Article

Structural Autonomy and Management Performance: An Influence Reinforced in the Particular Context of Portuguese Public Secondary Schools

Carla Fontes [1],*, Joaquim Leite [2] and Paula Odete Fernandes [1]

1 Applied Management Research Unit (UNIAG), Instituto Politécnico de Bragança (IPB), 5300-253 Bragança, Portugal
2 Department of Business and Social Sciences, School of Technology and Management, Instituto Politécnico de Bragança (IPB), 5300-253 Bragança, Portugal
* Correspondence: carlafontes@ipb.pt

Abstract: The purpose of this research is to verify interdependencies among service innovation, structural autonomy, performance measurement systems, and organizational outcomes in a new organizational context. The relationships between these variables that structure organizational design have been studied for several decades, but it is necessary to verify the validity of those interdependencies in new geographical contexts and periods. Contingency theory was the selected framework because it argues how different scenarios can justify different organizational solutions and is appropriate in the predominant quantitative research. For data collection, surveys were sent to 526 executive heads of all Portuguese public secondary schools, obtaining 154 valid responses. Data processing was carried out using descriptive analysis, Spearman correlation, and structural equation analysis. The results reinforce previous literature, proving the influence of structural autonomy, not only on pedagogical management performance but also on resource management performance within a specific context explored for the first time in the Portuguese public sector. However, the interdependence of these variables in relation to pedagogical innovation strategy and organizational outcomes of effectiveness and efficiency was not verified in this particular setting, corroborating the basic foundations of contingency theory.

Keywords: contingency theory; structural autonomy; pedagogical management performance; resource management performance; Portuguese public secondary schools

1. Introduction

Performance measurement has been of great interest to managers and academic researchers in management control (Deville et al. 2014; Micheli and Mari 2014). It has been more than two decades since a model of interdependencies in organizational design was tested in the particular context of Australian public hospitals (Abernethy and Lillis 2001), based on concepts previously explained in the literature more than four decades ago (Miles et al. 1978). The concepts involved in that model were as follows: service innovation, structural autonomy, performance measurement systems (PMSs), and organizational outcomes (efficiency and effectiveness) (Abernethy and Lillis 2001). PMSs were subdivided into clinical management performance (CMP) and resource management performance (RMP). The results of the study proved not only the existence of a relationship between service innovation strategy and structural autonomy but also the existence of an interdependence between structural autonomy and the use of PMSs. The authors also concluded that organizational efficiency outcomes are related to the use of RMP, while organizational effectiveness outcomes are related to the use of CMP.

In the meanwhile, the literature has continued to use the analysis model to study the validity of such interdependencies in other particular settings: in the context of Indonesian

public hospitals (Veronica and Heribertus 2003) or in the context of Australian public universities (Chung et al. 2009), as examples. In the study, in Indonesian hospitals, Abernethy and Lillis' (2001) model obtained similar results, corroborating its suitability for the hospital sector (Veronica and Heribertus 2003). In the study of Australian public universities, that model was also found to fit that country's higher education sector (Chung et al. 2009). The authors concluded that in that university context, there are interdependencies between service innovation strategy, structural autonomy, and PMSs that affect effectiveness and efficiency. Therefore, Abernethy and Lillis' (2001) model forms a basis for understanding the design of organizational structures.

Over the years, the various organizational activities change, justifying the need for research into new concepts and models on the one hand, and new validations of older concepts and models on the other. Further, in public organizations, strategic management tools can also be used to better understand the decision-making process (Ongaro and Ferlie 2019). The use of strategic PMSs has consequences for practitioner behavior, organizational capabilities, and organizational performance, but these consequences are not homogeneous across different contexts (Endrikat et al. 2020). Therefore, there is the heterogeneity of implications justified by the presence of various contingencies, namely differences in national culture, reward system, and industry.

In organizations, there are several internal factors that influence innovation and performance, highlighting the commitment of the human factor, particularly in terms of leadership skills (Tajeddini et al. 2020). The relationship between innovation and PMSs may present inconsistencies due to the influence of the technological context (moderating factor), management routines (mediating variable), and different types of innovation (Müller-Stewens et al. 2020). The relationship between incentive systems and innovation is not always consistent because there are explicit and implicit incentives that are interdependent choices within innovation processes (Speckbacher and Wabnegg 2020). Numerous researchers (Bozkurt et al. 2014; Gerdin and Greve 2004; Oro and Lavarda 2017; Prajogo 2016; Silva et al. 2016) have paid particular attention to the factors that influence organizational success. The successful implementation of pedagogical innovations depends on the level of autonomy of schools (Parra 2022). The growth of private secondary schools is associated with strategies to achieve, maintain, and extend the autonomy of school activity (pedagogical, management, and research) from centralized public models (Wang and Chan 2015). The level of centralization is positively associated with the sophistication of value-based management (Nowotny et al. 2022).

As in hospitals, schools also underwent structural reforms to measure performance, implementing strategies to improve services (effectiveness) and financial results (efficiency) (Silva 2005). Performance management in the public sector has financial costs needing to be funded from the state budget (Mizrahi 2021). In scenarios of uncertainty, the relevance of nonfinancial information for performance evaluation tends to increase, but financial information remains the most prevalent, suggesting that financial and nonfinancial measures are complementary rather than substitutes (Pires and Alves 2022). Nonprofit organizations tend to pay more attention to preserving service quality, fearing that a greater emphasis on financial efficiency may harm service quality (Pfiffnera et al. 2021). In schools, entrepreneurship, and knowledge management impacts strategy, improving innovation and organizational performance (Rofiaty 2019). Additionally, different types of schools (secondary/general or professional/vocational) located in different geographical contexts can generate different students' performances (pedagogical efficiency) (Camanho et al. 2021).

A generalized performance funding model in the public education sector may create a paradox in the structural autonomy of schools that explains the occurrence of failures in accountability, suggesting the need for different funding solutions for specific problems (Mizrahi 2021). The availability of resources and policies that encourage teachers' research tend to be the factors that most influence the performance (productivity) of these teachers (Tuan et al. 2022). Public sector organizations are subject to budget constraints (funding) which forces them to seek the most effective management control

(performance measurement) tools possible to assess the achievement of organizational objectives (Felício et al. 2021). The use of management control systems supports management in identifying, assessing, selecting, and implementing actions to improve organizational performance (Osma et al. 2022).

