Innovation, Environmental Antecedents and Performance Outcomes of Metropolitan, Municipal and District Assemblies in Ghana

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Abstract

The purpose of the study was to ascertain the effects of innovation types and environmental antecedents on performance outcomes of Metropolitan, Municipal and District Assemblies in Ashanti region, Ghana. Specifically, the study measures the mediating effects of environmental antecedents on the performance outcomes of the MMDAs. A total of 280 responses received from interested workers of the MMDAs were used for the study. As a result of the Covid-19 and its related restrictions, the questionnaire was developed using Google forms. Data were collected through social media and the responses received were screened and used for the analysis. The questionnaire was based on measurement scales for the key variables (innovation types, environmental antecedent, performance outcomes) understudy. SPSS and Sobel Test were used to estimate the mediation effect. The study results revealed that there is a significant but negative relationship between innovation types and performance outcomes at the MMDAs. Similarly, a significant and positive relationship was found between environmental antecedent and performance outcomes of the MMDs. Again, the results showed that there is a relationship between innovation types and performance outcomes of the MMDAs. Finally, the results showed that environmental antecedents mediate the relationship between innovation types and performance outcomes of the MMDAs. Based on the findings, the study recommends that managers of the MMDAs should continue to monitor and control the various environmental (public demands, political demand, regulatory frameworks, competition) forces within the public sector in order to realize the full potential of innovation and its role in facilitating performance outcome. Also, the MMDAs should embrace the innovation types (process innovation, process innovation, governance innovation, and conceptual innovation) in order to achieve higher performance outcomes (effectiveness, efficiency, citizen involvement and participation and customer satisfaction).

Keywords: Innovation, Environmental Antecedents, Performance Outcome

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I. Introduction

The field of public sector innovations has witnessed considerable number of research over the last decade. With the introduction of public sector reforms in Ghana, public agencies were to adopt structural and managerial features from the private sector into public institutions (Ohemeng, & Ayee, 2016; Aidoo-Buameh, 2014). Such adopted attributes include management by objectives, competitive tendering, consumer choice, total quality control and performance management (Ohemeng, & Akonnor, 2022). The introduction of public sector reforms in Ghana has been based on a supposition that private market practices are superior, and should be implemented in the public sector in order to generate successful governmental activities (Ayee, 2019).

The new public sector reforms include a direction towards output and outcomes, rather than input and processes, quantification and measurement of the public sector services and its management (Essuman-Mensah, 2019). For the Ghanaian public sector, like many other economies, the implementation of the reforms has consisted of two elements; management by goal and performance, and institutional operational devolution (Owusu, 2006; Mackay, & Gariba, 2000). With the reforms, decision-making and user satisfaction are highlighted as essential conditions for effective public management (Toso, & Alem, 2014). Compared to other nations, the Ghanaian economy has some special attributes. First, the economy has traditionally been heavily grounded on natural resources such as timber, cocoa and gold. With the emergence of oil and gas, the Ghanaian economy continues to depend largely on natural resources. Second, an appreciable proportion of the expenditure portfolio goes to the public administration, as a result of the large state owned enterprises of the public sector. Third, even when revised for industrial alignment, the level of innovations in the Ghanaian public sector is lower when compared to other emerging economies. The public sector plays a critical role in the distribution and formation of knowledge in the community (Dassah, 2017; Greiling, 2005). With a large and comprehensive public sector, it is significant, and in the citizenry best interest, that it is managed in the most effective way. This comprises a constant search and desire to find new and better resolutions to providing wellbeing to the public (Teigen, 2007). In order for the Ghanaian public sector to meet the challenges it faces, it is essential to advance knowledge on how the working environment can be structured for improved service for both employees and citizens. The Ghanaian government has gestured that innovations in the public sector will be a priority for the future, and will attempt to reduce or eradicate obstacles for innovations in the public sector (Ohemeng, & Kamga, 2020). The obstacles are based on legislative, organizational and technical origin. It must, however, be highlighted that the reduction of these can only be accomplished if they do not compromise other areas of public interests (Williams, & Yecalo-Tecle, 2020).

