

## **Linking Environmental Strategy to Firm Performance: A Sequential Mediation Model via Environmental Management Accounting and Top Management Commitment**

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### **Abstract**

This study aims to assess the linkage of environmental strategy and firm performance with sequential mediation role of environmental management accounting and top management commitment. Based on survey data, total 308 questionnaires were utilized to test the study's hypotheses by applying structural equation modeling and sequential mediation through SPSS and AMOS. To test sequential mediation, Hayes' Model 6 as described in PROCESS with bootstrap methods was used. The results of the study indicated that there is a positive and direct relationship within study model, the sequential mediating effect of environmental strategy on firm performance through environmental management accounting and top management commitment is positive and significant. The research seeks to draw the focus of environmental strategy to enhance the firm performance in Pakistan and to increase the adoption of environmental management accounting. This study encourages managers to subsidize in the direction of sustainability which will make top managers to be more committed to EMA practices. Environmental management accounting can support businesses to look at their ecological and social burdens as well as it may lead to the credentials of joint ecological and monetary benefits from business activities.

**Keywords:** environmental strategy, environmental management accounting, top management commitment, manufacturing companies, sequential mediation.

### **1. Introduction**

In today's contemporary world, the strategy, along with the procedures for the evolution of performance had gained significant consideration. Most of the associations have reformed their performance measurement procedures to confirm that they have reproduced their recent environment as well as strategies (Kennerley & Neely, 2003). In the recent era, the global business environment has shown an increasing level of alteration or change as well as revival both locally and globally (Otley, 1980). Several researchers and investigators give attention to the company's maintainability as well as on corporate social obligation (Nobanee & Ellili, 2016). Commitment to the typical environment had become a significant aspect (González-Benito & González-Benito, 2006) and working in

a socially responsible way is perceived important for the long term benefit of organizations (Adams & Zutshi, 2004). Furthermore, the main environmental events like, the chemical leakage in Bhopal in 1984 in India and the Exxon Valdez oil leak in 1989 in Alaska, have expressively increased the universal coverage of environmental problems (Ong et al., 2016). Due to these events, the complexities of the business settings are increasing and the anxieties as well as the consciousness about the environmental concerns, which has compelled organizations to tackle environmental problems by supervising and minimizing their actions' and environmental influence (Saeidi et al., 2011). Catering promptly to the varying business sector requirements is a crucial factor for an association to pick up an advantageous position in countering its challengers (Mokhtar et al., 2016).

Environmental Management Accounting (EMA) has received enhanced consideration in the current era (Christ & Burritt, 2013). EMA is regarded as a branch of conventional management accounting (Chang, 2007). EMA has established to feedback to the issues confronted by traditional management accounting schemes in linking conservational actions (Ferreira et al., 2010). The excessive ecological influence and its connected expenditures like the letdown of conventional accounting procedures deliver the evidence essential to decrease these influences as well as the expenses, which have direct influence on the growth of EMA. Numerous insights into the notion and activities of ecological accounting have developed (Burritt & Chika, 2006). EMA produced from a corporate environmental accounting obsessed by a self-governing zone of investigation of case information and judgment systems that would encourage the administration to subsidize concerning sustainability (Solovida & Hengky, 2017). Particularly, EMA had been recognized as a technique through which the business community could use it to achieve its ecological and related monetary accomplishment easily (Christ & Burritt, 2013). EMA encourages managers to subsidize in the direction of sustainability (Nickie Petcharat & Mula, 2012). Similarly, it could also encourage exertion on a sustainable society (Schaltegger & Burritt, 2000). EMA has been recognized as a substantial key strategic management accounting instrument to improve businesses' ecological execution (Schaltegger & Burritt, 2000). EMA can support businesses to tackle their ecological and social burdens as well as building the credentials of joint ecological and monetary benefits from business activities (Schaltegger & Burritt, 2000; Solovida & Hengky, 2017).

There are too many authors which take environmental creativities and the performances as instruments that may assist businesses to attain the competitive edge as well as in the betterment of the whole execution (Molina-Azorín et al., 2009) but if there is less information about the environment, then this may stop the corporate decision-makers to make effective decisions (Mokhtar et al., 2016). Through making as well as giving information connected to tangible as well as monetary factors about environmental execution, it has been claimed that EMA will deliver data that can be applied by the corporate administration to measure probabilities for financial and ecological development (Gale, 2006). The association between being practical in environmental concerns and organization accomplishment signifies a confounding problem in literature (López-Gamero et al., 2009). Totally, it is unbelievable how environmental practices influence an organization's fiscal performance (Ong et al., 2016). It is due to that reason