Frequent organizational reforms, both in the public and private sectors, force organizational changes, whose interdependencies in organizational design naturally change over time. In the public sector of OECD countries, reforms in education and school management always focus on structural autonomy in terms of pedagogy, management, and financing functions (Bracci 2009). However, the degree of structural autonomy is always associated with the accountability systems of schools envisaged in each modernizing reform, which can lead to misalignment between resource managers and teachers responsible for pedagogical functions. In the public sector, performance management influences the autonomy of professionals through its monitoring and accountability instruments, while not avoiding tensions and rivalries among the professionals involved concerning the virtues of performance management practices (Maillard and Savage 2022).

The occurrence of reforms, with significant changes in the education sector, suggests the need for changes, even if partial, in school management control, particularly in PMSs (Kallio et al. 2020; Vale et al. 2022). These systems produce information for decision-making to improve organizational outcomes resulting from educational/pedagogical accountability reforms (Gigliotti 2021). In other words, it is important to distinguish between PMSs (resource management and pedagogical management) and organizational outcomes. The use of PMSs can improve management performance (Van der Hauwaert et al. 2022).

In public organizations providing health or education services, human resources are preponderant and professionals have considerable control over the work performed, being a key factor for organizational success (Saleiro and Martins 2013). Portuguese economy and culture present differences in the public sectors compared to other countries (Kickert 2011; Saleiro and Martins 2013). It was in this framework that the motivation arose to verify those interdependencies in organizational design with new research into the particular context of Portuguese public secondary schools to update and expand the theory.

This study is structured into several main sections. First, the literature review that supports the research hypotheses covers the theme of this study, dealing with aspects such as contingency theory, service innovation strategy, structural autonomy, PMSs, and organizational outcomes of effectiveness and efficiency. In the next section, the research method used is presented. The main results that precede the final discussion and conclusion are presented in the last sections.

2. Literature Review

Research on PMSs tends to simplify contexts, but in each concrete scenario, the relationship between organizational performance and management control systems becomes more complex given the existence of particular contingencies (Ferreira and Otley 2009). Contingency theory researchers have sought to identify the impact of certain, potentially relevant, contextual variables on organizational structure (Chenhall 2003). However, there is an appropriate organizational structure for each type of organizational environment (Gerdin and Greve 2004; Otley 2016). The use of contingency theory to support management control research was widespread in the 1970s and 1980s and has continued in recent decades (Granlund and Lukka 2017). Contingency theory is a strong and consistent perspective, not only because of its impact over the years but also because of its representativeness in empirical quantitative research methodologies (Otley 2016).

Management control research based on contingency theory has a long history of understanding the role of performance measurement practices in organizations (Hall 2016). This approach assumes that PMSs are adopted so that managers can more easily achieve organizational goals (Chenhall 2003). The proper design of these systems is influenced by context. The contingency theory used in management control research focuses on trying to establish a correlation between the effectiveness of a particular PMS design and its context

(Chenhall 2003; Hall 2016; Hopper and Bui 2016; Otley 2016). Within contingency theory, the external variables commonly studied in the literature include technology, competition, context, and culture (Otley 2016). The main internal variables studied have been the following: size, structure, strategy, information systems, psychological variables, employee participation in control systems, competitive position, product life cycle stage, and the change in organizational systems.

Several authors (Anthony and Govindarajan 2014; Chenhall 2003) have discussed how the combination of strategy and context can influence PMSs. This type of research involving strategy tends to select only one type of organizational strategy without understanding its implications for the use of management control systems (Otley 2016). Regardless of how strategy is designed, whether using Miles et al.'s (1978) typology or that of others, different strategic orientations require different approaches to strategic planning, budget management, and incentive systems. Performance management has effects on the effectiveness of an organization's management response, which may choose a more proactive or more reactive strategy (Gigliotti 2021). Therefore, organizational strategy can predict future performance, suggesting that the level of management autonomy can be an influencing factor. The existence of heterogeneous organizational outcomes (performance) can be explained by contingency theory.

Increasingly, innovation is a key factor in determining a competitive advantage through differentiation strategies (Dibrell et al. 2014; Hariyati and Tjahjadi 2015). Innovation plays a crucial role in entering new markets, maintaining market share, and increasing the competitive advantage of organizations. This strategic element is a relevant competitive factor (Hariyati and Tjahjadi 2015). Strategic planning processes and their flexibility are positively associated with innovation (Dibrell et al. 2014).

Another important organizational factor for the development of innovation within an organization is the autonomy of organizational structures and the level of decentralization (Dedahanov et al. 2017). More autonomy can mean that employees are less dependent on centralizing bureaucracies and are closer to customers and market trends. These employees also feel more responsible for the tasks they perform, creating new work patterns and new responses to identified needs. The greater the autonomy of a given organizational structure, the greater can be the responsibility of those who work there and have decision-making power there (Abernethy and Lillis 2001). More decentralized strategic management may entail a greater emphasis on performance evaluation (Johanson et al. 2019). The centralization/decentralization of decision-making, pedagogical and managerial, in national and international education systems is still an open field for debate and research (Parra 2022).

PMSs are generally viewed as tools that provide information to assist managers (Chenhall 2003). These systems, when coupled with greater structural autonomy and a well-executed strategy supported by innovation, can lead to better organizational outcomes, particularly greater degrees of effectiveness and efficiency (Abernethy and Lillis 2001; Chung et al. 2009). Efficiency is usually associated with financial variables and effectiveness seems more associated with nonfinancial variables. In other words, a firm may be efficient and not effective, but it may also be effective and inefficient, it may be one or the other, or it may be neither.

Organizational competitiveness needs to seek both process and product/service innovations. Considering that creativity needs autonomy, the type of control can influence employee behavior (Turner et al. 2021). A team's creativity benefits from the high autonomy of team members and high task interdependence (Grabner et al. 2022). Organizational competitiveness needs to seek both process and product/service innovations, and PMSs influence behaviors that generate innovativeness. The impact of autonomy on innovation is a hypothesis that has been studied, but the hypotheses in Abernethy and Lillis' (2001) model involving these two variables were the opposite: the impact of innovation on autonomy.

