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REGULAR ARTICLE

The Relationships Among School-Based Budgeting, Innovative Management, and School Effectiveness: A Study on Specialist Schools in Taiwan

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Abstract In response to the international trend of educational decentralization in recent decades, many elementary and junior high schools in Taiwan had adopted sub-budgets of the "subordinate unit budgets" in the Local Education Development Fund for years so as to develop school-based budgeting. Furthermore, with the decline in birth rates and the need of enrollment, the establishment of specialist schools has been encouraged nationwide in Taiwan since 2007. These specialist schools took advantage of specific geographical and cultural features to develop their localized educational features so that their educational competitiveness and qualities could be enhanced. The major purpose of this paper is to examine the relationships among school-based budgeting, innovative management, and school effectiveness in Taiwan's specialist schools. This paper adopts a questionnaire and employs structural equation modeling for the purpose of analysis. Innovation is a determining point whether schools can make progress or not. The results of the study show that innovative management conduces to direct enhancement of school effectiveness. Moreover, innovative management will be carried out more smoothly when school-based budgeting is performed positively. However, it was surprising to find that school-based budgeting cannot enhance the school effectiveness directly. Instead, it can promote the improvement of school effectiveness indirectly through innovative management.

Keywords School-based budgeting (SBB) · Local education development fund (LEDF) · Innovative management · Specialist school · School effectiveness

Introduction

In the recent decades, educational decentralization has been an important issue, which is extensively discussed in many countries of the world. Educational decentralization, often in the form of school-based management, is widespread in Asia, Latin America, and Africa. The goals of educational decentralization frequently include improved education quality, expanded access, and increased efficiency (Umansky and Vegas 2007). Based on decentralization, school-based management aimed to create more effective learning environments for students, principals, teachers, and parents so that these people will get greater freedom and responsibility in influencing schools' decisions on budgets, personnel, and curriculum (Ng and Chan 2008). Nevertheless, how to put school-based management into effect is worthy of discussion. School-based management would not be practiced into the level of school if the authorities of budgeting and personnel could not be delegated (Chen 2002). Many countries got used to the system of uniform centralized budget resource allocation to schools and it had impaired the achievement of equality, efficiency, liberty, and choice (Yau and Cheng 2011). Consequently, it is necessary to present some beneficial evidences to attract such countries to carry out school-

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based budgeting. In addition, certain issues deserve further discussion, such as whether the implementation of school-based budgeting could facilitate the financial autonomy of schools and whether those schools would use their budgets wisely and thereby promote the effectiveness of school management. By 2010, as a result of the passing of the Compilation and Administration of Education Expenditures Act in 2000, 41 % of local governments in Taiwan had established subordinate unit budgets in the Local Education Development Fund. The elementary and junior high schools affected by the Act, especially those that subsequently adopted sub-budgets of the subordinate unit budgets, were able to enhance the expense flexibility and efficiency of the budget and to develop school-based budgeting. However, it is worth discussing whether some benefits could be manifested through school-based budgeting in Taiwan.

Additionally, decreasing population levels as a result of the declining birth rates are becoming a potentially serious social problem in developed and rapidly developing countries (Cao and Wang 2009). Yet a closer look at demographic trends shows that the rate of world population growth has fallen by more than 40 % since the late 1960s. Moreover, about 59 countries, comprising roughly 44 % of the world's total population, are currently not producing enough children to avoid population decline, and the phenomenon continues to spread (Longman 2004). Owing to the trends of declining birth rates in recent years, elementary and junior high schools have to face the problem of declining enrollments. Many schools began to take account of developing their educational features and carrying out some innovative management measures so that the enrollments could be increased. However, it is also an important issue whether innovative management would have the expected result of enhancing school effectiveness. Moreover, Ministry of Education (MOE) in Taiwan launched a plan in 2007 to subsidize those elementary and junior high schools that had used their vacant space to develop specialist schools. Since then, "specialist schools" have been a part of national policy (Ministry of Education 2007). These specialist schools exhibit specific geographical and cultural features so that some localized educational features could be developed to enhance their educational competitiveness and qualities. In recent years, many studies have shown concern about the current strategies of innovative management in specialist schools (Cheng 2006b; Wang 2008). Since school-based budgeting and innovative management are two different methods in managing schools, it has been difficult to determine whether one or both of these methods are useful in increasing school effectiveness. This paper, therefore, discusses the relationships among school-based budgeting, innovative management, and school effectiveness and establishes a theoretical model to analyze those relationships. Based on the findings of this study, suggestions are then proposed for authorities and schools.

Literature Review

School-Based Budgeting and Subordinate Unit Budgets in Taiwan's Local Education Development Fund

Educational decentralization is an international trend in the recent decades; moreover, school-based management is a common practice of educational decentralization. By definition, school-based management refers to the delegation of school management by the government to the schools themselves, giving them the authority to decide the policy and allocation of resources according to their individual needs, and in particular, the needs of students (Cheung and Kan 2009). The authorities on budgets, personnel, and curriculum, which are empowered to schools, comprise the main concepts of school-based management. Briggs and Wohlstetter (2003) pointed out that one critical aspect of authority for schools was budget authority. Schools with successful school-based management found ways to redirect funds to support their plans for student academic improvement. Furthermore, Hsieh and Hsieh (2005) have indicated that the most important feature of school-based management is empowering schools to manage and to allocate their budgets; moreover, the empowerment of budgets is fundamental for making decisions on curriculum, instruction, and personnel. With the implementation of school-based budgeting, schools will be able to manage their budgets with more freedom and develop features to address local circumstances.

School-based budgeting, also referred to as school-based financial management (Baines 2007; Tooley and Guthrie 2003), is an innovation that holds great promise for better decision-making in public schools. School-based budgeting is one significant concept of the school-based management. Under school-based management, decentralized budgeting indicates the allocation of funds in a lump sum, rather than predetermined categories of expenditures, which endows the school with the opportunity to spend money to achieve its goals. Self-budgeting may provide an important condition for schools to use resources effectively according to their own characteristics and needs so as to pursue their own goals and to solve their own problems in time (Yau and Cheng 2011). The implementation of school-based budgeting can bring many benefits. Through the transfer of administrative power from the government to the schools, school-based budgeting incorporates students, administrators, teachers, and parents into the decision-making network that addresses the use of resources (Latarola and

Stiefel 1998). Latarola and Stiefel (1998) have also noted that individuals closest to students (e.g., parents, teachers, and school administrators) can better allocate resources to meet students' learning needs than those individuals further removed from the school setting; relocating the decision-making process at the level of the individual school results in higher achievements for students. Similarly, Goertz (2001) argues that school-based budgeting policies are intended to increase schools' effectiveness and productivity by incorporating the perspectives of those closest to the students (e.g., parents, teachers, and school administrators) into the decision-making process and by giving schools the flexibility to design programs and to allocate resources for those services and programs that best meet the unique needs of their students. Furthermore, Hadderman (2002) suggests that school-based budgeting facilitates school-based management, the latter of which shifts the decision-making responsibilities from the district office to principals, teachers, and community members. Based on these viewpoints, this paper assumes that school-based budgeting refers to the schools that obtain authorization from the authorities to allocate their budgets and resources in more flexible and autonomous ways and to enhance the effectiveness of budgetary expenditures. School-based budgeting meets the unique needs of students and schools and permits each school to develop programs and curricula that address its particular concerns and problems. Based on the past studies (Ho 2010; Line 2005; Yang 2008), this paper also identifies four aspects of school-based management: meeting the real needs of schools, enhancing the flexibility of budget use, strengthening the efficiency of budget expenditures, and ensuring the quality of budget execution.