that many researches have described that there is a positive association among them and several documented that there is no significant relationship among them. Providing the enhancing significance of environmental administration and emerging environmental management relations, producing feasible environmental management policies and having a sensible knowledge about the environmental management accounting system and the association' execution will assist in achieving organization's aims. Commitment is one of the most important factors that are surely affects the performance of any organization. In this research, organizational commitment signifies higher level management commitment. In any organization highest decision-making authority is considered the Top-level management. The top management is accountable for attaining objectives and aims with other members of the organization and are mostly administrative (Wheelen Thomas & Hunger David, 2006). They have a significant impact on the achievement or failure of the business. Based on the above explanation, it may be stated that the commitment of top management is a crucial factor in institutional enablement (Robbins & Coulter, 2007). Although, the EMA and its determinants have been examined in the past but there are very limited studies which examine the role of EMA between environmental strategy and firm performance. As best to the researcher knowledge, the role of TMC has been never considered in the literature to examine its impact on firm performance taking environmental strategy as independent construct through sequential mediation. Furthermore, the current study is the first one to examine the impact of environmental strategy, EMA, and TMC on firm performance in a combined model. Therefore, to fulfil these research gaps, following objectives of the study has been proposed;

- To analyze the impact of environmental strategy on EMA Adoption;
- To examine the impact of EMA adoption on top management commitment;
- To investigate the impact of top management commitment of firm performance;
- To investigate the role of EMA and TMC between environmental strategy and firm performance via sequential mediation.

The current study has importance for researchers as well as practitioners because it enhances the literature by providing the empirical evidence about the role of EMA adoption and TMC implementation between environmental strategy and firm performance. Practically, this study help manufacturing firms of Pakistan and other developing countries as well in understanding that how they can effectively implement EMA to enhance the firm performance and how different motivational and stakeholder's factors can affect this phenomenon. Furthermore, policymakers will also come to know through this study that what factors can derive effective EMA and TMC implementations and enhance the performance in manufacturing organizations.

This paper has been divided into five sections, first one is introduction, which discussed above. Section two presenting the theoretical framework, literature review and hypothesis development. Section three, provide the methodology for the study i.e., data collection tool, instruments adoption and measurement and analysis techniques. Section four, presenting the empirical output and interpretation of the results, whereas, in section five discussion on hypothesis, study conclusion, limitations and implications are discussed.

## 2. Theoretical Framework and Hypothesis Development

In an environmental accounting system, EMA has turned into an essential part (Jamil et al., 2015). EMA is now attaining more significant, as an important part not just for the decision making environmental management nonetheless also for all the types of management actions and the variety of decisions exaggerated by ecological concerns that are growing (Al-Mawali et al., 2018). EMA, though, as an increasing section of the examination, but it has received comparatively less attention from the researchers and tentatively well-versed errands. In 2005, the International Federation of Accountants (IFAC) deliberated EMA as the panel a complete set of principles as well as the methods that stretch the information important to the attainment of numerous further environmental management actions (Al-Mawali et al., 2018). There are too many ideas and observations about EMA, it has no single generally recognized explanation. Several researchers have defined EMA in various ways. Like, (Bartolomeo et al., 2000) considered EMA as the establishment, investigation, and utilization of financial and physical (monetary and non-money) environment connected data in order to increase the associational monetary performance as well as the environmental execution (Bartolomeo et al., 2000). Hence, Stakeholder theory suggested that the purpose of any business is to generate the core value for their stakeholder in order to succeed and be sustainable over time. The organization maintained the balance between its stakeholders, therefore, the stakeholder approach naturally concerned about how an organization-maintained relationship with stakeholders. Thus, any information shared by the organization with its stakeholders is a part of legitimacy or social process. In management, accounting the stakeholder theory well established, thus, the stakeholder theory pursues the organization to disclose the relevant and appropriate information with their stakeholders. Therefore, rendering the IFAC's Statement Management Accounting Conceptions, EMA is "the administration of environmental and financial concert through the improvement and execution of suitable environment-related accounting systems and performance. While this might comprise recording and examining of some corporations, environmental management accounting normally includes life-cycle costing, full-cost accounting, benefits valuation, and strategic planning for environmental management" (IFAC, 2005). A corresponding explanation is provided by the United Nations Expert Working Group on EMA: EMA is generally defined as the credentials, assortment, investigation, as well as usage of two types of data for inner decision making: physical data and monetary data on environment-related expenses, incomes, and reserve (Beder, 2013; Bennett & James, 2017). This explanation particularly emphasizes mutually the tangible along with monetary sides of EMA. (St & Burritt, 2000; Sulaiman & Ahmad, 2006). EMA is the valuation along with examination of mutually economic as well as non-economic data to contribution internal environmental management processes. This will equalize the predictable financial management accounting approach, with the objective to improve suitable tools that help to identify the distribution of environment-related expenses (Bennett & James, 2017).