Considering the previous literature (Abernethy and Lillis 2001; Chung et al. 2009; Veronica and Heribertus 2003), it is pertinent to question the same hypotheses for the Portuguese public schools with some autonomy and possible emphasis on innovation

strategy. In schools, the use of innovative learning tools increases autonomy, improves students' self-awareness, and contributes to educational success (Cherrier et al. 2020). Thus, the first hypothesis (H1) is as follows:

Hypothesis 1 (H1). *Service innovation impacts structural autonomy.*

According to the literature (Abernethy and Lillis 2001), there is a direct and positive relationship between the degree of autonomy granted to clinical units and the importance of using financial and nonfinancial performance evaluation measures. This hypothesis has also been proven in later literature (Chung et al. 2009; Veronica and Heribertus 2003). Employee autonomy tends to increase employee commitment to work and performance (Tisu et al. 2021). In educational institutions, studies related to the influence of structural autonomy on performance are still scarce (Heinicke and Guenther 2020). The proliferation of performance measures in the education sector poses a threat to the autonomy (self-control) of teacher researchers, as they serve vertical (from superiors) and horizontal (between teachers) control (Gerdin and Englund Forthcoming). This horizontal control acts as a moderating variable that reinforces hierarchical influence by vertical control. Considering that there are differences between hospitals and schools that may affect the significance of this relationship, the second hypothesis (H2) of this study is as follows:

Hypothesis 2 (H2). *Structural autonomy impacts pedagogical management performance (PMP) (H2a) and resource management performance (RMP) (H2b).*

A positive relationship between service innovation strategy and the use of PMSs, through structural autonomy, has been verified indirectly in the literature (Abernethy and Lillis 2001; Chung et al. 2009; Veronica and Heribertus 2003). In addition to this indirect interdependence, a direct and positive relationship between service innovation and the use of PMSs has also been proven (Abernethy and Lillis 2001). In the university context, the use of PMSs to monitor strategy implementation seems to be more significant than in the hospital context (Chung et al. 2009). Thus, as in this previous literature, hypothesis H3 is similarly formulated:

Hypothesis 3 (H3). *Service innovation impacts PMSs indirectly via structural autonomy.*

The level of structural autonomy and decentralization can impact the productivity (organizational outcomes) of teachers who are also researchers, in turn influencing the improvement of the pedagogical quality of teaching (Tuan et al. 2022). Improved autonomy is beneficial to employees' jobs in organizations in terms of engagement and well-being, hence autonomy impacts organizational performance (Suárez-Albanchez et al. 2022). The autonomy–performance relationship depends on the institutional and industry context (contingencies) that have a moderating effect on this relationship (Geleilate et al. 2020).

The influence on the use of PMSs is enhanced when the dependent variable is a combination of the innovation strategy and an appropriate level of autonomy (Abernethy and Lillis 2001). These hypotheses have also been supported in additional literature (Chung et al. 2009; Veronica and Heribertus 2003). In the public sector, the way PMSs are used affects organizational performance (Speklé and Verbeeten 2014). Performance measurement provides management with many critical, useful, and necessary functions, but it can also negatively affect organizational performance (Melnyk et al. 2014). The relationship between performance management and organizational outcomes is still heterogeneous and inconclusive (Gigliotti 2021). Thus, H4 is as follows:

Hypothesis 4 (H4). *Service innovation impacts organizational outcomes indirectly, via structural autonomy and PMSs.*

3. Research Methodology

The present study aims to empirically verify the interdependencies among the strategic emphasis on service innovation, structural autonomy, PMSs, and organizational outcomes. This quantitative research study is supported by the literature on interdependencies in organizational design and contingency theory with the argument that in different contexts, different organizational solutions are justified (Abernethy and Lillis 2001; Otley 2016). Data were collected in the year 2016 through a survey sent to 526 Portuguese public secondary schools. The respondents were the executive heads of these schools in mainland Portugal without islands (Madeira and Azores which have a different degree of autonomy in public secondary schools).

Portuguese public secondary schools are the population of the present study. These schools have an organizational structure with characteristics analogous to other public sector organizations: the coproduction (students and staff) of outcomes, and schools that are accountable for the performance of students (customers) and staff (providers of the education service, with an emphasis on teachers) (Gigliotti 2021). Secondary schools have undergone structural redesigns for management control, resulting in greater accountability for the implementation of strategies to improve services (effectiveness) and financial goals (efficiency) (Kickert 2011; Saleiro and Martins 2013). The data were processed statistically, using descriptive analysis and Spearman correlation on the one hand, and structural equation analysis on the other. This structural equation analysis proved to be appropriate in the quantitative research paradigm (Suárez-Albanchez et al. 2022; Van der Hauwaert et al. 2022).

In the literature review, the research hypotheses were first supported. The proposed analysis model is represented in Figure 1.
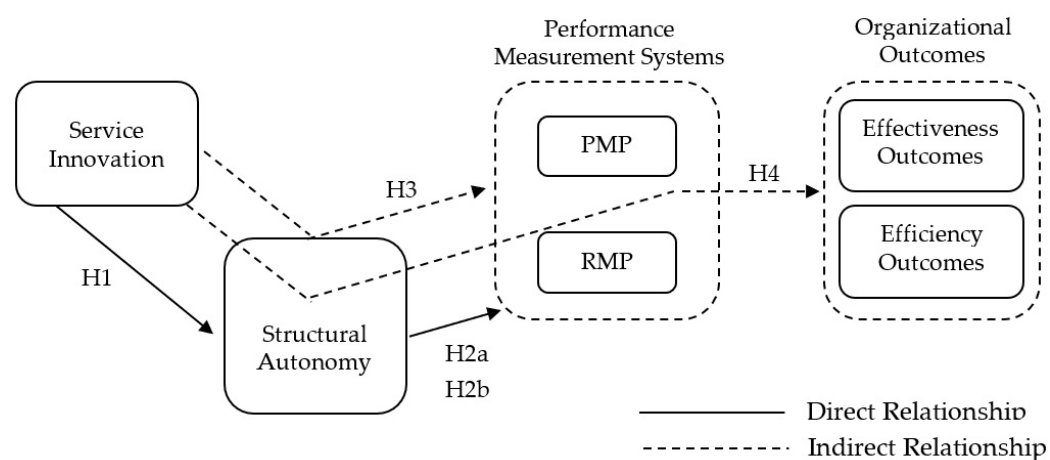
Figure 1. Hypothesized Model.