Essentially, cost reduction as a result of innovations in the public sector provides benefits such as improved image of the public sector, increased citizen satisfaction and innovation enhancement in the private sector (Alves, 2013). Studying innovations in the public sector, therefore, is necessarily significant as it influences multiple phases of the society (Alves, 2013). Based on the grounds provided by previous research, Storey and Salaman (2005) argue that innovations are critical to economic growth and national competitiveness, in relation to globalized world with ever-increasing accessibility, and use of information technology resulting in spiraling competition. This paper, therefore, aims at contributing to the field of public sector innovations research by studying the topic through public sector employee perceptual analysis. The purpose of this study is to analyze employees at various levels at the metropolitan, municipalities and district assemblies (MMDAs) and evaluate how they understand, as well as create conditions for, innovation in their organizations and how they perceive innovation to influence performance outcomes.

II. Literature Review

Conceptual Framework

A conceptual framework is a hypothesized model that identifies the concepts under study and their relationship. It presents the dependent or outcome variables that are affected by the dependent variables. Researchers (Varpio et al. 2020; Bharti, 2015; Simpson, 2002; McGaghie et al., 2001) describe conceptual framework as an interface of concepts that are generally defined and systematically structured to present, a rationale, a direction and a tool for the incorporation and interpretation of information. According to Tamene (2016) and Leshem, & Trafford (2007), the purpose of a conceptual framework is to aid the reader to rapidly see the projected relationships between the dependent variables and independent variables. Systematically, it is placed in the comprehensive model of explicit prepositions, statement of relationships between two or more variables.

Innovation and Public Sector Performance

Description of public sector innovations varies from a passive adopter of innovation to a preemptive source of novel concepts and inventions (van Acker, &

Bouckaert, 2018; De Vries et al., 2018). For estimation reasons, Kattel et al. (2018) suggest and describe innovations as the application of new or meaningfully enhanced goods and services and by which potential users can have access to them. Thus, innovations in this study have been conceptualized as the enhancement of the public services to include communication methods innovations, process innovation, organizational innovation, conceptual innovations and policy innovations with the objective to boost public sector performance.

The initiatives to appreciate public sector innovations performance to some point is difficult due to limited theory devoted to public sector innovations (Bloch & Bugge, 2013; Bommert, 2010; Mulgan & Albury, 2003). Notwithstanding that, the understanding from innovations system theory could be appropriate to structure modalities on public sector innovation and performance. Innovation systems theory advanced that the actors and procedures involved in innovations could be acknowledged and characterized. Innovations from innovation system thought is as a result of interaction between many stakeholders and does not appear in isolation (Bloch & Bugge, 2013).

The theory emphasizes that innovation is the outcome of interface between several pertinent actors that are involved in the innovation process, thus verifying innovations does not occur in isolation (Flanagan, Uyarra, & Laranja, 2011). Instead, innovations emerges from complex relationships among stakeholders in the system (Waddell et al., 2015). Thus, the responding stakeholders could be acknowledged and categorized in terms of their roles, and the processes leading to innovations may be classified (Bloch & Bugge, 2013). Defining phases of the organizational surroundings of the innovative system play key roles in modeling the condition for innovations within the system (Bloch & Bugge, 2013). Innovations in the public sector are codependent with its systemic and wider societal context as countless projects are typically knotted with other institutions and entities including the central agency. Therefore, when trying to comprehend innovations performance and how innovations happen in the public sector, the application should not disregard its wider innovations systems (Evans et al., 2017). It is imperative to have an appreciable understanding of innovations system. Such understandings is valuable for policy makers to classify leverage points which will contribute to enhancing innovations performance and overall competitiveness (OECD, 2008).