### 2.1 Environmental Strategy and EMA Adoption

All the organization's procedures identify the resources through with the association's objective to complete their aims and purposes. EMA is considered the most vital element of Management Control System (MCS) like EMA, which is a management accounting

technique which focuses on proficiency and efficacy in the ingesting of an association's resources. Consequently, if there is a strategy which is the driving force of MCS, then it is deceptive, for this must have an effect on the level of EMA practice (Al-Mawali et al., 2018). The maximum corporate strategic arrangements applied in contingency-based studies comprise prospectors, assessors, protectors, and merchandise differentiation-cost management (Chenhall, 2003). The consequences of Phan and Baird (2015) denote that the complexity of EMA might depend on the association's environmental strategy. Christ and Burritt (2013) used the "contingency theory's assumptions" in an examination exploring the existing and upcoming practice of EMA among associations. They determined that EMA's practice was connected to the organization's environmental strategy. Though these arrangements might be useful to the EMA explorers, there is an approval for the embellishment of an organization's environmental strategy. In addition, the environmental strategy sometimes may affect EMA practices (Narayanan, 2014). Thus, it is the core responsibility of the managers when they design environmental strategies, they must pay attention to alignment between EMA and firm performance for achieving sustainability and financial benefits. Thus, literature on the environmental strategy suggests that firm responses to environmental concerns may vary along with environmental issues basically moves from confrontation to compliance with preventive strategies (Agarwala, 2005). Therefore, firms are complying with current regulations (simply follow EMA) and go for adopting responsive strategies to compete competitors and win financial benefits. After analyzing previous studies, it can assume that the EMA practice might be depend on organizational ecological planned aims and purposes. So, we can hypothesize that:

- **H<sub>1</sub>:** Environmental strategy has a significant and positive impact on EMA adoption.

#### *2.2 EMA Adoption and Top Management Commitment*

The most effective execution of EMA actions involves the commitment or assurance from various efficient divisions (Lee, 2011). The study agrees that if there is nonappearance of communication among accounting and EMS, then this may delay an organization's exertions with regard to EMA adoption (Bartolomeo et al., 2000; Bennett & Wolters, 2002; Lee, 2011) While the business structure of any organization encourages corresponding and the transfer of thoughts inside the organization, then it is practical to agree that EMA must possibly be represented as well as efficient. Pondeville, Swaen, and De Rongé (2013) Results emphasized the significance of high-level management in the growth of a company's ecological strategy and implementation about progressive management control system to increase occupational achievement. In the end, they summarize that TMC is the most important factor in enforcing any variation in the system of management or novel execution like EMA. (Latan et al., 2018) investigated the impact of different association's resources in which TMC also included the usage of EMA and consequences which shows that there is a positive and significant relationship between TMC and EMA usage. As concern with the study of Latan et al. (2018) shows that commitment of the top management to the environment will lead to implementing a procedure which is able to give information allied to the environment. The commitment of the top-level management to the environment considered an important element for enhancing the performance by the adopting of environmental management accounting.

Yet, the sustainable adoption of EMA leads the top management to gain environmental as well as financial benefits. This shows that EMA is the crucial factor for giving data to achieve greater corporate environmental performance. Therefore, purpose of current study is to present the results in empirical form to enhance literature and proved the guidelines for top management, so the following hypothesis is proposed.

- **H<sub>2</sub>:** EMA Adoption has a significant and positive impact on top management commitment

### 2.3 Top Management Commitment and Firms' Performance

It is sensible to accept that an association's financial performance must be enhanced if the commitment from the management of any business will include (Tzempelikos, 2015) the upper level management considered actual key account management relations. The researcher further differentiated high level management commitment and top management involvement. In the end, the researcher found that top management commitment is one of the most crucial keys in enhancing an associational financial performance. Firm performance is an extensive mixture of both insubstantial receiving, for example, enhancing the firm performance and tangible receiving, for example, financial and economic outcomes. (PourKiani & Tanabandeh, 2016) investigated the association among management commitment as well as job satisfaction, service quality, firms' performance. They found out that management commitment directly enhances firm performance as well as finding a positive relationship between firm performance and management commitment. As per Solovida and Hengky (2017), firm performance is basically the key of any association for which an association make different policies and strategies and the leader's commitment is the key in the achievement of any organizational success. Ferreira et al. (2010) state that commitment of leadership plays an important role in enhancing organizational effectiveness, which is only possible with effective performance of organization. The study of Pasumarthi, Vaitheeswaran, Gupta, and Satpathy (2015) argued that if top management is less committed or less effective, then the firm would fail to provide quality services and overall performance will also be affected. Management systems make sure that employees become better at decision making. Authors have described that whenever the manager is commitment towards such change in plans in which environmental strategies have to be incorporated in manufacturing processes then it is easy to enhance firm performance (Pinna, Demartini, Tonelli, & Terzi, 2018). Yet, the current study proposed the following hypothesis to examine impact of TMC on performance of the organization;

- **H<sub>3</sub>:** Top management commitment has a significant and positive impact on firms' performance

### 2.4 A Sequential Mediation Model

In social sciences, mediation investigation and unintended effects have become an essential consideration in investigation, which might be used to describe complicated associations amongst independent and dependent variables. Sequential mediation is one of the most important methods of mediation when more than one mediator is involved in research and their association regarding the indirect key, then this model will be used. Sequential mediation is endorsed as the significant instrument in research considered to inspect "domino-effects" in dogmatic activities and is considered one action which