The conceptualization of the variables involved in the model was as follows: (i) service innovation, (ii) structural autonomy, (iii) PMP and RMP, and (iv) organizational outcomes of effectiveness and efficiency. Given the quantitative nature of the study, the data collection instrument used was the questionnaire survey applied online, and the variables were measured on a 7-point Likert scale (see adapted questionnaire in Appendix A). A similar adaptation of the questionnaire has been used in other literature (Chung et al. 2009; Veronica and Heribertus 2003). For the data analysis, univariate, bivariate, and multivariate statistics were selected. An analysis of the descriptive statistics of the variables used preceded the structural equation analysis to perform the study of causal relationships. As for the expected results, it is believed that some of the relationships between the variables in the model can be strengthened in the context of Portuguese public secondary schools.

4. Results

In 2016, the population of Portuguese public secondary schools was 526 (General Secretariat for Education and Science 2016). This number was also the population for this study and 154 valid responses were obtained. The population has the following geographical distribution: 57 schools (37%) in the North region, 44 schools (29%) in the Lisbon region, 17 schools (11%) in the *Alentejo* region, and the remaining schools in the Center and *Algarve* regions.

The main descriptive statistics associated with the questionnaire variables, as well as the Spearman correlation matrix, are presented in Table 1. Spearman's correlation matrix was used because the service innovation variable was measured on an ordinal scale.

Table 1. Descriptive Statistics and Correlation Matrix.

Variables	Mean (Std. Dev.)	(1)	(2)	(3)	(4)	(5)	(6)
(1) Service Innovation	4.99 (1.199)	1					
(2) Structural Autonomy	12.99 (5.668)	0.038	1				
(3) PMP	7.01 (3.129)	0.195 (<0.05)	0.566 (<0.01)	1			
(4) RMP	22.95 (5.597)	0.194 (<0.05)	0.407 (<0.01)	0.581 (<0.01)	1		
(5) Effectiveness	8.08 (2.337)	0.410 (<0.01)	0.269 (<0.01)	0.284 (<0.01)	0.232 (<0.01)	1	
(6) Efficiency	17.36 (4.453)	0.278 (<0.01)	0.308 (<0.01)	0.376 (<0.01)	0.495 (<0.01)	0.455 (<0.01)	1

The correlation between service innovation and both PMSs (PMP and RMP) is positive, direct, and statistically significant. This correlation is consistent with previous research (Bozkurt et al. 2014; Melnyk et al. 2014) and it can be explained by the fact that PMSs can be used as a source of information to monitor the impact of implementing an innovation strategy. Concerning innovation in services, it can be verified that this variable also correlates with the two variables used to measure outcomes (effectiveness and efficiency) and that this correlation is statistically significant. This result is in line with the literature (Oro and Lavarda 2017), which states that the innovation strategy plays an important role in the structural adjustment of the organization, which, in turn, positively influences the organizational results.

Structural autonomy is positively correlated with the variables PMP, RMP, efficacy, and efficiency. This correlation suggests that the greater the autonomy granted to a given department, the lower the senior management capacity to directly monitor these units and, therefore, the greater the use of PMSs. Both PMSs (PMP and RMP) correlate with organizational outcomes. This correlation is consistent with the literature on PMSs since one of the main objectives of the performance evaluation aims to improve organizational results (Oro and Lavarda 2017; Silva et al. 2016). It should be noted that the only correlation that is not statistically significant is that between innovation in services and structural autonomy.

For the elaboration of the model, the premises of the structural equation analysis, the absence of outliers, the population size, the univariate and multivariate normality, and, finally, the absence of multicollinearity were validated (Schreiber et al. 2006). The existence of outliers was evaluated by the Mahalanobis (D^2) square and the normality of the variables was evaluated by the coefficients of univariate and multivariate skewness (Sk) and kurtosis (Ku). These measures show an acceptable quality of adjustment.

The quality of the fit of structural equation analysis was evaluated using the χ^2 test, absolute measures of fit, and incremental measures of fit. The values obtained ($\chi^2/gl = 1.770$;

CFI = 0.984; GFI = 0.982; RMSEA = 0.071) show an acceptable quality of fit. A modified version of Abernethy and Lillis' (2001) model was introduced to better fit the school context.

Figure 2 shows the directional paths of the model, along with the standardized direct effects of the trajectories between the variables under analysis, the coefficients of determination of each variable, and the statistical significance of the relationships between the variables under study.
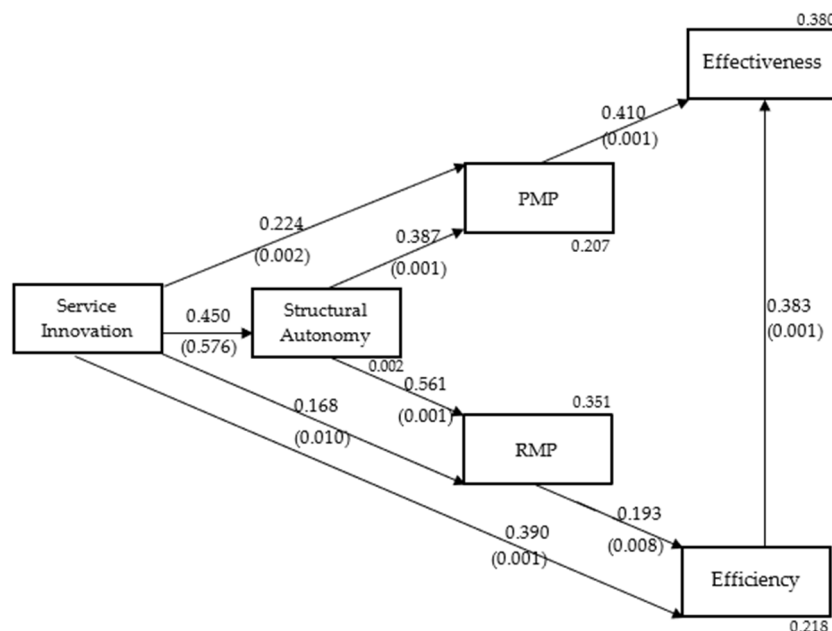
Figure 2. The final model of structural equations.