Environmental Antecedents and Performance Outcomes

Regardless of the existence of differing accounts, the widely available evidence signals an overall significant influence of environmental antecedents on firm performance (Molina-Azorín et al. 2009). However, the direction and strength of the relationship are debated to vary across diverse boundary situations and contingent factors (Molina-Azorín et al., 2009; Klassen and McLaughlin 1996). For example, in frameworks where consumers are subtle to environmental concerns, environmental activities can be an imperative source of distinction from rivals and hence a foundation of competitive gain (Weerawardena, & Mort, 2012; Orsato, 2006). Likewise, improved reputation amongst consumers, capability to profit from the financial capital of decent investors, avoiding environmental disasters and reduction of waste that lead to bad publicity could be the bases of a possibly affirmative link between environmental antecedents and firm's performance (Klassen and McLaughlin 1996; Galbreth and Ghosh 2013). Furthermore, Jansen et al. (2005) highlight the progressive role of environmental antecedents in service differentiation and innovativeness and resulting in competitiveness. A growing body of pragmatic evidence, therefore, exists for the progressive effects of environmental antecedents on countless performance outcomes increasingly in the public sector (Melnyk, Sroufe, and Calantone 2003; Luthra, Garg, and Haleem 2015; Molina-Azorín et al., 2009). It is, however, reasonable to argue that establishments adopting environmental activities may attain performance through market differentiation and focusing niche market areas (Galbreth and Ghosh 2013). Thus, it is expected to see some performance benefits of environmental activities for public institutions, and this fits central orientation of the previous literature.

Innovation, Environmental Antecedents and Public Sector Performance

Public sector performance is a multidimensional paradigm (Andrews et al, 2010). Principal to the thought is the formation of public value (Van Dooren, De Caluwe & Lonti, 2012; Moore, 2005). Anticipated outcomes are often described in terms of effectiveness, efficiency, future proofing, legitimacy towards stakeholders and quality and responsiveness (Yang and Panday, 2007; Boyne, 2002). Public performance can thus be theorized as attaining public goals in an efficient, effective and legitimate manner, conserving present and future quality of public services (Verbeeten, 2008). The public sector is confronted with innovation to boost performance (Osborne & Brown, 2011), and at the same time enhancing current activities in order to boost efficiency and reduce cost (Pollitt & Bouckaert, 2004). Innovation is severally considered as the application of a new (technical, organizational, policy, service or other) thought that transforms and changes the operational and outcomes of the public sector (Damanpour et al., 2009; Hartley, 2005), thereby generating public value (Moore & Hartley, 2008; Moore, 2005). This thought is perceived as new by people or other elements of adoption (Rogers, 1995), and characterizes a discontinuity with the past (Osborne & Brown, 2011).

However, performance outcomes in the public sector can also be boosted by gradual enhancement, in endurance with the past (Moore, 2005). It is imperative to differentiate gradual enhancement from innovation, as both procedures require different methodologies (March, 1991). This difference may get indistinct in public sector innovation policies (Osborne and Brown, 2011) and innovations as well as its enhancement are often presumed to be synonymous (Hartley, 2005). Innovativeness, however, concerns the implementation of new policies, procedures, services and, technologies in discontinuity with the past, whereas optimization involves the enhancement of existing processes, policies, services and technologies in continuity with the past (Osborne & Brown, 2011; Damanpour et al., 2009). Literature concerning the previous studies underscore that both are indispensable for boosting performance (Junni, et al.,

2013; Damanpour et al., 2009; Jansen et al., 2006; March, 1991).

III. Methodology

The participants for this study comprise all the employees of the MMDAs in Ghana. The target population comprises employees of MMDAs in Ashanti region. The data collection process took into consideration the Covid-19. This is because some public institution placed restrictions on the nature of contact employees can have with customers. Researchers therefore took advantage of the social media to distribute the questionnaire for interested participants. A questionnaire was designed with information that could be uploaded on Google form. The data collection process encouraged respondents to post to other colleagues they knew who work with MMDAs in Ashanti region. Even though the data collection technique adopted for the study was convenience sampling, the use of Google forms and the posting of the questionnaire through various WhatsApp platforms means that the process also included snowballing or referral sampling. Considering the fact that the data collection was basically about convenience sampling, the sample size could only be determined parallel to the number of participants who responded to the Google form based questionnaire. A total of 291 responses were received after careful screening of the responses and a sample size of 280 was used for the analysis. The obtained data were first edited and examined to check if the respondents answered the questions genuinely or consistently. A few questionnaires which were not fully completed were however removed. After editing, the data were coded and analyzed.

A perceptive approach was used to measure the variables. Three principal constructs were used for this work – innovation types, environmental antecedents and performance outcomes. Innovation types were measured as four-dimensional constructs. The four (4) dimensions are product innovation, process innovation, governance innovation and conceptual innovation. By the help of initial 9 items, the study finally used 5 items to measure innovation types. The five items were stated in line with process innovation, product innovation, governance innovation and conceptual innovation. The respondents were requested to state their level of agreement to these statements based on a 5-point Likert scale. Sampled statements include; "introduction of new concepts", "frames of reference", "new paradigms that help to reframe the nature of specific problems" and "paradigms aim at possible solutions".