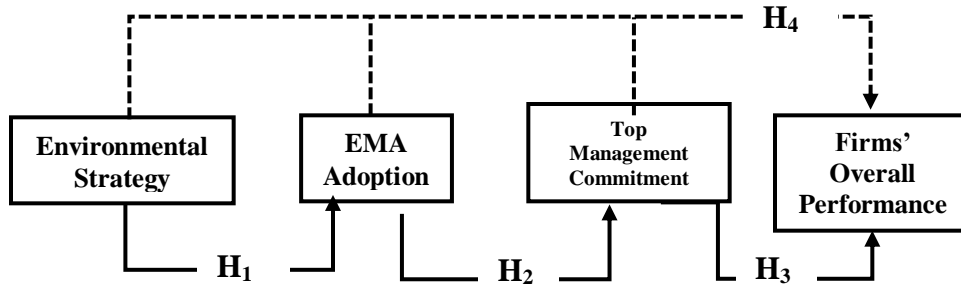
generates a series of responses. Kashyap and Rangnekar (2016) investigated the sequential mediation model as well as examine how this model is a proper test for the theoretical assumptions. In this research, to inspect the sequential mediation, the process which is offered by (Preacher & Hayes, 2008) was implemented. With regard to that, there are at least three criteria, which must be defensible. Firstly, the independent variable (Environmental Strategy) ought to significantly correlate with the mediator variable, (EMA and Top management commitment). Moreover, after controlling the influence of the predictor variable, the association among the mediators and the dependent variable (EMA as well as Top Management and Firms' performance) ought to be significant. Thirdly, the indirect effect from the independent variable on the dependent variable (Environmental strategy and firms' performance) ought to be significant. To check the significance of indirect influence Process procedures was utilized. The following hypotheses were formulated for this study regarding sequential mediation;

- **H<sub>4</sub>:** Environmental management accounting and top management commitment sequentially mediate between environmental strategy and firm performance

Based on above discussion, the following research model has been proposed for the current study;

**Figure 1: Research Model**

**Note:** From  $H_1$  to  $H_3$  are the direct path hypotheses, whereas, dotted line presenting the sequential mediation hypothesis noted as  $H_4$ .



### 3. Research Methodology

In the current research study, quantitative approach was used as the research methodology. To obtain the purpose of the research study, researcher gives preference to get primary data which was collected using a questionnaire. The questionnaire in this study based on five point Likert scale from “strongly disagree” to “strongly agree” as well as the respondents were asked to check appropriate option according to their own experience and knowledge (Boone & Boone, 2012). The population captured in this study includes all those persons who are performing their duties as top managers in the manufacturing firms of Pakistan. The required respondents were contacted through personal meetings. All the respondents were guaranteed that their replies would be kept intimate and will not be misrepresented. The sampling method proposed by the Christensen, Johnson, Turner, and Christensen (2011) is used for current study. According to the authors, up to 300 instruments are enough for generalization of the

research study. Researcher meets respondents by personally and requests their consent to fill the questionnaire. Total 350 questionnaires were distributed among the respondent out of which 327 were returned back immediately because all questionnaires were filled by respondents in the presence of the researcher. So, a high response rate was achieved statically analysis, a prerequisite test was conducted on questionnaires; out of 327 the 19 questionnaires were eliminated either because they were roughly marked or incomplete response. Finally, 308 questionnaires were used for the analysis in order to test the research hypotheses. Two statistical software, SPSS and AMOS were utilized by the researcher; the efficiency of AMOS is to conduct complete research model by structuring it in a single test because it is the appropriate software for the study model as this study has one independent variable, one dependent variable, and one mediating variable.

### *3.1 Measures*

Measurement operationalization is compulsory in empirical studies; the philosophy of this research is positivism, and the researcher tested the existing theory with the new data. So, there is no need to develop a new instrument for collecting data from respondents. The scale of environmental strategy was based on 4 items and adopted from the study of Al-Mawali et al. (2018) and they reported .892 reliability. The scale of top management commitment has 9 items and was adapted from the study of Latan et al. (2018) and they reported .923 reliability. The scale for environmental management accounting and firm performance was also adopted from the study of Al-Mawali et al. (2018), the EMA has 11 items (reliability .952) and firm performance has 8 items (reliability .939).

## **4. Research Findings**

The empirical findings showed that 171 male and 137 females participated in the study. The age of the respondent from 20 years to 30 years have a frequency of 122 respondents, 31-40 years range have 57 respondents, 41-50 years range have 73 respondents and others are greater than 50 years. Moreover, 23 respondents were undergraduates, 145 are graduates and, 130 were masters and the remaining 10 have other education.

### *4.1 Reliability and Validity*

Reliability is the items wise validation of constructs, which states the internal consistency. It offers a plain method of evaluating whether or not a test is reliable. It is utilized under the assumption that the multiple items evaluate similar basic variable. The value of Cronbach's alpha varies from zero to one. A negative value signifies that something is incorrect with the data such as an error in a reverse score of a few items. The common rule of thumb for Cronbach's alpha is 0.70 and higher is satisfactory, .80 and higher is good, and .90 and above is best. Convergent validity is the extant of assurance a researcher has that a character is well evaluated by its measures (Kim & Kim, 2010). Whereas, discriminant validity shows the discrimination of a variable from others, it is measured by employing cross-loading of measures. By considering the cross-loading, the factor loading pointers on the allotted variable have to be greater than all the loading of other variables with the stated cut-off figure of factor loading greater than 0.70 (Kim & Kim, 2010).



