of transition are necessary due to the evolving dynamics of education, particularly with the incorporation of digital instruments. This study demonstrates that effective innovation management requires strong leadership through strategic vision and empowerment.

The hypothesis that leadership has a beneficial impact on school-based budgeting (SBB) is also supported by the data (H2: β = 0.419, p < 0.001). In line with earlier research that emphasizes the flexibility provided by school-based budgeting as a way for school leaders to distribute resources according to local needs, this finding emphasizes the

significance of strong leadership in efficiently managing school finances (Iatarola & Stiefel, 1998; Stiefel et al., 2003). School administrators should make sure that funds are allocated in a way that promotes learning objectives and student achievement by including important stakeholders in budgeting choices, such as instructors, parents, and students. In the context of decentralization, when school-level leadership is essential for meeting the distinctive requirements of the school community, this is especially significant. Effective financial resource management by school administrators is correlated with the institution's capacity to carry out strategic plans and maintain creative methods. Although leadership is crucial, other elements—like institutional support or outside regulations—may also have an impact on the effectiveness of school-based budgeting, as indicated by the study's rather modest finding on the influence of leadership on budgeting practices.

The beneficial impact of leadership on school effectiveness is another important finding of this study (H3: $\beta = 0.285$, $p < 0.01$). This outcome emphasizes how crucial school leadership is in directing the organization toward accomplishing its learning objectives. Establishing an atmosphere that supports academic success and organizational development requires effective leadership (Mariana, 2021). A more favorable learning environment is created by school leaders that exhibit a clear vision, communicate clearly, and involve stakeholders in decision-making. This increases the effectiveness of the school as a whole. This result bolsters the work of Mulyasa (2004) and Setyaningsih & Souchyadi (2021), who stress that leadership plays a crucial role in determining school success, especially when it comes to coordinating community involvement, pedagogy, and resources toward shared goals. Furthermore, the results imply that leadership directly influences school environment and organizational culture, two crucial elements of school performance (Hoy & Miskel, 2014).

The study also found that innovation management positively affects school effectiveness (H4: $\beta = 0.411$, $p < 0.001$). This result supports the idea that innovation whether in teaching methods, curriculum design, or school management practices can enhance educational outcomes. The relationship between innovation and school effectiveness is well-documented in the literature, with authors like McCahren, Song, and Martens (2011) highlighting how organizational learning and creativity contribute to the overall effectiveness of schools. In this context, innovation management is not just about introducing new technologies but also about fostering a mindset that values continuous improvement and adaptive problem-solving.

The impact of school-based budgeting on school effectiveness, on the other hand, was not supported (H5: $\beta = 0.114$, $p > 0.05$). Despite enabling schools to distribute funds in accordance with local goals, school-based budgeting did not significantly affect school effectiveness in this study. This could imply that although budgeting is a necessary activity, its impact on academic performance may depend on how well the resources are used. Furthermore, elements like community involvement, student engagement, and teaching quality may have a more direct impact on academic achievement.

In this study what is the important implications for leadership and management practices in the field of education. First, it is clear that excellent leadership is essential to enhancing innovation management, school-based budgeting, and overall school success. School leaders' professional development programs should emphasize improving their abilities in these areas, especially in encouraging creativity and utilizing resources efficiently. The research also shows that while school-based budgeting is important, its success mostly depends on the leadership's ability to align financial resources with academic priorities.

CONCLUSION

The consider concludes that the parts of organization and advancement organization are critical factors affecting school ampleness, though school-based budgeting does not clearly contribute to school execution. This ask almost highlights that compelling organization, with the capacity to persuade and influence staff, is essential for developing an creative environment conducive to change, which in turn updates school comes about. In show disdain toward of the truth that school-based budgeting gives schools with the autonomy to assign resources concurring to their specific needs, it essentially impacts operational viability rather than particularly boosting educator comes about. Along these lines, the consider suggests that school improvement endeavors got to prioritize specialist enhancement and headway exercises, though school-based budgeting remains a solid, in spite of the fact that assistant, component in overhauling in common adequacy.

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