Environmental antecedents on the other hand were measured by 4 items. Again, respondents were made to state their level of agreement or disagreement to the statements representing their patronage intentions based on the 5-point Likert scale. Sampled statements for environmental antecedents construct are; "regulatory frameworks influence performance outcomes of the public sector", "nature of competition faced by public sector agencies influence their performance outcomes", political demands in the public sector affect performance outcomes" and "public demands of the public sector influence their performance outcomes".

Moreover, performance outcomes construct was measured with 4 items. Again, respondents were made to state their level of agreement or disagreement to the statements representing their perceptions on the importance of innovation types on performance outcome of the public sector based on the 5-point Likert scale. Sampled statements for performance outcomes are; "innovation can increase effectiveness in the public sector", "innovation leads to efficiency in the public sector", "innovativeness in the public sector may encourage citizen involvement and participation", "innovativeness of the public sector may improve customer satisfaction" and "public sector innovation may encourage private business partnerships". The validity and reliability estimates were performed using the SPSS.

IV. Results

Demographic Characteristics

The demographic summary of the respondents are reported on Table 1. As shown on Table 1, the majority (67.5%) of the respondents of the study where males whereas 32.5% were females. Regarding the age distribution of the surveyed respondents, results suggest that majority of the respondents were between the ages of 30-39 (42.5%). This is followed by those who were between the ages of 40-49 (28.75%); and 20-29 (21.25%). Again, from Table 1, it is revealed that most of the respondents surveyed have a working experience with the MMDAs. The descriptive analysis showed that the majority of the respondents (50%) have about 1-5 years of working experience. This is followed by those who have about 6-10 years of experience; representing about 28.75%. Those who had more than 10 years of experience in the public sector (MMDAs) were estimated to constitute about 21.25% of the total sample surveyed.

Table 1: Sample Characteristics

	Categories	Percent
Gender	Male	67.5
	Female	32.5
	Total	100
Age	20-29	21.25
	30-39	42.5
	40-49	28.75
	50 and above	7.5
	Total	100
Working Experience	1-5 years	50
	6-10 years	28.75
	10 +	21.25
	Total	100
Staff position	Private Senior staff	56.25
	Junior staff	43.75
	Total	100
Educational Level	Diploma	12.5
	Higher National Diploma	16.25
	First Degree	41.25
	Master's/PhD	30
	Total	100

Source: SPSS Software Output

Table 1 also reports that, most of the respondents were senior staff members of the MMDAs representing 56.25% of the total sample. Junior staff members who participated in the study constituted 43.75% of the total participants. Focusing on educational background, it is observed that most of the respondents

have first degree education (41.25%) and Masters' education (30%). Those who have diploma and higher national diploma education represented 16.25% and 12.5% respectively.

Validity Checks

To establish the validity of the data and instruments used to conduct the study analysis, content and convergent validity were examined. Content validity was examined by reviewing the items for face validity and calculating the internal consistency of the variables using the Cronbach's alpha scores. Factor analysis was also applied to check the convergent validity of the data items. Both the exploratory and confirmatory factor analysis were employed as tools in the factor analysis. The factor analysis was used to identify the items that can be considered as similar whilst at the same time explaining a larger percentage of the variance of each key variable used in the survey. In this study, three major variables were of interest. Innovation types (initially assessed by 9 items), environmental antecedent (initially assessed by 7 items) and performance outcomes (initially assessed by 7 items). The initial stage of the factor analysis was conducted using the exploratory factor analysis technique with particular focus on the Principal Component Analysis (PCA) under Direct Oblimin rotation. This was conducted to transform the data to a set of coherent subscales useful for regression analysis. The suitability of data for PCA was checked using the Bartlett's test of sphericity, Kaiser-Meyer-Olkin measure of sampling adequacy and correlation analysis. PCA was conducted separately for each major variable. Analysis of the Bartlett's test of sphericity showed that conducting a PCA for Performance outcome construct was appropriate with a chi square value of 254.51, degrees of freedom = 5, and p-value = 0.000. The same conclusion was also drawn for conducting PCA for service characteristics (Bartlett's test of sphericity = 2029.434, degrees of freedom = 36 and p-value = 0.000) and perceived risk of purchase (Bartlett's test of sphericity = 3569.434, degrees of freedom = 38 and p-value = 0.000). Further confirmation of the factorability of the dataset using Kaiser-Meyer-Olkin measure of sampling adequacy indicated that the KMO values of 0.883, 0.778 and 0.689 for PCA suitability of each variable respectively. All measures and constructs are presented in detail on Table 2.