**Table 1: Reliability, Convergent and Discriminant validity**

	Items	Cronbach Alpha	CR	AVE	MSV	ES	EMA	FP	TMC
ES	4	0.932	0.938	0.790	0.345	<b>0.889</b>			
EMA	11	0.947	0.959	0.740	0.303	0.550	<b>0.860</b>		
FP	8	0.929	0.931	0.754	0.342	0.585	0.493	<b>0.868</b>	
TMC	9	0.913	0.917	0.763	0.345	0.587	0.514	0.491	<b>0.873</b>

Note: ES= Environmental Strategy, EMA = Environmental Management Accounting, TMC= Top Management Commitment, FP = Firms' Performance. CR= Composite Reliability, AVE= Average Variance Extracted, MSV=Maximum Shared Variance.

The results of table 1 demonstrated that the Cronbach alpha value of each construct is greater than .70 and near .90, which proved the internal consistency. Value of composite reliability and average variance generated confirmed the issue of convergent validity, while the remaining column shows the discriminate validity of the data. Composite reliability for each construct has a value more than .70 and value of MSV is less than AVE. So, it proves the convergent validity and other remaining column shows that every construct has its value rather than others which proved the discriminant validity of the data.

#### 4.2 Confirmatory Factor Analysis

The test of confirmatory factor analysis is used to identify another model for this study whether it is good a fit or not. There are 4 to 5 indicators, which proved the model fitness and their threshold and the observed values are below;

**Table 2: Confirmatory Factor Analysis**

Indicators	CMIN/DF	GFI	IFI	CFI	RMESA
Threshold range	Less than 3	≤ .80	≤ .90	≤ .90	Less than .08
Observed Value	3.107	.755	.901	.901	.083
After Modification	2.957	.803	.925	.925	.076

Notes: CMIN= ( $\chi^2$ ) Chi-Square; Df= Degree of freedom; GFI, Goodness of Fit Index, CFI= Comparative Fit Index; IFI= Incremental fit index, RMSEA= Root Mean Square Error of Approximation

The first observed value for model fitness shows that they are not under the good range, but AMOS provides the option of modification by co-variations of error term according to Harrington (2009). After modification, the results of above-mentioned table shows that all values are under the threshold range, i.e., the value of CMIN/DF for the data is 2.957, which is less than 3.0, GFI .801, which is greater than .80, IFI and CFI are .925 which are greater than .90, and last but not the least, RMESA is .07, which is less than .08. So, it means that the model for the study is a good fit. The following is a figure of CFA in AMOS, which is also showing the factor loading of each item plus co-variation among constructs (Brown, 2014).

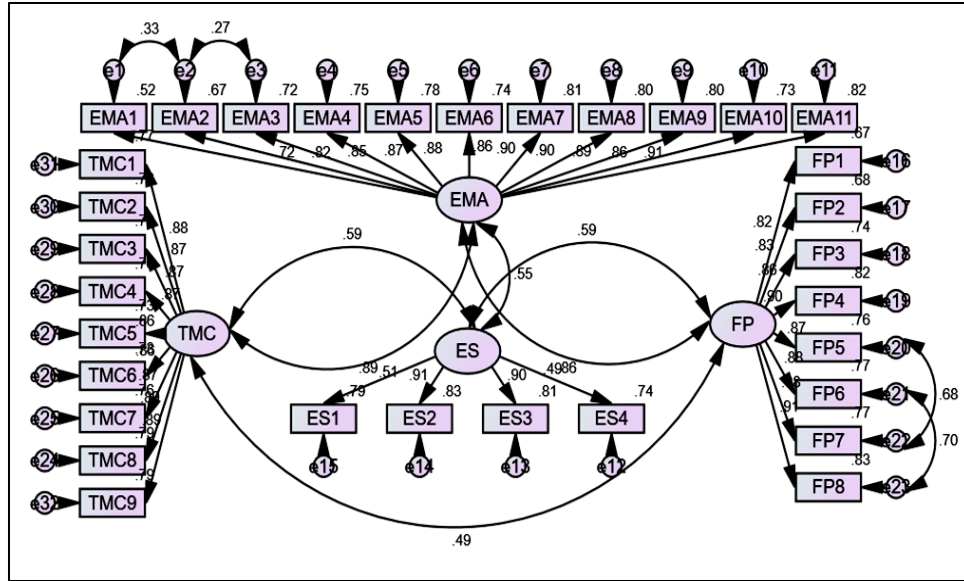


Figure 2: CFA Model

4.3 Structural Equation Modeling

SEM is a multivariate statistical analysis tool which is utilized to examine the structural associations between the variables (Blunch, 2012). SEM is generally is the combination of factor analysis as well as multiple regression analysis, along with it employed to examine the structural association between measured constructs and latent variables. In order to test the study hypotheses, researcher used SEM (structural equation modeling) through AMOS was performed, table 4 presents the regression weights of each construes on one another and indicates the test of the hypothesis.