Taiwan's Local Education Development Fund (LEDF) is a type of budgetary system implemented through a fund; the LEDF was established under the Compilation and Administration of Education Expenditures Act of 2000 and allows local governments to control local education affairs. Under this program, local governments can sustain high levels of educational development, enhance the performance of budget execution, support the development of elementary and junior high schools, and improve educational effectiveness (Tu 2002). The content of Article 13 of the Compilation and Administration of Education Expenditures Act is as follows: "With respect to its education revenues and expenditures, the government of a special municipality or a city shall establish a Local Education Development Fund." However, as the wording of Article 13 contains no clear definition of the nature of budgets, only a few local governments, such as those in Taipei City and Kaohsiung City, have implemented "subordinate unit budgets" in the LEDF as a means of enhancing the flexibility and autonomy of the general budget in its early stages. In contrast, other local governments have incorporated the budgets of the LEDF into their general budgets as a result of difficulties with budgetary modulation, personnel, and accounting operations. In consequence, their funds operate like traditional general budgets despite the presence of the word "fund" in the title of the program (MOE 2008; Yuchih 2004). To address the discrepancies between local governments, the Taiwanese MOE launched a trial plan on February 25, 2008, which encourages local governments to establish subordinate unit budgets in the Local Education Development Fund. Under this plan, the MOE helped the local governments to establish "subordinate unit budgets," which were a type of special fund and functional fund, in the LEDF (MOE 2008). According to the 2011 investigations of the MOE, nine local governments had adopted subordinate unit budgets by 2010 ($9/22 = 41\ \%$), and by 2011, another ten local governments had adopted them; by the end of 2012, all 22 local governments will have adopted subordinate unit budgets. While many local governments had adopted subordinate unit budgets in the LEDF, public elementary and junior high schools could gradually achieve the goal of school-based budgeting by adopting sub-budgets of the subordinate unit budgets. After the local governments have adopted subordinate unit budgets in the LEDF, public schools will get almost the same budgetary advantages because of adopting their sub-budgets. The changed budget management of public schools could give rise to eight positive results (Lee 2008; MOE 2008; Mou 2005; Yuchih 2004): (1) More flexibility and more efficiency could be achieved in managing school budgets; (2) The allocations of budgets could meet the needs of schools according to their middle- to long-term developmental plans and their real needs of expenditure; (3) The accounts of school budgets could be settled, and surplus funds from the present fiscal year could be carried over to the next fiscal year to prevent wastage; (4) Cash in treasury could be established, and the educational budgets could be used for specific purposes; (5) Schools could be encouraged to raise funds by themselves and to seek donations as a means of increasing their revenues; (6) Delays resulting from political conflicts could be reduced, and schools could demonstrate their autonomy; (7) The revenues and expenditures of schools could be more public and transparent, which would prevent the misallocation of funds and ensure the best possible spending practices; (8) The efficiency of budgetary execution could be increased by compiling and consulting a school budget evaluation. On the whole, school-based budgeting would be facilitated by the adoption of subordinate unit budgets in the LEDF. Since many elementary and junior high schools in Taiwan have adopted sub-budgets of the subordinate unit budgets in the LEDF for years, they would be able to develop

school-based budgeting because of their budgetary properties.

Innovative Management and Specialist Schools in Taiwan

With the worldwide trend of declining birth rates in recent years, schools are in urgent need of developing their educational features and preventing the problem of insufficient enrollment from happening. Innovative management, also known as innovation management, has become an important issue nowadays. Innovative management in schools is an approach that encourages educators to pursue professional growth and to embrace new educational ideas. Schools adopting innovative management strategies integrate the resources of parents and communities and create conditions that facilitate education in the following five ways: innovation in administration and management, innovation in curriculum and instruction, innovation in students' potential development, innovation in the campus environment, and innovation in external resources (Huang 2007). Furthermore, Huang (2007) pointed out that innovative management at schools can inspire the creativity of personnel, increase the efficiency of the school administration, enhance teaching effectiveness, foster a campus environment that meets the students' learning needs, develop new programs and curricula, and encourage the school's educational vision. The benefits of innovative management in schools were highly concerned in the recent years. A classroom study (Godoy and Gravoso 2008) indicated that when the teacher participates in instructional innovation for at-risk learners, it improved her competence in the lesson and provided her with fresh ideas on how to teach students in ways that will promote understanding. Hence, education plays an important role to improve individual or organizational creativity. Moreover, school innovative management is conducive to promoting creativity education and such management not only helps schools increase their competitiveness but also facilitates their sustainable development (Zhao 2009). In short, innovative management indeed brings some educational benefits. As for the present conditions of the implementation of innovative management in Taiwanese schools, it has been discussed by some recent studies. In the survey of Wang (2008), for instance, she concluded that the majority of teachers surveyed in New Taipei City rated their schools at the upper-intermediate level ($M = 3.17$) of school innovative management. Furthermore, in the study of Taoyuan county, Hsinchu county, Hsinchu city, and Miaoli county, Chen (2009) concluded that the majority of surveyed teachers rated their schools at the middle level ($M = 2.91$) of school innovative management. In both Wang and Chen's studies, a 4-point Likert scale was adopted. Obviously, the means in both results are high which indicates that the practice of innovative management in schools is satisfying.