Table 2: Factor Analysis

Variables	Loadings	Eigen Value	Variance Explained	Weights	Alpha
Innovation					0.902
Innovativeness in procedures and process at the MMDAs can increase performance outcomes	.835	3.609	44.458	.809	
Introducing product and services varieties can improve the performance of MMDAs	.838			.882	
Governance innovations and administrative restructuring can improve performance of MMDAs	.624			.811	
Conceptual innovations in policy directions can increase the performance structure of the MMDAs	.848			.864	
Introduction of e-governance systems and digitisations of operations can improve performance measures of the MMDAs	.612			.680	
Environmental Antecedents					0.853
The nature of political demands in the public sector can influence performance of the MMDAs	.903	1.908	43.606	.966	
The extent of public demands of services in the public sector goes a long way to influence performance outcomes of the MMDAs	.811			.792	
The nature of regulatory framework in the public sector can influence performance outcomes of the MMDAs	.660			.689	
The level of competitiveness with other private organizations can	.903			.886	
have impact of performance outcome of the MMDAs					
Performance Outcomes					0.932
Performance outcomes of the MMDAs can be measured with increased efficiency	.789	4.256	75.654	.899	
The effectiveness of the public sector in terms of achieving target can be used to measure MMDAs performance	.845			.789	
The implementation of innovations by MMDAs can increase citizen involvement and participation	.899			.865	
Increased customer/citizen satisfaction in the MMDAs can be attributed to innovations and favourable environmental factors	.658			.869	

Source: SPSS Software Output

This study considered items measured on a 5-point Likert scale. Respondents were asked to assess the innovation and environmental antecedents associated with the services and operations of the MMDAs and the resultant performance outcomes. By running a factor analysis (see Table 2), the items that loaded more than the absolute value of 0.5 were included in the analysis. Each of the key variables revealed that one component was suitable to measure it; as the recorded eigenvalues were above 1 with total explained variance always above 40%. It must however be noted that for effectiveness, all items that loaded on more than one factor were excluded from the analysis. At the end of the exploratory factor analysis, innovation was operationalized with four items explaining approximately 44.5% of the total variance, environmental antecedent was measured with four items explaining 43.6% of the total variance and performance outcome was also measured with four items explaining 75.7% of the total variance as indicated on Table 2 above.

Having conducted the exploratory factor analysis, there was a need to examine the construct validity of the non-overlapping dimensions extracted as well. This stage is what is referred to, in literature, as the measurement of model. The results of the confirmatory factor analysis consistently supported the factor structure for all the key variables as discussed earlier on Table 2. It was observed that all the standardized regression weights

between each manifest variable and its respective item were significant at less than 1% indicative of strong convergent validity. Again the items demonstrated less than significant cross loadings with items of other variables also indicative of excellent discriminant validity. This implies that each item measured exactly what it was supposed to measure (convergent validity) and also did not erroneously capture effects which it was not intended to capture (discriminant validity). Thus, the data are excellent for further analysis and hypothesis testing. The result of the confirmatory factor analysis is also shown on Table 2. All the variables obtained satisfactory Cronbach's alpha above the generally recommended score of 0.7. This demonstrated that strong internal consistency has also been achieved; further showing that the responses are reliable for analysis. Further robustness checks using statistically recommended fit indices demonstrate that all the variables used in this study were measured well (Hair et al., 2010). Table 3 includes all the mentioned details.