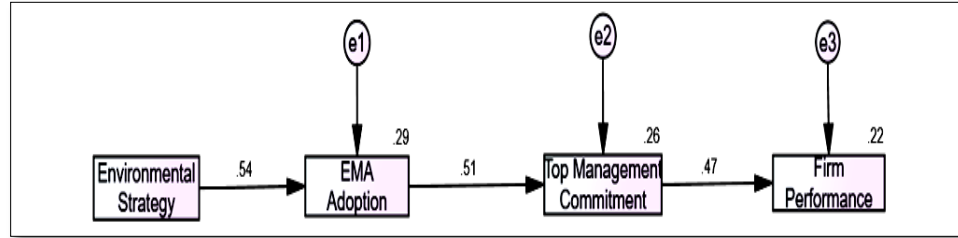
Table 3: Structural Model Results (Path Analysis)

Path Analysis			Standardized $\beta$	Unstandardized $\beta$	S.E.	C.R.	P-value	Hypotheses	Decision
ES	→	EMA	.540	.509	.045	11.245	.000	H <sub>1</sub>	Accepted
EMA	→	TMC	.507	.522	.051	10.317	.000	H <sub>2</sub>	Accepted
TMC	→	OP	.469	.463	.050	9.316	.000	H <sub>3</sub>	Accepted

Note: ES= Environmental Strategy, EMA = Environmental Management Accounting, TMC= Top Management Commitment, FP = Firms 'Performance.

This test is chosen by the researcher as it approximates the multiple and interconnected reliance in a particular examination. The research demonstrated that environmental strategy has 54% significant impact on environmental management accounting, meaning is that if company increase its environmental strategy it will bring 54 percent change in EMA adoption. Moreover, these results are consistent with this study of and support the H<sub>1</sub> of the study. The outcomes of the path analysis indicated that EMA adoption has a significant and positive impact on top management commitment (Latan et al., 2018), therefore, H<sub>2</sub> of the study was also accepted. Adoption of EMA will brought 50.7 percent

positive influence in the top management commitment. Hypothesis 3 of the study agrees with the results of (Colwell & Joshi, 2013) and it shows in this study, the effect of TMC on performance of the firm is 46 percent, so, H<sub>3</sub> was also accepted. Which mean that if one unit of TMC increase it will bring 46.9 percent positive influence on firm performance. The following figure, the SEM Path analysis shows the standardized coefficient.



**Figure 3: SEM Path Analysis**

*4.4 Sequential Mediation Results (H<sub>4</sub> Testing)*

To test the hypothesis of sequential mediation, either EMA adoption and top management commitment sequentially mediate the effect of environmental strategy on manufacturing firm performance, the researcher run a sequential mediation analysis “Model 6 as described in PROCESS with bootstrap methods (Hayes & Scharkow, 2013). The full process model and the coefficients” which are displayed in table 4. The findings indicated that total effect of environmental strategy on firms’ performance is 52.90% ( $\beta=.5290$ . t-value=11.6260 and p-value=.000), which means that one-unit increment of environmental strategy leads to 52.90% has positive effect on the manufacturing firm’s performance. The environmental strategy has ( $\beta=.3333$ . t-value=6.9075 and p-value=.000) direct impact on firms’ performance, which means that there is 33.3% positive variation in firm performance due to environmental strategy. So, this finding indicated that environmental strategy has a significant positive effect by 33.3 percent, if environmental strategy increased by one unit it will bring 33.3 percent positive influence in company performance.

**Table 4: Sequential Mediation Results (H<sub>4</sub> Testing)**

Model 6	Y = FP	X = ES	M1 = EMA	M2 = TMC	Sample size 308	
Outcome: EMA						
Model 1: Summary						
	R	R-sq.	F	Df1	Df2	P
	.5401	.2917	126.0383	1	306	.000
	Coeff		SE	T		P
Constant	1.7799		.1689	10.5390		.000
ES	.5092		.0454	11.2267		.000
Outcome: TMC						
Model 1: Summary						
	R	R-sq.	F	Df1	Df2	P
	.6127	.3754	91.6372	2	305	.000