Taiwan's policy regarding specialist schools affects the public elementary and junior high schools in certain ways, such as transforming remote schools into specialist schools and reusing vacant school space. The policy originated in a trial project concerning specialist schools; 18 remote schools were invited to participate in the project by the New Taipei City government in August 2003 (Lin et al. 2009). According to Tseng (2007), the differences between specialist schools and other schools can be elaborated from several perspectives. For one thing, from the perspective of objective conditions, specialist schools exhibit specific geographical and cultural features, including diverse natural or social environments, histories, customs, and distributions of school resources. For another, on the subjective level, principals of specialist schools bring up educational visions and establish values based on their own experiences and beliefs; they evaluate community resources and school personnel when making decisions for and implementing innovations in their schools. Furthermore, specialist schools feature programs and curricula that reflect the real situations in the community, and they thereby seek to ensure long-term development. In sum, these schools have distinctive management approaches that are designed to enhance the effectiveness of teaching; they increase their competitiveness and the efficacy of their management by making use of local resources such as industrial cultures, natural landscapes and ecosystems, and community traditions. Having distinct educational visions and recognizing the particular conditions of their settings, specialist schools rely on the participation of school personnel and community partners to develop unique curricula, instructional approaches, and school environments.

The development of specialist schools has been encouraged in Taiwan since 2007. In 2007, the MOE launched a subsidy plan for those elementary and junior high schools that would reuse vacant space and transform into specialist schools. From 2007 to 2010, 50,000,000 New Taiwanese dollars (NT$) had been allocated annually by the MOE to specialist schools, and the number of schools that were ranked higher than "B" and thereby received the subsidies were 102, 105, 117, and 106, respectively (MOE 2010). Certain key points of the subsidy plan are as follows (MOE 2006): (1) Strategies and methods: (a) to reuse vacant school buildings, (b) to transform small remote schools into specialist schools, and (c) to reuse vacant space in urban schools; (2) Screening criteria: (a) environmental resources and their use (20 %), (b) curriculum, instruction, or activities (20 %),

(c) professional personnel and partners (20 %), (d) sustainable development and unions (20 %), and (e) anticipative performances and experience sharing (20 %); and (3) The sum of subsidies: the subsidy for each school ranges from NT$ 300,000 to NT$ 800,000. Seventy percent of the subsidy is for upgrading facilities and purchasing equipments, while the other 30 % is for developing curricula, printing instructional materials, and training the teaching staff. The amount of subsidies is determined by using the following school rankings: (a) A+: each school could obtain NT$ 800,000; (b) A: each school could obtain NT$ 500,000; (c) B: each school could obtain NT$ 300,000; and (d) C: schools cannot obtain any subsidy. According to this plan, specialist schools that got the subsidies usually had their educational features and performed very well in one or more aspects of innovative management.

The Relationships Among School-Based Budgeting, Innovative Management, and School Effectiveness

School effectiveness is determined by the extent to which schools achieve educational goals by efficiently utilizing personnel, materials, and natural resources (Yang 2007). Yang (2007) also found that four factors contribute to a school's overall effectiveness: students' effectiveness, teachers' effectiveness, administrative effectiveness, and support from parents and communities. An effective school must have an outstanding record in each of these four subcategories. The present study follows Yang's definition (2007) of school effectiveness, which refers to the extent to which schools achieve educational goals. Such effectiveness also takes into account administrative and managerial affairs, curricular and instructional development, students' academic achievements, and support from parents and communities. The relationships among school-based budgeting, innovative management, and school effectiveness are discussed below.

The first relationship to be discussed is the relationship between school-based budgeting and innovative management. Briggs and Wohlstetter (2003) indicated that both successful and struggling school-based management had resources from outside sources. Schools with successful school-based management, however, seemed to benefit the most when resources were focused on particular innovations or initiatives. In addition to school budgets, donations and subsidies are both common resources in schools. Moreover, Line (2005) indicates that school-based budgeting allows more autonomy and flexibility in allocating school budgets and permits school officials to determine expenses based on the school's development, programs, and curricula. Cheng (2006a) also suggests that if schools are willing and are able to raise funds by themselves, they should be allowed either to obtain a certain rate of refunds or to control all the funds they raise. In this way, school officials would try their best to raise funds, and their long-term plans to develop featured programs and curricula would not be suspended. This notion is supported by the findings of a study on school-based budgeting in elementary schools (Shih 2006), which concluded that many of the study's interviewees suggested that school-based budgeting was conducive to developing many features of the schools. Although no quantitative study has been performed to verify the relationship between school-based budgeting and innovative management, most studies do indicate that school-based budgeting facilitates the development of school features and inspires innovation in schools. Therefore, the first hypothesis is:

H_1 School-based budgeting has a positive effect on innovative management.

The second relationship to be considered is the relationship between innovative management and school effectiveness. Valmohammadi (2012) points out that the implementation of innovation practices is positively and significantly related to organizational performance of Iranian organizations. Moreover, in the study of Arslan (2011), he found that the provincial local governments which adopted innovative management practices tend to have higher local e-government performances. When it comes to organizational behavior in general, Robbins (2002) indicates that organizational innovations could improve some products, processes, and services and that it could further enhance organizational effectiveness. Based on the results of the above international studies, it can be concluded that the implementation of innovative management was conducive to enhancing organizational effectiveness. As for the related studies in Taiwan, their findings can be explained as follows: A study concerning the relationship between school innovation management and school effectiveness in elementary schools in Hualien County (Huang, 2007) showed that the collective variable of "school innovation management" was a significant, positive predictor of the collective variable called "school effectiveness" ($\beta = .859$, $p < .001$). Moreover, Yang (2007), who conducted a study on school innovative management and school effectiveness in elementary schools in New Taipei City, found that five aspects of school innovative management had a significant effect on the overall school effectiveness. Listed in the descending order of impact, the aspects involve campus environmental innovation ($\beta = 0.347$, $p < .001$), innovation in student activities ($\beta = 0.261$, $p < .001$), innovation in administration and management ($\beta = 0.129$, $p < .001$), innovation in curriculum and instruction ($\beta = 0.110$, $p < .001$), and innovation in resource exertion ($\beta = 0.083$, $p < .001$).

Finally, a study of the links among public relations, organizational innovative management, and school effectiveness in Taiwanese elementary schools (Hsu 2009) found that instructional behavior innovation ($\beta = 0.166$, $p < .001$) and organizational atmosphere innovation ($\beta = 0.070$, $p < .01$) had small but significant effects on the overall school effectiveness; however, equipment and resource innovation and administrative operation innovation had no significant effect on the overall school effectiveness. On the whole, there is no empirical study of specialist schools which directly explores the relationship between innovative management and school effectiveness; however, most previous studies agree that innovative management or some aspects of such management have significant, positive effects on the overall school effectiveness, but the effect sizes vary. Consequently, the second hypothesis is:

H_2 Innovative management has a positive effect on school effectiveness.