For the decision on the validation or invalidation of the research hypotheses, a significance level of 1% was assumed. In this regard, according to Figure 2, all relationships have significant effects, except for the relationship between service innovation and structural autonomy, which allows the rejection of H1 in the present study. The rejection of H1 is not consistent with the literature (Abernethy and Lillis 2001; Chung et al. 2009) which found a positive and significant relationship between service innovation and structural autonomy. It should be noted that in the study of Abernethy and Lillis (2001), the relationship had a path coefficient (coef.) of 0.26 ($p < 0.05$), and Chung et al. (2009) had a coef. 0.19 ($p < 0.05$).

It can be observed that the significant effects of PMP in services innovation (coef. = 0.224) and structural autonomy (coef. = 0.387) are statistically significant at a significance level of 1%. Likewise, it was observed that the effects of structural autonomy (coef. = 0.561, $p < 0.01$) on RMP use are also positive and statistically significant. That is, in the school context, the use of PMSs is directly related to structural autonomy. Thus, H2a and H2b of the present study are not rejected.

The direct and positive effect of the use of PMP on organizational results of effectiveness can also be observed (coef. = 0.410; $p < 0.01$). In this school context, the existence of organizational results of effectiveness is related to the use of PMSs. Equally significant is the effect of the use of RMP on organizational efficiency outcomes (coef. = 0.193), which, although relatively low, is statistically significant ($p < 0.01$). This also highlighted the positive and significant effects of service innovation, in terms of efficiency (coef. = 0.390, $p < 0.01$). Finally, it was verified that the effect produced by the efficiency in effectiveness was positive and statistically significant (coef. = 0.383, $p < 0.01$).

Besides the mentioned effects, it is important to take into account that this is a model of simultaneous equations that includes not only the direct effects of one variable on the other but also indirect effects in the model, for example, the indirect effect produced by service innovation (via structural autonomy) in the use of PMSs. The results of the indirect effects are presented in Table 2.

Table 2. Indirect effects of model trajectories.

Trajectory (Indirect Effect)	Service Innovation	Structural Autonomy	PMP	RMP	Efficiency
Structural Autonomy	0	0	0	0	0
PMP	0.017	0	0	0	0
RMP	0.025	0	0	0	0
Effectiveness	0.262	0.200	0.074	0	0
Efficiency	0.037	0.108	0	0	0

In Table 2, the service innovation strategy has a positive effect on both PMSs (PMP and RMP). In this way, it is possible to verify that the innovation in the services causes an indirect effect on the use of the PMP through structural autonomy (coef. = 0.017). It is also verified that innovation in service strategy shows an indirect effect on the use of RMP, through structural autonomy (coef. = 0.025). Furthermore, it can be observed that service innovation strategy has an indirect effect on the organizational results of effectiveness (coef. = 0.262) and efficiency (coef. = 0.037) through structural autonomy and PMSs. Nevertheless, this effect is more expressive in effectiveness than in efficiency. As for the significance of the effects mentioned, it is shown not to be statistically significant. This result reflects the fact that the direct path between innovation in services and structural autonomy is not statistically significant. Thus, H3 and H4 are rejected.

5. Discussion

Despite similarities with other public sector settings, the context of Portuguese secondary schools seems to have a sufficient strength of difference that resulted in the proof of only one of the four hypotheses in this study. In the theoretical model with four hypotheses, only H2 was validated. Hypotheses H2a (Structural autonomy impacts PMP) and H2b (Structural autonomy impacts RMP) were supported. This suggests that the autonomy granted to the executive heads of Portuguese public secondary schools influences the importance attached to performance evaluation measures, which thus reveals the result of delegated autonomy. However, this relationship can be bidirectional because performance management influences the autonomy of professionals in the public sector (Maillard and Savage 2022). This is consistent with the literature (Abernethy and Lillis 2001; Chung et al. 2009; Veronica and Heribertus 2003) on the relationship between structure and PMSs.

It has also been proven that the relationship between structure autonomy and PMSs is stronger in the context of resource management (financial measures) than in pedagogical management (nonfinancial measures). This result contributes, in theoretical terms, to reinforcing the emphasis on financial measures (Abernethy and Lillis 2001; Chung et al. 2009). Such a result corroborates how organizational structure in the school sector, when measured by autonomy, impacts PMSs as an internal determinant (Rofiaty 2019; Tajeddini et al. 2020). However, because Portuguese public schools have a limited degree of structural autonomy, given that they also depend on government policies, this public sector is the subject of public reforms (Kallio et al. 2020; Kickert 2011) that differ in each country or region (Camanho et al. 2021; Kickert 2011). In addition, there are external variables or contingencies (economic, political, social, and cultural factors) that influence the autonomy–PMSs relationship (Ferreira and Otley 2009; Tajeddini et al. 2020) and, consequently, organizational performance (Endrikat et al. 2020; Geleilate et al. 2020; Lourenço 2020). Central political power tends to hold some control over schools through bureaucratic regulations and institutionalization (Wang and Chan 2015).

This research found a positive relationship between the strategic emphasis on service innovation and the PMSs measures (PMP and RMP) in different contexts (Ferreira and Otley 2009) that was not put into the analysis model. However, this innovation–PMSs relationship has been proven consistently in other literature (Müller-Stewens et al. 2020; Turner et al. 2021), particularizing the incentives for innovation (Speckbacher and Wabnegg 2020). This result also validates the previous research that establishes connections between strategy

and PMSs (Bozkurt et al. 2014; Chenhall 2003; Melnyk et al. 2014). Positive relationships were also found in RMP efficiency and PMP effectiveness. Thus, the use of measures that are focused on resource management influences the results of organizational efficiency (Endrikat et al. 2020; Geleilate et al. 2020; Lourenço 2020). The use of nonfinancial measures influences the organizational results of effectiveness.

It should also be noted that a positive and direct relationship between efficiency and effectiveness was found. In the public not-for-profit sector, the achievement of efficiency objectives is generally related to the results of effectiveness (Santos and Ramos 2016). In contrast to Abernethy and Lillis (2001), who found a positive relationship between service innovation and effectiveness, in the present study, a positive relationship between service innovation and efficiency was found.