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	Coeff		SE	T		P
Constant	1.0947		.1906	5.7420		.000
EMA	.3950		.0553	5.3373		.000
ES	.3954		.0521	7.5877		.000
Outcome: FP						
Model 1: Summary						
	R	R-sq	F	Df1	Df2	P
	.6074	.3689	59.2311	3	304	.000
	Coeff		SE	T		P
Constant	1.0542		.1993	5.2903		.000
EMA	.2033		.0574	3.5424		.005
TMC	.1690		.0569	2.9726		.003
ES	.3333		.0564	5.9075		.000
<b>Total Effect Model</b>						
Outcome: FP						
Model 1: Summary						
	R	R-sq	F	Df1	Df2	P
	.5535	.3064	135.1631	1	306	.000
	Coeff		SE	T		P
Constant	1.6897		.1694	9.9735		.000
FP	.5290		.0455	11.6260		.000
<b>Total, Direct and Indirect Effects</b>						
Total effects of X on Y		Effect	SE	T		P
		.5290	.0455	11.6260		.000
Direct effects of X on Y		Effect	SE	T		P
		.3333	.0564	5.9075		.000
Indirect effects of X on Y		Effect	Boot SE	BootLLCI	BootULCI	
Total		.1957	.0568	.1017	.3274	
Ind1:		.1035	.0437	.0195	.1925	
Ind2:		.0254	.0161	.0015	.0680	
Ind3:		.0668	.0371	.0006	.1499	
Indirect effect key						
Ind1:		ES → EMA → FP				
Ind2:		ES → EMA → TMC → FP				
Ind3:		ES → TMC → FP				
ES= Environmental Strategy, EMA = Environmental Management Accounting, TMC= Top Management Commitment, FP = Firm Performance. "Bootstrap samples for bias corrected bootstrap confidence intervals = 5,000 Level of confidence for all confidence intervals in output = 95.00, Coeff = coefficient, Boot LLCI = lower limit confidence interval, BOOT ULCI = upper limit confidence interval".						

Moreover, results of sequential mediation in above table showing that specific not have directly but indirectly effect of environmental strategy on firm performance through both

EMA adoption and TMC was originated to be positive and significant with a point estimate of .1957 and a 95 % confidence interval .1017 and .3274 LLCI and ULCI respectively, providing full support to hypothesis 4. Moreover, individual indirect effect in the first key with EMA is 10.35%, which mean that environmental strategy will bring a 10.35 percent positive influence through EMA on firm performance. Same as in the second key with both mediators the effect of environmental strategy on firm performance is 2.54%, which indicated that one unit increase in environmental strategy will bring 2.54 percent positive influence on firm performance through EMA and TMC. Whereas, in the last key the indirect effect of environmental strategy on firm performance through TMC is 6.68%. Thus, it is concluded that environmental strategy is considered exclusive aspect that will leads to positive EMA adoption, which will surely increase the confidence level of managers in their top management, and this can increase the performance of the firms in Pakistan. Hence, the results of the study prove that EMA adoption and top management commitment sequentially mediate the association between environmental strategy and firm performance.

## 5. Discussion and Conclusion

### 5.1 Discussion

The aim of the research is to examine the association among the environmental strategy, the level of EMA usage, upper level management commitment along with firm performance. A survey of Pakistani manufacturing companies was conducted for gathering the required data to test the research's hypothesis. Two statistical software SPSS and AMOS were utilized by the researcher, the efficiency of AMOS is to conduct complete research model by structuring it in a single test because it is the appropriate software for the study model as this study has one independent variable, one dependent variable, and two mediating variables. To achieve the aims of this study, primary data was collected using a questionnaire. The closed-ended questionnaire was presented to the respondents with a five-point Likert scale. The effect of environmental strategy (as an independent variable) on EMA usage has been examined in the first phase of this study. Afterward, the effect of the EMA usage on the top management commitment was investigated as well. Then, the effect of TMC on firm performance was examined. The results of this study show the positive and significant association between environmental strategy and the level of EMA usage, as well as the positive and significant association between EMA usage and top management commitment. Moreover, the positive and significant association among upper level management assurance and firm performance also found. The outcomes are consistent with the basic assumption of the theory, which assumes that the usage of management accounting techniques is contingent on the associations' circumstances (Chenhall, 2003). Hence, the results of the study prove that EMA adoption and top management commitment sequentially mediate the association between environmental strategy and firms' performance. The significant positive outcomes of this study is in congruence with the findings of previous studies like (Christ & Burritt, 2013) determined that EMA's practice was connected to the organization's environmental strategy. These outcomes were consistent with the contingency-based assumption of Pondeville et al. (2013) study, which emphasized the significance of top management in the growth of a company's ecological strategy and implementation of a

progressive management control system to initiate occupational achievement. Tzempelikos (2015) examined the contribution of top management in effective key account management relations, the researcher further differentiates top management commitment and top management involvement. In the end, the researcher found out that the top management commitment is one of the most crucial keys in enhancing an association's financial performance. Furthermore, in contrast to, the outcomes of this current is are not consistent with some previous studies those results the results of this study is inconsistent with some other related studies like (Agbejule, 2005) show that management accounting system (MAS) has negatively effect on environmental uncertainty and performance in the supervision TMC.