The third relationship to be explored is the relationship between school-based budgeting and school effectiveness. In a 2006 study on school-based budgeting in elementary schools (Shih 2006), a third of the interviewees agreed that school-based budgeting facilitated school effectiveness. Additionally, a study on the relationship between school-based budgeting and school effectiveness in elementary and junior high schools (Chen 2002) showed that school-based budgeting was a significant, positive predictor of the overall school effectiveness ($\beta = 0.178$, $p < .001$). What is more, Lin (2006) found that a school's ability to determine budgetary allocations and expenditures, which was a facet of school-based management, had a significant, positive effect on the overall school effectiveness ($\beta = 0.145$, $p < .001$). Nevertheless, a study addressing the relationship among school-based budgeting, equal education opportunities, and school effectiveness in junior high schools (Yang 2008) showed that some aspects of school-based budgeting were more influential than others in determining the overall school effectiveness. In his study, although the efficiency of budget expenditure ($\beta = 0.446$) and the autonomy of budget execution ($\beta = 0.297$) had significant effects on the overall school effectiveness, neither participation in budget allocation nor the flexibility of budget exertion had significant effects on the overall school effectiveness. In spite of the case, most previous studies do show that school-based budgeting or some aspects of such budgeting have significant, positive effects on overall school effectiveness. To conclude, the third hypothesis is:

H_3 School-based budgeting has a positive effect on school effectiveness.

Method

Design

Since many elementary and junior high schools in Taiwan have adopted sub-budgets of the "subordinate unit budgets" in the LEDF for years, they could develop school-based budgeting because of their budgetary properties. Moreover, owing to the implementation of the subsidy plan of elementary/junior high schools for reusing vacant school space and developing specialist school, specialist schools which got the subsidy always had outstanding performance in one or more aspects of innovative management. The present study deeply concerned the relationships among school-based budgeting, innovative management, and school effectiveness. After the literature review, the relationships between the above variables are specified as Fig. 1.

Moreover, as there are a great number of items (count up to 65 items) in the questionnaire, the possibility of over-complication and/or ambiguity should be taken into account, either of which might have occurred if each item in the questionnaire had been analyzed. As Hwang (2004) has indicated, a package variable, which is obtained through item parceling, always has better reliability and is more reasonably defined than a single item. In addition, a package variable can generate stable results for parameter estimations, as the ratio of factors is more parsimonious. Finally, factor analysis is a method often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables (SPSS Inc. 2004). As a result of these considerations, this study performed a factor analysis by using the maximum likelihood method of factor extraction and the Varimax method of orthogonal rotation. The factor scores for each of the factors related to school-based budgeting, innovative management, and school effectiveness were extracted from all the items in the questionnaire

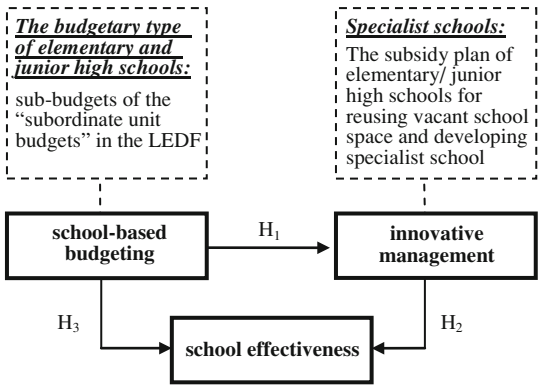

Fig. 1 Study design

(i.e., the original observed variables), and these factor scores became the new observed variables. After the transformations of factor scores for each factor related to school-based budgeting, innovative management, and school effectiveness, this study assigned the following symbols, contracted names, and contents to the new variables (see Table 1):

Based on a review of the current literature, the conceptual model of relationships among school-based budgeting, innovative management, and school effectiveness was specified as a general structural equation model (see Fig. 2). The relationships among the variables in this model were specified as follows:

1. An exogenous latent variable, school-based budgeting (ξ_1) was measured by four exogenous observed variables, including meeting needs (X_1), budget flexibility (X_2), budget efficiency (X_3), and budget quality (X_4).
2. An endogenous latent variable, innovative management (η_1) was measured by five endogenous observed variables, including administrative innovation (Y_1), instructional innovation (Y_2), development innovation (Y_3), environmental innovation (Y_4), and resource innovation (Y_5).
3. An endogenous latent variable, school effectiveness (η_2) was measured by four endogenous observed variables, including administrative effectiveness (Y_6), instructional effectiveness (Y_7), students' performances (Y_8), and parents' support (Y_9).
4. An exogenous latent variable, school-based budgeting (ξ_1) was a predictor of innovative management (η_1) and school effectiveness (η_2). Moreover, innovative management (η_1), which was an endogenous latent variable, was also a predictor of school effectiveness (η_2), another endogenous latent variable. In other words, innovative management (η_1) was an intervening variable.
5. Estimation parameters in the model:

(1) It was hypothesized that school-based budgeting (ξ_1), an exogenous latent variable, was a predictor of innovative management (η_1) and school effectiveness (η_2). The regression coefficients of innovative management (η_1) and school effectiveness (η_2) were γ_1 and γ_2, respectively. Moreover, innovative management (η_1), another endogenous latent variable, was also hypothesized as a predictor of school effectiveness (η2), and its regression coefficient was β_1. ζ_1 and ζ_2 were prediction errors, or residuals, that were obtained when the following two endogenous latent variables were predicted: innovative management (η_1) and school effectiveness (η_2).

Table 1 The symbols, contracted names, and contents of variables in school-based budgeting, innovative management, and school effectiveness

Symbols	Contracted names	Contents of variables	Properties of variables
ξ_1	School-based budgeting	The construct of school-based budgeting	Exogenous latent variable
X_1	Meeting needs	Meeting the real needs of schools (factor scores)	Exogenous observed variable
X_2	Budget flexibility	Enhancing the flexibility of budget use (factor scores)	Exogenous observed variable
X_3	Budget efficiency	Strengthening the efficiency of budget expenditures (factor scores)	Exogenous observed variable
X_4	Budget quality	Ensuring the quality of budget execution (factor scores)	Exogenous observed variable
η_1	Innovative management	The construct of innovative management	Endogenous latent variable (intervening variable)
Y_1	Administrative innovation	Innovation in administration and management (factor scores)	Endogenous observed variable
Y_2	Instructional innovation	Innovation in curriculum and instruction (factor scores)	Endogenous observed variable
Y_3	Development innovation	Innovation in students' potential development (factor scores)	Endogenous observed variable
Y_4	Environmental innovation	Innovation in school environments (factor scores)	Endogenous observed variable
Y_5	Resource innovation	Innovation in public relations and resources (factor scores)	Endogenous observed variable
η_2	School effectiveness	The construct of school effectiveness	Endogenous latent variable
Y_6	Administrative effectiveness	Effectiveness of administrative service (factor scores)	Endogenous observed variable
Y_7	Instructional effectiveness	Effectiveness of teachers' instruction (factor scores)	Endogenous observed variable
Y_8	Students' performances	Students' academic achievements (factor scores)	Endogenous observed variable
Y_9	Parents' support	Support from parents and communities (factor scores)	Endogenous observed variable