Table 3: Model Fitness Results

CFA model	χ^2	DF	RMSEA	NNFI	CFI	SRMR
1. Innovation	7.461	5	.078	.980	.990	.024
2. Environmental Antecedent	0.00	0.00	.00	1.00	1.00	.000
3. Performance Outcome	8.77	5	.03	.99	.99	.03
4. Full Measurement Model	0.00	0.00	.00	1.00	1.00	.000

Note: χ^2 =Chi-square; DF= degree of freedom; RMSEA =root mean square error of approximation; NNFI=Bentler non-normed fit index; CFI =comparative fit index; SRMR=standardized root mean

Source: SPSS Software Output

Model Estimation and Results

Having observed that the data obtained was generally reliable and each variable has been measured excellently, further analysis was conducted to attempt to test the study hypothesis whilst answering the research questions put forward. The first part of this section involved a descriptive and correlation analysis of the key variables of interest. The last part of this section then focused on the regression analysis to examine the empirical relationships.

Descriptive and Correlation Results

Table 4 shows that the performance outcome was moderately high among the respondents surveyed with a mean figure of 5.385. This showed that the sampled public sector workers at the various MMDAs were relatively highly sensitive towards performance outcomes of their institutions. The mean result of 4.58 for innovation types also demonstrate that the sampled respondents moderately agreed that the attributes of innovation by the MMDAs such as process innovation, product innovation, governance innovation and conceptual innovation when implemented by the MMDAs can be very important to the assemblies. Table 4 also provides a report that, the level of environmental antecedent as perceived by the respondents is moderate. This result is interesting; given the observation that respondents generally agreed that the innovation types were moderately needed. As part of the analysis, the age of respondents, level of education and number of years working in the MMDAs were used as control variables. The descriptive result on these items emphasize that the average age of the respondents was 33. Meanwhile, it is also demonstrated that on average the sampled respondents surveyed had received some secondary or technical education. The implication is that all things being equal, respondents would be more knowledgeable, and attempt to understand as well as appreciate the relevance of implementing innovations and the role of environmental factors in the Ghanaian public sector. The report also showed that, the average respondent was a senior staff.

Table 4: Descriptive Statistics

	Min	Max	Mean	SD
Age	28	66	33.66	7.848
Level of education	1	4	3.487	1.067
Staff position	1	3	2.112	.355
Innovations	1	7	4.58	.8947
Environmental antecedent	1	7	4.295	.944
Performance outcomes	1	7	5.385	.5354

Source: SPSS Software Output

Table 5 on the other hand presents the results of correlational analysis. It is showed that there is a negative correlation between performance outcomes and innovation types of the public sector. The correlation statistic of -0.294 significant at 1% indicates that any significant one point upgrade in the sophistication in innovations is associated with a significant point downgrade in performance outcomes. Furthermore, the correlation outcome indicates that there is a negative relationship between environmental antecedent and performance outcome. A correlation score of -0.2935 ($p<.01$) was obtained. This designates that any substantial enhancement in the environmental factors in the MMDAs is related to a substantial reduction in performance outcomes. Pertaining to the linkage between environmental antecedents and innovations, the result indicates that there is a positive correlation between the two. The correlation statistic of 0.764 ($p<.01$) signifies that as the innovations are implemented and environmental antecedents also heightens accordingly. Perhaps this is why there is a negative relationship between the innovation and performance outcome. What this correlation analysis fails to explain is the extent of impact these variables have on each other. To identify this, there is the need to perform a regression analysis.

Table 5: Correlational Analysis

		1	2	3	4	5	6
1	Age	1.00					
2	Level of education	.5345	1.00				
3	Staff position	.0412	.1851**	1.00			
4	Innovation types	.0113	.0552	-.524***	1.00		
5	Environmental antecedent	.0100	.0192	.4677***	.764***	1.00	
6	Performance outcome	.1476	-.0371	.0065	-.294**	-.2935**	1.00

Note: *p < .05 (2-tailed test); **p < .01 (2-tailed test)

Source: SPSS Software Output

Regression Analysis

The Ordinary Least Square (OLS) regression method was employed for estimating the conceptual framework of the study. Bearing in mind the outcome variable (public sector performance), 4 separate models were estimated. In the case of each, hierarchical models were estimated.

Pertaining to Model 1 and Model 2, the study sought to investigate the determinants of environmental antecedent. In model 1 only the control variables of age of respondent, staff position and educational background were used as the independent variables. In model 2, innovation was added to the already included control variables and its effect was investigated. This assisted the researcher to investigate the real impact of innovation while controlling for some specific individual effects. Evidence of good-fit of the model 2 is provided by the diagnostic result of the Model 2 of the Table 6. The result of the adjusted R^2 of 0.828 shows that 82.8% of the differences in the environmental antecedents are attributed to the independent variables or the predictors. The difference between the adjusted R^2 of model 1 and 2 (0.828 – 0.236 = 0.592) shows that innovation alone explains about 59.2% of the changes in performance outcome. The predictors' variance inflation factors of the model are also all below 10 indicating the lower level of collinearity among the predictors of the model.