### *5.2 Research Implications*

The outcomes of the research show that environmental strategy is an inimitable characteristic that might lead to positive EMA adoption, which are increase the trust in manager that are the part of the top-level management and this may increase the performance of the firms in Pakistan. EMA encourages the managers to subsidize in the direction of sustainability which results show that top managers will be more committed. Top management is the highest decision-making authority in any organization. The top management is accountable for attaining objectives and aims by other members of the firm and are mostly administrative. Commitment in a typical environment had become a significant aspect and working according to the socially responsible way is enhancing perceived as important for the long-term benefit of organizations. So, the assurance of upper level management is a crucial factor for increasing the performance of any organization. Producing feasible environmental management policies and having a sensible knowledge about the environmental management accounting system and the association' execution will assist to achieve the organization's aims. EMA can support businesses to assess their ecological and social burdens as well as build the credentials of joint ecological and monetary benefits from business activities. So, this study provides direction for the implementation of EMA practice and top management commitment and organizations should pay attention to it for enhancing their performance.

### *5.3 Research Contributions*

This study has several contributions regarding EMA. This study contributes to the existing literature and develops a new avenue for upcoming researchers and scholars. This study suggests the managers of the manufacturing companies or similar sector to develop and propose accessible environmental strategies to achieve sustainability for their organizations. Furthermore, this study recommends the government to focus on environment-related issues and gives clear suggestions to manufacturing organizations to focus on and consider environmental sustainability.

### *5.4 Conclusion*

This study was conducted to examine the association among the environmental strategy, the level of EMA usage, top management commitment and firm performance in manufacturing companies of Pakistan. In today's contemporary world, the strategy, and the procedures for the evaluation of performance, had gained significant consideration. Most organizations have reformed their performance measurement procedures to confirm that they reproduce their recent environment as well as strategies. The outcomes of this

research show that environment strategy has a positive and significant association with EMA usage as well as the top management commitment has also the positive and significant association with EMA. Also. The result also show that top management commitment has a positive and significant association with Firms' performance. Now, EMA is increasingly attaining more significant, not only for environmental management decisions but also for all the types of management actions and the variety of decisions exaggerated by ecological concerns that is growing. EMA is considered a relatively new management accounting discipline with on-going development. Environmental strategy is considered an important aspect which becomes cause of positive EMA adoption, that will surely increase the confidence of the manager on the other hand, and this may increase performance of the firms in Pakistan. Hence, the results of the study prove that EMA adoption and top management commitment sequentially mediate the association between environmental strategy and firm performance.

#### 5.5 Limitations and Future Suggestions

The main constraint of this study is that this study is cross-sectional which is constrained by time to complete this study. It is considered that EMA is a long-term plan accounting practice that requires long-time period to be created and developed to return outcomes in terms of improving firms' performance, top management commitment also affects EMA adoption, for instance, if the top management is committed, then the EMA can easily be implemented. A stud done in longitudinal framework that will lead to illuminate the instrumental associations among the factors of concern that are not addressed by the cross-sectional study. It might also be able to deliver more precise outcomes. The second constraint is that the employees may not feel while providing the data that may has influence on the results of the study. Another constraint of this research is that a structured questionnaire was utilized, and this can create an unnatural situation, which may lead to withdrawal of some the respondents. Although, the environmental strategy is considered most important element that may affect firms' performance, a number of other psychological factors that may affect firms' performance, so organizations should employ counselors and psychologists that can assist managers in reducing their problems.

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## Appendix: Questionnaire

Constructs and Items	Standardized Loading	Cronbach's Alpha
<b>Top Management Commitment</b>		<b>0.913</b>
Work has made a contribution to the environmental performance	.860	
Accurate environmental cost information	.855	
Continues to put an emphasis on environmental performance	.858	
Improve my company's environmental management system	.857	
Continue to treat environmental performance	.840	
Extra effort to meet environmental performance	.843	
Environmental performance is one of the most important targets to achieve	.857	
Providing accurate information on company's environmental performance	.872	
Responsibility for the environmental performance	.872	
<b>Environmental Management Accounting</b>		<b>0.947</b>
Identification of environment-related costs	.728	
Classification of environment-related costs	.826	
Creating and use of environment-related cost account	.850	
Allocation of environment-related costs to production processes	.861	
Allocation of environment-related costs to products	.872	
Product life cycle cost assessments	.843	
Introduction or improvement to environment related cost management	.869	
Estimation of environment related contingent liabilities	.871	
Product inventory analyses (i.e., the specification of the types and quantities of materials and energy required and the number of residues released to the environment)	.876	
Preparing annual environmental performance report	.841	
Product impact analyses (i.e., assessment of the environmental effect of competing for product designs)	.874	
<b>Environmental Strategy</b>		<b>0.932</b>
History of implementation of environmental programs is concrete in our organization	.843	
Key performance indicators: air, waste, water, and energy are being considered in our organization	.870	
Environmental awards have been received by our organization	.864	
Reporting structure (level) is according to a chain of command in our organization	.828	
<b>Firm's Overall performance</b>		<b>0.929</b>
We are satisfied with our firm's ROI. (Return on Investment)	.795	
We are satisfied with ROE. (Return on Equity)	.801	
We are satisfied with ROA. (Return on Assets)	.835	
We are satisfied with ROS. (Return on Sales)	.875	
Complying with environmental regulations	.876	
Preventing and mitigating environmental crises	.881	
Uncovering cost cutting opportunities	.877	
Limiting environmental impact beyond	.906	

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