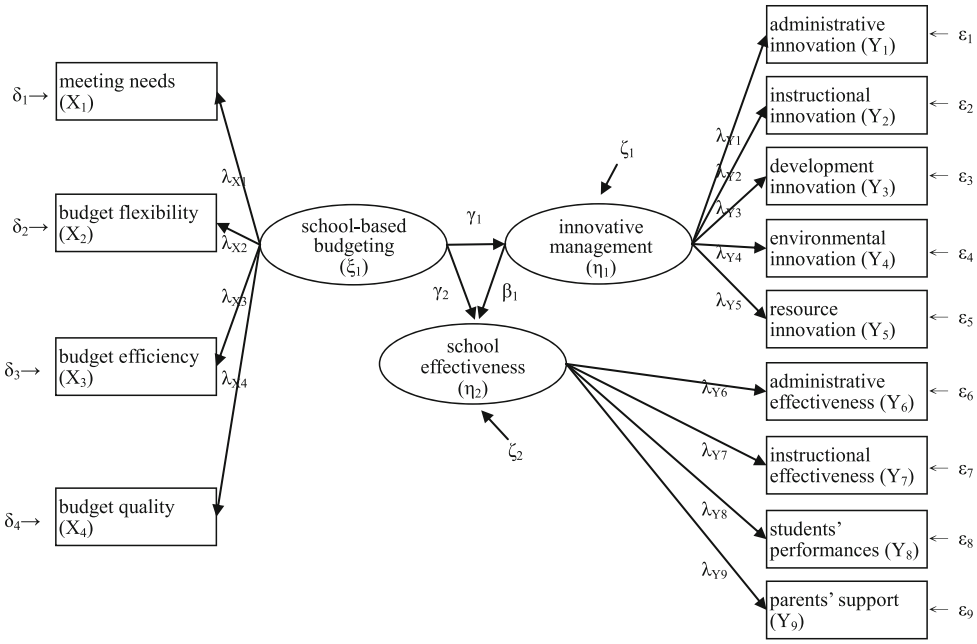

Fig. 2 The conceptual model of relationships among school-based budgeting, innovative management, and school effectiveness

(2) The symbols of λ_{X1}–λ_{X4} were factor loadings of school-based budgeting (ξ_1), which was an exogenous latent variable. δ_1–δ_4 were measure errors of school-based budgeting (ξ_1).
(3) The symbols of λ_{Y1}–λ_{Y5} and λ_{Y6}–λ_{Y9} were factor loadings of the following two endogenous latent variables: innovative management (η_1) and school effectiveness (η_2), respectively. Furthermore, ε_1–ε_5 and ε_6–ε_9 were measurement errors of innovative management (η_1) and school effectiveness (η_2), respectively.

Subjects and Study Site

Eight local governments in Taiwan (Taipei City, Kaohsiung City, New Taipei City, Yilan County, Taoyuan County, Miaoli County, Penghu County, and Kinmen County) had taken the budgetary type of subordinate unit budgets in the LEDF by 2010. Since then, the public elementary and junior high schools supervised by these local governments have become sub-budgets of the subordinate unit budgets. These schools thus have the same budgetary properties with the local governments; moreover, they have the potential to develop school-based budgeting. The staff of 49 specialist schools supervised by these eight local governments are potential participants in the present study.

The contexts and demographics of the participants are as follows: 1. Gender: 34.8 % of them are men ($n = 279$) and 65.2 % of them are women ($n = 523$). It appears that women are more than men. 2. Years of work experience: 15.7 % of them have worked for 5 years or less ($n = 126$), 47.9 % for 6–15 years ($n = 384$), 28.3 % for 16–25 years ($n = 227$), and 8.1 % for at least 26 years ($n = 65$). It is found that the primary participants are 6–25 years (76.2 %); moreover, junior participants (5 years or less) and senior participants (at least 30 years) are also representative enough for statistical analysis. 3. Position: 46.1 % of them are administrators ($n = 370$) and 53.9 % of them are teachers ($n = 432$). The rate of teachers is slightly higher than that of administrators.

Research Instrumentation

The present study designed a questionnaire about school-based budgeting, innovative management, and school effectiveness as the instrument. The items in this questionnaire were questions in the form of a five-point Likert scale; in a descending order, the options corresponding to this scale were as follows: almost always (5), often (4), sometimes (3), seldom (2), and almost never (1). The questionnaire was composed of three parts. The first part consisted of 20 items about school-based budgeting, and four factors were explored. The four factors were meeting the real needs of schools, enhancing the flexibility of budget use, strengthening the efficiency of budget expenditure, and ensuring successful and effective budget execution. The second part of the questionnaire was composed of 25 items, which addressed innovative management. Five factors were explored in those items, and the factors were innovation in administration and management, innovation in curriculum and instruction, innovation in students' potential development, innovation in school environments, and innovation in public relations and resources. The third section of the survey was made up of 20 items, which dealt

with school effectiveness. In the 20 items, four factors were explored, and the factors were the effectiveness of the administration, the effectiveness of teachers' instruction, students' academic achievements, and support from parents and the community.

In order to ensure the quality of this questionnaire, a pilot survey is necessary. The staff in ten schools were selected by random sampling, and 192 valid samples were returned. The reliability of pilot survey from 192 valid samples is as follows: 1. The Cronbach's α in three parts of school-based budgeting, innovative management, and school effectiveness is .951, .965, and .951, respectively. 2. The Cronbach's α of four factors in school-based budgeting range from .855 to .893. 3. The Cronbach's α of five factors in innovative management range from .884 to .926. 4. The Cronbach's α of four factors in school effectiveness range from .882 to .938. Since each Cronbach's α is higher than .80, there is no doubt that the internal consistency reliability is very good in the questionnaire.

Data Collection Procedure

Among the 49 specialist schools supervised by these eight local governments in Taiwan, 80 % of the staff in each school were selected by simple random sampling, and these individuals were asked to complete the questionnaire. The survey was conducted between December 6, 2010 and December 20, 2010. In total, 1,541 questionnaires were distributed, 920 of which were returned. Of the 920 returned questionnaires, 802 were valid samples, which made the return rate of valid questionnaires 52 %.

Ethical Consideration

Since the questionnaires would be distributed to the staff in 49 specialist schools, we had got the permissions of all principals in these schools before the survey. Moreover, the subjects' private data in the questionnaire would be kept secret, so that they could feel relieved and finish the questionnaire.