Unlike Abernethy and Lillis (2001), the present research did not support H1 (Service innovation impacts structural autonomy), H3 (Service innovation impacts PMSs indirectly via structural autonomy), or H4 (Service innovation impacts organizational outcomes indirectly via structural autonomy and PMSs). In relation to the rejection of H3 and H4, this result is because the direct trajectory between service innovation and structural autonomy (H1) is not statistically significant. The rejection of H1 may be due to the fact that the Portuguese public secondary school context still has some constraints on service innovation and structural autonomy (Ferreira and Otley 2009; Kallio et al. 2020; Kickert 2011). Thus, no model can be adapted to all organizations and scenarios and these results are supported by contingency theory (Otley 2016).

6. Conclusions

This research aimed to verify interdependencies between service innovation, structural autonomy, PMSs, and organizational outcomes in the organizational context of Portuguese public secondary schools. Four hypotheses regarding this interdependence between variables were considered. This goal was supported by the argument that the validity of those interdependencies may be different in new geographical contexts and time periods. Considering that different contexts may require different organizational solutions, contingency theory, along with organizational variables, was the selected theoretical framework. This research adopted the predominant quantitative paradigm, collecting data via surveys sent to the executive heads of Portuguese public secondary schools. The data were statistically processed using descriptive analysis, Spearman correlation, and structural equation analysis.

The main results proved that structural autonomy influences PMSs in both PMP and RMP in the particular context of Portuguese public secondary schools. The interdependence of these variables in relation to pedagogical innovation strategy and organizational outcomes was not proved. The continued validation of organizational models is necessary to test and extend the theory (Otley 2016).

Despite the results obtained and conclusions presented, this study presents some limitations. One of the limitations is the quantitative method of data collection and processing used, given the limitations of questionnaire surveys. Another limitation is the size of the population because although the data obtained showed to be robust, it is unquestionable that a larger population would be desirable, in order to obtain greater representativeness of the population. Another limitation refers to the fact that there are more items related to the internal variables under study that could be considered. The fact that the model does not include external variables (economic and institutional factors) can also be presented as a limitation. Finally, in addition to efficiency and effectiveness, other organizational results could be studied, namely the results of economy, equity, quality, or others, which may be another limitation.

The validation of the hypotheses in another context is suggested for future research, namely in the private school sector. Such research would allow the verification of divergences from the results found in the public school sector. Another alternative would be to consider other variables items or other measurable criteria. Abernethy and Lillis' (2001)

theoretical model included only internal variables or contingencies. If the research model had included external variables or contingencies, different results would have been expected and this may also be a new line of research in the future. As this study has a quantitative methodology, other methods of collecting data, such as individual or group interviews, are suggested, in particular the application of qualitative case studies in addition to quantitative research.

Author Contributions: Conceptualization, C.F. and J.L.; methodology, C.F. and J.L.; software, C.F. and P.O.F.; formal analysis, C.F. and P.O.F.; investigation, C.F., J.L. and P.O.F.; writing—original draft preparation, C.F., J.L. and P.O.F.; writing—review and editing, C.F. and J.L.; supervision, P.O.F. All authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

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

Appendix A Measuring Variables via Survey

(adapted from Abernethy and Lillis 2001, based on Miles et al. 1978)

Question 1: Service Innovation

Consider the following 2 types of secondary schools (each type with 6 opposite features):

Type A secondary school—(1) training offer and programs are relatively stable, (2) tries to focus on its catchment area (region), (3) offers a more limited set of courses and programs than other similar schools, (4) generally does not seek creation and development of new courses and programs in the education sector, (5) development of courses and programs is concentrated in more common learning areas, (6) there is a belief that the most important thing is to do the best possible but in existing courses and programs.

Type B secondary school—(1) makes relatively frequent changes in training offerings and programs (changes or adds something to courses), (2) tends to offer a broader set of courses and programs than other similar schools, (3) responds quickly to early signs of opportunities and needs in the education sector, (4) seeks the creation and development of new courses and programs, (5) other schools often follow this school in the development of new courses and program content, and (6) may not be strong in all areas of education/training.

Regarding the two types of secondary schools (A and B), please mark your perception of how your school is positioned, on a scale between 1 and 7, where 1 represents type A secondary school (little innovative) and 7 represents type B secondary school (very innovative).

Question 2: Structural Autonomy

Please indicate the extent to which you agree (from 1—strongly disagree to 7—strongly agree) with the following aspects regarding the autonomy of your secondary school:

(1) The school is held accountable for the costs of its services
(2) The school is held responsible for managing the productivity of its services
(3) The school is treated as a business unit (made responsible for costs and revenues)
(4) Internal contracts are established with the secondary school principal (responsible for costs and productivity targets)

Question 3: Performance Measurement Systems (PMSs)

Please indicate the degree to which you use (from 1—never or very little used to 7—heavily used) the following measures regarding your secondary school's performance:

(1) Quality of teaching
(2) Adherence to standard procedures
(3) Cooperation with others secondary schools
(4) Harmony within the secondary school
(5) Research output of the secondary school
(6) Budget performance
(7) Output targets

Question 4: Organizational Outcomes

Please indicate how well your secondary school is doing (from 1—below average to 7—above average) in the following aspects:

(1) Costs when compared to other schools (below average is worst–worse; above average is most favorable–better)
(2) Ability to raise revenue
(3) Reputation of educational courses and course content
(4) Teachers' academic degrees
(5) Teachers' research and development
(6) Quality of educational courses and course content

References

Abernethy, Margaret, and Anne Lillis. 2001. Interdependencies in organization design: A test in hospitals. *Journal of Management Accounting Research* 13: 108–24. [CrossRef]

Anthony, Robert, and Vijay Govindarajan. 2014. *Management Control Systems*. London: McGraw-Hill Education, pp. 120–54.