Pertaining to Model 3 and Model 4, the attempt was to explore the factors that explain changes in performance outcome. Again, this investigation was hierarchically modelled with model 3 capturing only the effect of the control variables: age of the respondent, educational background and staff position. In model 4, the key variables of innovation and environmental antecedent were introduced to the modelling and their effects were examined. Diagnostically the model 4 result of the Table 6 shows good-fit. The value of the adjusted R^2 of 0.597 indicates that 59.7% of the variations in the differences in performance outcome are attributed to the predictors of the model. The differences in adjusted R^2 between model 3 and model 4 (0.597 – 0.350 = 0.247) shows that 24.7% of the variation in the outcome variable (performance outcome) is influenced by both environmental antecedent and innovation.

Focusing on the hypothesis testing at this juncture, the multiple regression result of the Model 4 of the Table 6 indicates that innovation has a negative effect on performance outcome (β = -.441, p<.01). This therefore indicates that any significant unit complication in the nature of innovation leads to a significant reduction in performance outcomes of MMDAs. Evidence is therefore provided by this result of the study for the rejection of hypothesis (H_2) which states that there is positive relationship between the nature of innovation and performance outcomes.

Model 2 result further revealed that innovation has a positive linkage with environmental antecedent after controlling for individual effects (β=.961, p<.01). This consequently designates that any important unit enhancement in innovation is related to 0.961 unit increases in environment forces in the MMDAs. This result also give strong empirical support for hypothesis (H_1) which indicates that there is a positive relationship between innovation and the environment antecedents.

Focusing on the relationship between environmental forces and performance outcome, the results of Model 4 on the Table 6 indicate that the environmental forces have a negative relationship with the performance outcome of the MMDAs (β = -.385, p<.10). This, therefore, gives adequate support to the proposition that higher environmental antecedents have a detrimental influence on the performance outcomes of the public sector. Hypothesis (H_3) which designates that environmental antecedent has a negative influence on performance outcome is therefore supported.

Pertaining the mediation test, it is shown on Table 7 that environmental antecedent strongly mediates the relationship between innovation and performance outcome. The Sobel test statistic shows that innovation has a strong indirect effect on performance outcome (STT= 1.877*) through environmental antecedent. Hypothesis (H_4) which states that environmental antecedent mediates the relationship between innovation and performance outcome was partially supported. Examining the form of mediation effect, it is realized that environmental antecedent is a partial mediator. This is because apart from the indirect linkage between innovation and performance outcome, a strong direct relationship was also found between innovation and performance outcome. According to Baron and Kenny (1985), this condition implies that the mediated role of environmental antecedent is partial.

Table 6: OLS Regression Analysis Results

Variables	Performance Outcome			Performance Outcome		
	Model 1	Model 2	VIF	Model 3	Model 4	VIF
Control Paths						
-Age	-.009 (0.67)	-.003 (-0.40)	1.53	3.766 (3.96)***	1.515 (1.96)**	1.53
-Educational Background	.123 (1.17)	-.033 (-0.64)	1.52	-9.522 (-1.25)	-.0482 (-0.75)	1.49
-Staff Position	-1.387 (-5.18)***	-1.13 (-2.09)**	1.45	5.512 (2.98)**	-.276 (-1.41)	1.42
Hypothesised						
-Innovation		.961 (16.18)***	1.44		-.441 (2.087)**	6.96
-Environmental Antecedent					-.385 (-1.89)*	6.32
Adjusted R^2	0.236	0.828		.350	.597	
F-statistics (DF)	9.170	95.89		9.100	2.61	
P-value	0.000	0.000		0.000	0.034	
Mean VIF	1.32	1.49		1.08	3.54	

Note: t-values are in the parenthesis; *p < .05; **p < .01

Source: SPSS Software Output

Table 7: Mediation Analysis (Direct and Indirect Effects Assessment)