Data Analysis

Structural equation modeling (SEM) using LISREL8.72 statistical software was the adopted design in the present study to explore the causal relationships among school-based budgeting, innovative management, and school effectiveness in Taiwanese specialist elementary and junior high schools. In addition, the maximum likelihood (ML) method was applied for parameter estimations and goodness-of-fit statistics. The analyses of reliabilities and validities were accomplished by using the estimated parameters.

Results

This section discusses the goodness of fit, reliability, and validity exhibited in the model of relationships among school-based budgeting, innovative management, and school effectiveness in Taiwanese specialist elementary and junior high schools. The results of the model's parameter estimations will be analyzed after confirming that the goodness of fit and the reliability and validity of the model have achieved acceptable standards.

Test of Goodness of Fit

The goodness of fit of the present study's model will be discussed according to the classifications and standards proposed by Hwang (2004). First, in terms of the absolute fit indexes, the goodness-of-fit index (GFI) of the model was .904, which meant that it met the GFI standard by exceeding .90. Moreover, the root mean square residual (RMR) and the Standardized RMR (SRMR) were .041 and .046, respectively, and they, therefore, met the standard, which were below .05. Finally, the root mean square error of approximation (RMSEA) was .099. The model in the present study can thus be classified as a mediocre fit (MacCallum et al. 1996), and the goodness of fit between the theoretical model and the samples can be classified as satisfactory. Second, all of the model's five relative fit indexes were higher than the standard of .90: normed fit index (NFI) was .98; non-normed fit index (NNFI) was .97; comparative fit index (CFI) was .98; incremental fit index (IFI) was .98; and relative fit index (RFI) was .97. These results suggest that this model had a better goodness of fit than most models. Third, the parsimonious fit indexes were both higher than .50 and, therefore, met the standard: parsimonious goodness-of-fit (PGFI) was .62 and parsimonious normed fit index (PNFI) was .78. These numbers proved that the model was reasonable and it could be established through fewer parameters. Since this model has met the standards of goodness of fit with regard to the absolute fit indexes, relative fit indexes, and parsimonious fit indexes, it appears that this model is acceptable and worthy of analyzing.

Reliability and Validity

Reliabilities of Individual Items

The strictest standard of the reliability of individual items should be higher than .50 (Hwang 2004). The R^2 of the four exogenous observed variables used to measure school-based budgeting (exogenous latent variable) are as follows: meeting needs (.64), budget flexibility (.61), budget efficiency (.72), and budget quality (.69). The values of these variables ranged from .61 to .72. Next, the R^2 of the five

endogenous observed variables used to measure innovative management (endogenous latent variable) are as follows: administrative innovation (.71), instructional innovation (.68), development innovation (.62), environmental innovation (.76), and resource innovation (.75). The values of these variables ranged from .62 to .76. Finally, the R^2 of the four endogenous observed variables used to measure school effectiveness (endogenous latent variable) are as follows: administrative effectiveness (.74), instructional effectiveness (.66), students' performances (.64), and parents' support (.65). The values of these variables ranged from .64 to .74. In brief, all R^2 values of the individual items, or observed variables, were higher than .50, which proves that the reliabilities of the individual items are good.

Composite Reliabilities of Latent Variables

The composite reliability (ρ_c) is defined as $\rho_c = (\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma(\theta)]$, where values greater than approximately .60 are desirable (Hwang 2004). Three composite reliabilities of latent variables were calculated in this study: school-based budgeting (ξ_1) was .888; innovative management (η_1) was .922; and school effectiveness (η_2) was .891. In all cases, the composite reliability of the latent variables in this model was higher than the standard of .60. Therefore, good internal consistencies were exhibited in these observed variables, which were then used to measure the latent variables.

Convergent Validities

Calculating the average variance extracted from the latent variable is one way to represent the convergent validity. The average variance extracted (ρ_v) was defined as $\rho_v = (\Sigma\lambda^2)/[\Sigma\lambda^2 + \Sigma(\theta)]$, where values higher than .50 were considered adequate (Hwang 2004). Three average variances extracted from the latent variables were calculated in the present study: school-based budgeting (ξ_1) was .665; innovative management (η_1) was .704; and school effectiveness (η_2) was .671. Each average variance extracted from the latent variables in this model was clearly higher than the standard of .50. As a result, each of the latent variables in this model could be validly estimated by its corresponding observed variables. Besides, these values also suggest that the observed variables made greater contributions to the latent variables in measurement than the errors did.

In general, this model displayed good reliabilities and validities. The obtained reliability and validity values indicate that the model of relationships among school-based budgeting, innovative management, and school effectiveness meets the standards of reasonableness and acceptability. As a result, sequential model analysis was performed.

Results of Parameter Estimations

Since the goodness of fit, reliability, and validity of this model were good, the model was analyzed by using the results of the parameter estimations (as shown in Table 2; Fig. 3).

Table 2 The results of parameter estimation in the model

Symbols	Completely standardized solution	Standard error	*t*-value	Symbols	Completely standardized solution	Standard error	*t*-value
γ_1	.78	.04	21.44***	ζ_1	.39	.03	12.22***
γ_2	.02	.04	.44	ζ_2	.13	.02	7.60***
β_1	.92	.05	19.83***	δ_1	.36	.02	16.23***
λ_{X1}	.80	.03	26.28***	δ_2	.39	.02	16.57***
λ_{X2}	.78	.03	25.62***	δ_3	.28	.02	14.44***
λ_{X3}	.85	.03	28.85***	δ_4	.31	.02	15.08***
λ_{X4}	.83	.03	28.06***	ε_1	.29	.02	17.06***
λ_{Y1}	.84	–	–	ε_2	.32	.02	17.51***
λ_{Y2}	.82	.03	28.86***	ε_3	.38	.02	18.03***
λ_{Y3}	.79	.03	27.07***	ε_4	.24	.01	16.16***
λ_{Y4}	.87	.03	31.87***	ε_5	.25	.01	16.39***
λ_{Y5}	.87	.03	31.47***	ε_6	.26	.02	15.40***
λ_{Y6}	.86	–	–	ε_7	.34	.02	16.87***
λ_{Y7}	.81	.03	28.41***	ε_8	.36	.02	17.11***
λ_{Y8}	.80	.03	27.78***	ε_9	.35	.02	17.01***
λ_{Y9}	.80	.03	28.05***				