Bozkurt, Özlem, Adnan Kalkan, and Mutlu Arman. 2014. The relationship between structural characteristics of organization and followed business strategy: An application in Denizli. *Procedia-Social and Behavioral Sciences* 150: 222–29. [CrossRef]

Bracci, Enrico. 2009. Autonomy, responsibility and accountability in the Italian school system. *Critical Perspectives on Accounting* 20: 293–312. [CrossRef]

Camanho, Ana, Luisa Varriale, Flávia Barbosa, and Thiago Sobral. 2021. Performance assessment of upper secondary schools in Italian regions using a circular pseudo-Malmquist index. *European Journal of Operational Research* 289: 1188–208. [CrossRef]

Chenhall, Robert. 2003. Management control systems design within its organizational context: Findings from contingency-based research and directions for the future. *Accounting, Organizations and Society* 28: 127–68. [CrossRef]

Cherrier, Sophie, Pierre-Yves Le Roux, François-Marie Gerard, Guillaume Wattelez, and Olivier Galy. 2020. Impact of a neuroscience intervention (NeuroStratE) on the school performance of high school students: Academic achievement, self-knowledge and autonomy through a metacognitive approach. *Trends in Neuroscience and Education* 18: 100125. [CrossRef]

Chung, Tze, Graeme Harrison, and Robert Reeve. 2009. Interdependencies in organization design: A test in universities. *Journal of Management Accounting Research* 21: 55–73. [CrossRef]

Dedahanov, Alisher, Changjoon Rhee, and Junghyun Yoon. 2017. Organizational structure and innovation performance: Is employee innovative behavior a missing link? *Career Development International* 22: 334–50. [CrossRef]

Deville, Aude, Gery Ferrier, and Hervé Leleu. 2014. Measuring the performance of hierarchical organizations: An application to bank efficiency at the regional and branch levels. *Management Accounting Research* 25: 30–44. [CrossRef]

Dibrell, Clay, Justin Craig, and Donald Neubaum. 2014. Linking the formal strategic planning process, planning flexibility, and innovativeness to firm performance. *Journal of Business Research* 67: 2000–7. [CrossRef]

Endrikat, Jan, Thomas Gunther, and Robert Titus. 2020. Consequences of strategic performance measurement systems: A meta-analytic review. *Journal of Management Accounting Research* 32: 103–36. [CrossRef]

Felício, Teresa, António Samagaio, and Ricardo Rodrigues. 2021. Adoption of management control systems and performance in public sector organizations. *Journal of Business Research* 124: 593–602. [CrossRef]

Ferreira, Aldónio, and David Otley. 2009. The design and use of performance management systems: An extended framework for analysis. *Management Accounting Research* 20: 263–82. [CrossRef]

Geleilate, José-Mauricio, Daniel Andrews, and Stav Fainshmidt. 2020. Subsidiary autonomy and subsidiary performance: A meta-analysis. *Journal of World Business* 55: 1–14. [CrossRef]

General Secretariat for Education and Science. 2016. Anuário da Educação 2016. Portuguese Ministry of Education. Available online: https://www.sec-geral.mec.pt/sites/default/files/anuarioedu2016_web.pdf (accessed on 10 June 2017).

Gerdin, Jonas, and Hans Englund. Forthcoming. Vertical, horizontal, and self control in academia: Survey evidence on their diverging effects on perceived researcher autonomy and identity. *The British Accounting Review. Ahead-of-Print*. [CrossRef]

Gerdin, Jonas, and Jan Greve. 2004. Forms of contingency fit in management accounting research: A critical review. *Accounting, Organizations and Society* 29: 303–26. [CrossRef]

Gigliotti, Philip. 2021. Understanding heterogeneous effects of performance management: An application of Kroll's contingency approach to educational accountability. *Perspectives on Public Management and Governance* 4: 30–46. [CrossRef]

Grabner, Isabella, Aleksandra Klein, and Gerhard Speckbacher. 2022. Managing the trade-off between autonomy and task interdependence in creative teams: The role of organizational-level cultural control. *Accounting, Organizations and Society* 101: 101347. [CrossRef]

Granlund, Markus, and Kari Lukka. 2017. Investigating highly established research paradigms: Reviving contextuality in contingency theory based management accounting research. *Critical Perspectives on Accounting* 45: 63–80. [CrossRef]

Hall, Matthew. 2016. Realising the richness of psychology theory in contingency-based management accounting research. *Management Accounting Research* 31: 63–74. [CrossRef]

Hariyati, Hariyati, and Bambang Tjahjadi. 2015. The relation between sustainable innovation strategy and financial performance mediated by environmental performance. *Social & Environmental Accounting* 9: 146–80. [CrossRef]

Heinicke, Xaver, and Thomas W. Guenther. 2020. The role of management controls in the higher education sector: An investigation of different perceptions. *European Accounting Review* 29: 581–630. [CrossRef]

Hopper, Trevor, and Binh Bui. 2016. Has management accounting research been critical? *Management Accounting Research* 31: 10–30. [CrossRef]

Johanson, Jan-Erik, Åge Johnsen, Elias Pekkola, and Stephen Affleck Reid. 2019. Strategic management in Finnish and Norwegian Government agencies. *Administrative Sciences* 9: 80. [CrossRef]

Kallio, Tomi, Kirsi-Mari Kallio, and Annika Blomberg. 2020. From professional bureaucracy to competitive bureaucracy—Redefining universities' organization principles, performance measurement criteria, and reason for being. *Qualitative Research in Accounting & Management* 17: 82–108. [CrossRef]

Kickert, Walter. 2011. Distinctiveness of administrative reform in Greece, Italy, Portugal and Spain: Common characteristics of context, administrations and reforms. *Public Administration* 89: 801–18. [CrossRef]

Lourenço, Sofia. 2020. Do self-reported motivators really motivate higher performance? *Management Accounting Research* 47: 100676. [CrossRef]

Maillard, Jacques, and Stephen Savage. 2022. Performance mechanisms meet professional autonomy: Performance management and professional discretion within police investigation departments. *Policing and Society* 32: 145–58. [CrossRef]

Melnyk, Steven, Umit Bititci, Ken Platts, Jutta Tobias, and Bjørn Andersen. 2014. Is performance measurement and management fit for the future? *Management Accounting Research* 25: 173–86. [CrossRef]

Micheli, Pietro, and Luca Mari. 2014. The theory and practice of performance measurement. *Management Accounting Research* 15: 147–56. [CrossRef]