Path	standardized coefficients			Sobel test statistic	Form of mediation
	Direct effect (D)	Indirect effect (I)	Total effect (D+I)		
IT → EA	.961	NA	NA	NA	NA
EA → PO	-.385	NA	NA	NA	NA
IT → PO	-.441	NA	NA	NA	NA
IT → EA → PO	.961	.961 x -.385 = -.370	.591	-1.877*	Partial

Note: * mediation significant at 10% IT = Innovation types; EA = Environmental antecedent; PO = Performance Outcome

Source: SPSS Software Output

It is revealed that out of the 4 study hypotheses, 3 were supported. The results confirmed that there is strong positive linkage between innovation and environmental antecedents. However, the nature of innovation has a negative influence on performance outcomes. Similar findings were observed between environmental antecedent and performance outcomes. Regarding whether there is mediation or not, the findings of the study confirmed the hypothesis that environmental antecedent partially mediated the path linking innovation and performance outcome.

V. Discussion of Results

The purpose of this study was to investigate the relationships among innovation types, environmental antecedents and performance outcomes of the metropolitan, municipal and district assemblies (MMDAs). The underlining objective was to examine if environmental antecedents performs a mediation role on the path between innovation types and performance outcomes. The study employed a quantitative research design with the use of survey instruments administered to a convenient sample of 280 employees of the various MMDAs in Ashanti Region. The research was motivated by the fact that the Ghanaian public sector have received a lot of criticism in relations to their efficiency and effectiveness in delivering services to the citizens. Citizens have concerns regarding the various methods and the structures within which the MMDAs operate. People believe that there are certain environmental factors that affect the performance framework of the MMDAs. Notably, among the factors nature of political demand is also included. Public sector researchers conclude that the posture of the political regime in power determines the outcome of the operations of the MMDAs. Also there is general lack of understanding concerning how performance in the public sector should measure vis-à-vis the public sector. Again, whether, private sector innovations can be introduced in the public sector and the nature of effect it will have in the public sector. The current study therefore focused on the public sector, especially on the MMDAs in the Ashanti Region in order to contribute to the growing concern of the citizens towards measuring performance in the Ghanaian public sector. The multiple linear regression technique was used to analyze the data and hypothesis were tested.

Based on the study results, it can be concluded that performance outcomes in the Ghanaian public sector can be influenced by the nature of innovations. The implementation of process innovation, product innovation, governance innovation and conceptual innovation are more likely to improve the indicators of performance outcome in the MMDAs. This is probably because such facilitations and improvements in systems and process in the public offices can motive citizens to participate in programs aimed at improving the public sector. The nature of environmental antecedents associated with the MMDAs is relatively critical to the operations of the public sector. Indeed, the study results show that environmental antecedents is positively associated with the nature of innovations in the public sector. This demonstrates that the implementation of innovations are associated with heighten environmental forces; whereas increases in the environmental pressures have consequences on the performance outcome of the MMDAs.

Furthermore, it can be concluded that environmental antecedents partially mediates the relationship between the innovation types and performance outcomes of the MMDAs. The implication is that nation of innovations have both a direct and indirect relationship with performance outcomes. That is environmental antecedents can directly explain customers' performance outcomes of the MMDAs in the Ghanaian public sector.

VI. Conclusion

Based on the relationship between innovations types and performance outcomes of the MMDAs; it is generally recommended that MMDAs can use various innovation types as a guide to predict performance outcomes and consequently to model a framework for improved effectiveness and improved efficiency; thereby increasing citizen readiness and willingness to participate in programs organized by the MMDAs. It is also advised that since citizens are more likely to question the efficiency of the MMDAs and contest some of their actions, the operations of the MMDAs can be improved and tailored to suit the demands of the general public. Managers of the MMDAs should apply the regulations as defined by the local government to benefit the citizens. Such controlled environmental force can create a favorable platform for measuring performance outcomes in relation to innovations. Moreover, MMDAs should specifically embark on a program aimed at innovation relating to process and procedures. MMDAs should also appreciate the nature of competition in the public sector. As an environmental antecedent that can determine performance outcomes, it is important that managers of the MMDAs assess the category of competition. The competitiveness of the public sector has also been questioned by the citizens. The competition can also be observed with the private businesses when the type of services will be accessible by the private sector.

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