* $p < .05$, ** $p < .01$, *** $p < .001$

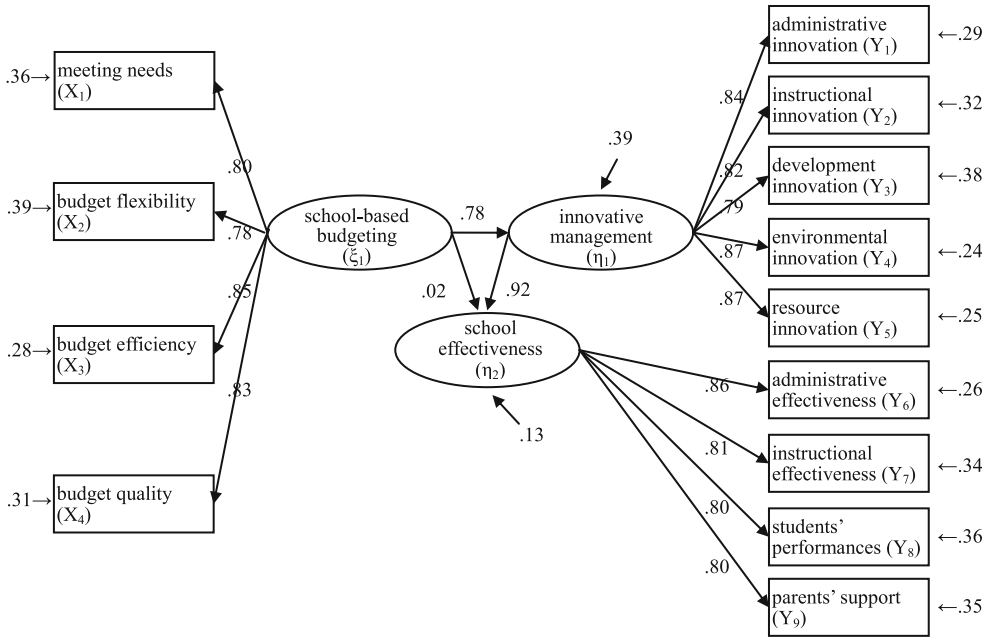

Fig. 3 The path diagram of relationships among school-based budgeting, innovative management, and school effectiveness

As Table 2 and Fig. 3 illustrated, the results of hypotheses testing and the findings of this study were as follows:

1. Hypothesis H_1 could be supported since the exogenous latent variable of school-based budgeting (ξ_1) had a significant, positive direct effect on the endogenous latent variable of innovative management (η_1) ($\gamma_1 = .78, p < .001$). The model thus indicates that the adoption of school-based budgeting is beneficial for enhancing innovative management. Moreover, the model suggests that the practice of innovative management is facilitated when the practice of school-based budgeting expands.
2. Hypothesis H_2 was supported because the endogenous latent variable of innovative management (η_1), which can be regarded as an intervening variable, had a significant, positive direct effect on the endogenous latent variable of school effectiveness (η_2) ($\beta_1 = .92$, $p < .001$). The model thus indicates that the application of innovative management is beneficial for increasing school effectiveness. Moreover, the model suggests that school effectiveness is enhanced when the practice of innovative management improves.
3. Hypothesis H_3 was only partially supported; since the regression coefficient of the exogenous latent variable of school-based budgeting (ξ_1) on the endogenous latent variable of school effectiveness was not significant ($\gamma_2 = .02$, n.s). The model, therefore, shows that school-based budgeting has no direct effect on school effectiveness. Nonetheless, school-based budgeting had an indirect effect of .72 (i.e., .78*.92 = .72, $p < .001$) on school effectiveness through the intervening variable of innovative management. Thus, while it may be true that school-based budgeting has no direct effect on school effectiveness, it is also true that school-based budgeting does have an indirect effect on school effectiveness through innovative management. In other words, when the practice of school-based budgeting expands, school effectiveness is improved indirectly as a result of enhanced innovative management.

Discussion

The results of the present study provide strong evidence for the relationships among school-based budgeting, innovative management, and school effectiveness. This section re-examines the findings obtained from the data analysis in terms of their educational implications.

With the Implementation of School-Based Budgeting, Innovative Management is Significantly Enhanced, and School Features are Highly Developed

Since many local governments in Taiwan have established subordinate unit budgets in the Local Education Development Fund and since the public elementary and junior high schools supervised by these local governments have adopted sub-budgets of the subordinate unit budgets, these schools are potential candidates to develop school-based budgeting. This study found that since the elementary and junior high schools in Taiwan were encouraged to

implement school-based budgeting, such budgeting has had direct, positive effects on innovative management ($\gamma_1 = .78$). Moreover, this study found that the size of the effect was very great. One can, therefore, conclude that the more entrenched the practice of school-based budgeting, the better the innovative management. As a result, school-based budgeting can be useful in developing school features. In comparison with the past studies, although Cheng (2006a) suggested, by literature review, that school-based budgeting was beneficial for developing school features; Shih (2006) and Line (2005) also concluded, by interviewing, that many interviewees suggested that school-based budgeting was conducive to developing many features of the schools and was helpful for inspiring teachers to express their creativities. Nevertheless, there was no empirical quantitative study to support this argument. Through the questionnaire survey and quantitative analysis in this paper, it can be demonstrated that with the implementation of school-based budgeting, innovative management is significantly enhanced, and school features are highly developed. This finding makes a great progress on verifying the relationship between school-based budgeting and innovative management, not only because the positive relationship between them indeed existed, but also the effect of school-based budgeting, which was very critical to innovative management. That is, school-based budgeting is the determining factor which decides whether the implementation of innovative management will succeed or not.

With the Implementation of Innovative Management in Specialist Schools, School Effectiveness was much Increased

Based on the results of the questionnaire distributed to staff members at Taiwanese specialist elementary and junior high schools, the present study found that innovative management, which could be seen as an intervening variable, had a direct, positive effect on school effectiveness ($\beta_1 = .92$). Moreover, this study found that the size of the effect was very great. One can, therefore, conclude that school effectiveness will be significantly increased when innovative management is widely practiced. In comparison with some related studies, Hsu (2009) suggested that only some aspects of organizational innovation management had small but significant correlations to the overall school effectiveness; however, Huang (2007) and Yang (2007) indicated that innovative management included all the aspects, and was a significant, positive predictor of school effectiveness. Although the finding in this paper was much agreeable to Huang (2007) and Yang (2007), a critical problem in their studies had been improved in this paper. Since the subjects in their studies almost came from common schools which may even have no educational features, it resulted in the lack of sample representativeness. Nonetheless, all of the subjects in this paper came from specialist schools which might exhibit specific geographical and cultural features and were devoted to developing many educational innovations. In other words, the relationship between innovative management and school effectiveness demonstrated in this paper was more reliable and it had better sample representativeness than other studies. Furthermore, since the effect size between the above variables was very great ($\beta_1 = .92$), it could be concluded that innovative management was a critical factor for increasing school effectiveness.