Miles, Raymond E., Charles C. Snow, Alan D. Meyer, and Henry J. Coleman Jr. 1978. Organizational strategy, structure, and process. *The Academy of Management Review* 3: 546–62. [CrossRef] [PubMed]

Mizrahi, Shlomo. 2021. Performance Funding and Management in Higher Education: The autonomy paradox and failures in accountability. *Public Performance & Management Review* 44: 294–320. [CrossRef]

Müller-Stewens, Benedikt, Sally Widener, Klaus Moller, and Jan-Christoph Steinmann. 2020. The role of diagnostic and interactive control uses in innovation. *Accounting, Organizations and Society* 80: 101078. [CrossRef]

Nowotny, Steven, Bernhard Hirsch, and Christian Nitzl. 2022. The influence of organizational structure on value-based management sophistication. *Management Accounting Research* 56: 100797. [CrossRef]

Ongaro, Edoardo, and Ewan Ferlie. 2019. Exploring strategy-making in 'non-new public management' public services settings: The case of European Union agencies. *Administrative Sciences* 9: 23. [CrossRef]

Oro, Ieda, and Carlos Lavarda. 2017. Interaction between strategy and organizational performance: The influence of family management. *Brazilian Business Review* 14: 493–509. [CrossRef]

Osma, Beatriz, Jocobo Gomez-Conde, and Ernesto Lopez-Valeiras. 2022. Management control systems and real earnings management: Effects on firm performance. *Management Accounting Research* 55: 100781. [CrossRef]

Otley, David. 2016. The contingency theory of management accounting and control: 1980–2014. *Management Accounting Research* 31: 45–62. [CrossRef]

Parra, Juan David. 2022. Decentralisation and school-based management in Colombia: An exploration (using systems thinking) of the Full-Day Schooling programme. *International Journal of Educational Development* 91: 102579. [CrossRef]

Pfiffnera, Roger, Adrian Ritza, and Gene A. Brewerb. 2021. Performance information use under financial stress: How do public, nonprofit, and private organizations differ? *Public Performance & Management Review* 44: 1–27. [CrossRef]

Pires, Rui, and Maria-Ceu G. Alves. 2022. The impact of environmental uncertainty on accounting information relevance and performance: A contingency approach. *Economies* 10: 211. [CrossRef]

Prajogo, Daniel. 2016. The strategic fit between innovation strategies and business environment in delivering business performance. *International Journal of Production Economics* 171: 241–49. [CrossRef]

Rofiaty, Rofiaty. 2019. The relational model of entrepreneurship and knowledge management toward innovation, strategy implementation and improving Islamic boarding school performance. *Journal of Modeling in Management* 14: 662–85. [CrossRef]

Saleiro, Helena, and Susana Martins. 2013. Diretores e lideranças: Perfis em contexto escolar. Master's thesis, Instituto Universitário de Lisboa, Lisboa, Portugal.

Santos, Tânia, and Rosário Ramos. 2016. Aplicação de modelos de equações estruturais no estudo da eficácia de sistemas de gestão de desempenho. Master's thesis, Universidade Aberta, Lisboa, Portugal.

Schreiber, James, Amaury Nora, Frances Stage, Elizabeth Barlow, and Jamie King. 2006. Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research* 99: 323–37. [CrossRef]

Silva, Graça, Chris Styles, and Luis Lages. 2016. Breakthrough innovation in international business: The impact of tech-innovation and market-innovation on performance. *International Business Review* 26: 391–404. [CrossRef]

Silva, Rui. 2005. Estrutura e Dinâmica das Organizações. *Revista Iberoamericana de Educación* 36: 5. [CrossRef]

Speckbacher, Gerhard, and Markus Wabnegg. 2020. Incentivizing innovation: The role of knowledge exchange and distal search behavior. *Accounting, Organizations and Society* 86: 101–42. [CrossRef]

Speklé, Roland, and Frank H. M. Verbeeten. 2014. The use of performance measurement systems in the public sector: Effects on performance. *Management Accounting Research* 15: 131–46. [CrossRef]

Suárez-Albanchez, Julio, Pedro Jimenez-Estevez, Juan Jose Blazquez-Resino, and Santiago Gutierrez-Broncano. 2022. Team autonomy and organizational support, well-being, and work engagement in the Spain computer consultancy industry: The mediating effect of emotional intelligence. *Administrative Sciences* 12: 85. [CrossRef]

Tajeddini, Kayhan, Emma Martin, and Levent Altinay. 2020. The importance of human-related factors on service innovation and performance. *International Journal of Hospitality Management* 85: 102431. [CrossRef]

Tisu, Luca, Delia Vîrga, and Ioana Mermeze. 2021. Autonomy and performance: Proactive vitality management and work engagement as sequential mediators of the relationship. *Psychological Reports. Online First*. [CrossRef] [PubMed]

Tuan, Nguyen Anh, Truong Thi Hue, Luong Thuy Lien, Luu Huu Van, Hoang Thi Tuyet Nhung, and Luu Quoc Dat. 2022. Management factors influencing lecturers' research productivity in Vietnam National University, Hanoi, Vietnam: A structural equation modeling analysis. *Heliyon* 8: e10510. [CrossRef] [PubMed]

Turner, Karynne L., Alberto Monti, and Maria Annosi. 2021. Disentangling the effects of organizational controls on innovation. *European Management Journal* 39: 57–69. [CrossRef]

Vale, José, Joana Amaral, Luís Abrantes, Carmem Leal, and Rui Silva. 2022. Management accounting and control in higher education institutions: A systematic literature review. *Administrative Sciences* 12: 14. [CrossRef]

Van der Hauwaert, Evelyn, Sophie Hoozée, Sophie Maussen, and Werner Bruggeman. 2022. The impact of enabling performance measurement on managers' autonomous work motivation and performance. *Management Accounting Research* 55: 100780. [CrossRef]

Veronica, Anastasia, and Purwanugraha Heribertus. 2003. Interdependensi antara inovasi jasa, struktur outonomi, sistem penilaian kinerja dan organizational outcomes. *Kinerja Journal of Business and Economics* 7: 57–69.

Wang, Ying, and Raymond Chan. 2015. Autonomy and control: The struggle of minban schools in China. *International Journal of Educational Development* 45: 89–97. [CrossRef]