Implementing School-Based Budgeting Does Not Directly Enhance School Effectiveness. Nonetheless, Such Budgeting Could Indirectly Strengthen School Effectiveness by Encouraging Innovative Management

Through the analysis of the structural equation model, the present study found that school-based budgeting could not directly enhance school effectiveness. That is, even though Taiwanese elementary and junior high schools were encouraged to implement school-based budgeting through employing sub-budgets of the subordinate unit budgets in the LEDF, their school effectiveness still could not be enhanced directly. Nevertheless, if these schools incorporated innovative management into their school-based budgets, school-based budgeting would have an indirect effect on school effectiveness (with the size of the effect being .72). Compared to several previous studies, the quantitative analysis results of Chen (2002) and Lin (2006) indicated that school-based budgeting (or a school's ability to determine budgetary allocations and expenditures) was a significant, positive predictor of the school effectiveness; moreover, Yang (2008) argued that only certain aspects of school-based budgeting had significant effects on the overall school effectiveness. However, there was no related study discussing whether some possible intervening variables may exist between school-based budgeting and school effectiveness in the past. In this paper, we try to add the intervening variable of innovative management between them. Nevertheless, when the intervening effect of innovative management was taken into account in this paper, it was surprising to find that school-based budgeting had no direct effect on school effectiveness but had an indirect effect on school effectiveness through innovative management. That is, school-based budgeting is not sufficient in itself to enhance school effectiveness; instead, such budgeting practices must be combined with innovative management so that school effectiveness can be enhanced. It is a brand-new finding compared to the previous studies on school-based budgeting.

Conclusion

Under the international trend of educational decentralization in recent decades, the subordinate unit budgets in the LEDF in Taiwan have given elementary and junior high schools good chance to develop school-based budgeting and thereby enhance the expense flexibility and efficiency of the budget. Furthermore, with the decline in birth rates and the need of enrollment, the establishment of specialist schools has been encouraged by granting subsidies in Taiwan and it brings a beneficial condition for the implementation of innovative management. After discussing related literatures on school-based budgeting, innovative management, and school effectiveness and verifying the relationships among above variables, there are some conclusions as follows.

First, the authorities should grant schools more autonomy over their budgets, and elementary and junior high schools should expand their financial resources by capitalizing on their environmental resources. By wisely using their budgets, schools could promote innovative measures. As this study suggests, the implementation of school-based budgeting in elementary and junior high schools resulted in enhanced innovative management and further development of school features. Therefore, by granting schools more autonomy over their budgets, local governments would be encouraging innovative educational development. To supplement the governments' efforts, elementary and junior high schools should capitalize on their environmental resources by, among other things, renting out campus space and facilities and utilizing their geographical features to cooperate with industries. What is more, these schools should also raise funds in legal and practical ways to increase their quota of budget and to enhance the expense flexibility and efficiency of the budget. The funds raised by the schools would be conducive to support innovative management and to promote the development of school features.

Second, although great changes can happen when innovative management is implemented; however, whether these changes are beneficial requires further inquiries. After investigating the staff of specialist schools in Taiwan, it is proved that innovative management has a significantly positive effect on school effectiveness; that is, the implementation of innovative management is conducive to enhancing school effectiveness in specialist schools. Therefore, as far as improving school effectiveness is concerned, innovative management is indeed an efficacious and practicable strategy.

Third, school-based budgeting will not directly enhance school effectiveness if schools are merely encouraged to implement certain budgetary measures, such as meeting the real needs of schools, enhancing the flexibility of budget use, strengthening the efficiency of budget expenditures, and ensuring consistent and successful budget execution. However, measures related to innovative management could be incorporated into school-based budgeting and thereby indirectly enhance school effectiveness. That is, simply granting schools financial autonomy over budgets or encouraging loosening up restrictions in budgetary matters does not directly affect school effectiveness, because the school budgets may not be spent directly on affairs which are conducive to enhancing school effectiveness. However, when measures of innovative management are presented in company with school-based budgeting, school effectiveness will be effectively enhanced.

Implications

In this section, the implications of the present findings are revealed for further research so as to strengthen educational practices.

In general, "innovation" is very important for staff in the schools. Without the innovation, schools will always stick to the current established practices. As the quantitative and empirical results indicated in the present study, the more specialist schools implement innovative management, the greater their effectiveness. This study thus proves that the subsidy policy for specialist schools is not only important but also well-managed. However, although the selected specialist schools can serve as model schools, the number of such schools remains small and the budget quota for specialist schools in Taiwan is limited. It is suggested that the policy of specialist schools is worthy to be expanded and made more widely known in the future. In consequence, the authorities' budget quota for specialist schools should be increased, and the subsidies should be expanded. Such measures would prompt more elementary and junior high schools to convert into specialist schools and would thereby enhance those schools' effectiveness. Most important of all, schools will develop their unique and promising educational features owing to the subsidy policy of specialist schools; moreover, schools will present multiple styles of educational and cultural appearances instead of maintaining one conservative style.

Furthermore, since innovative management is so beneficial, how to effectively carry out innovative management is worthy of discussion. Most importantly, except for meditating many innovative measures, it is found that the implementation of school-based budgeting is a critical factor which is conducive to carrying out innovative management smoothly. It cannot be denied that the rigid accounts and use of budgets are critical factors which prohibit the implementation of the innovative measures. If

the design of budgeting can loosen up the unnecessary restrictions and become more flexible, schools will be able to arrange many educational affairs with more innovative methods and thus exhibit their diversified styles.

To sum up, innovative management is an important medium; moreover, it connects school-based budgeting with school effectiveness. An effective school with outstanding performance will emerge when innovative management is carried out positively. Furthermore, as far as strengthening innovative management is concerned, school-based budgeting which could loosen up a lot of budgetary restrictions will be a beneficial and critical factor. However, it is surprising to find that school-based budgeting had no direct effect on school effectiveness but had an indirect effect on school effectiveness through innovative management. Two meanings are implicated in the above phenomenon: 1. School-based budgeting is like a supportive management with a logistical property. School-based budgeting is an essential and indispensable condition. Innovative management cannot be carried out effectively without it and thereby school effectiveness will not be enhanced. 2. Innovative management is like an actual combat management with a front-line property. Innovative management is a direct and critical factor for improving school effectiveness, and there is a tight linkage between them. In brief, a country cannot win in a war without each of the logistical army or the actual combat army, and whether a school management will be successful is the same.

In addition, it is found that school-based budgeting and innovative management are not two managerial measures without any linkage; instead, the implementation of school-based budgeting is a critical factor for strengthening innovative management. As a result, emphasis should not be put merely on either school-based budgeting or innovative management. On the whole, we suggested that the authorities should positively take into account carrying out school-based budgeting and innovative management simultaneously so that the school effectiveness will be considerably enhanced. All the above findings in this paper can serve as a reference for the authorities and schools.

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