Mediating Role of Environmental Management Accounting and Control System between Top Management Commitment and Environmental Performance: A Legitimacy Theory

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Abstract

The Purpose of current study is to assess the impact of top management commitment on firms' performance, based on legitimacy theory with mediating role of environmental management accounting and environmental management control system. Survey-based data has been collected through questionnaires from ISO 14001 based manufacturing firms of Pakistan. Path analysis has been conducted by applying structural equation modelling on total 304 respondents' data to answer the study hypotheses by using SPSS and AMOS. Results of the study indicate that there is a positive and direct impact of top management commitment on the firms' environmental performance. Moreover, environmental management accounting and control system significantly mediate the relationship between top management commitment and environmental performance. The theoretical model of this study is first time developed and tested by the researcher in Pakistan. Practically, the findings of this research give a deep insight and understanding of how the managers in Pakistan can improve the environmental performance of their firms, through commitment

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and environmental management accounting as well as environmental management control system tools.

Keywords: environmental management accounting, environmental management control system, top management commitment, environmental performance, legitimacy theory

1. Introduction

Economic development has become the centre of optics for the countries to develop and excel in the prism of the successful business world. Therefore, these can be accomplished through the equilibrium of wealth increase and environmental sustainability effectively. The significance and vitality of this concern have taken glory amongst the people, public, society, and governmental discourse (Ahmad & Mohamed Zabri, 2015. Furthermore, the ecosystem must be safeguarded in such a way that it may become friendly for environmental security and preservation. So, all the activities must be associated accordingly for environmental security. Organizations are heeding towards pro-environment tasks so they help them to best utilize their resources. Wastage of the factories must also be disposed of so, it may not harm the environmental dealings. The competitive urge in the markets has led the companies to produce good quality products at lower rates within the required time (Sarkis, Zhu, & Lai, 2011) without considering environmental harms. But the increasing number of manufacturing firms, their processes, and natural resources are utilized too much which consequently are harming the environment and increasing environmental problems drastically. Therefore, countries are taking actions for the solution of these problems so that the companies may follow environment-friendly rules (Aladwan, 2018), and that rules are nothing but Environmental Management Accounting (EMA).

EMA is significant for the revival of the environment-friendly rules and regulations as well as corporate culture. It contributes to managing and minimizing the costs that affect the environment. It also helps to counter various problems such as relational matters, environmental affairs, and compliance issues. EMA aids in picking out the problem generating activities that adversely affect the environment. Albeit, it encapsulates the ability in the managers arranging the activities in such a way that their negative impact on

the performance of the organization may be diminished (Shah, 2005). Otherwise, developing countries like Pakistan would be affected badly due to the mismanaged-environmental activities and economic performance will be influenced by this disaster. Because, the less eco-friendly activities increase carbon emissions, affect the environment and the waste materials of the companies endanger the marine lives. As, according to the report of the German watch, Pakistan is among the top ten countries that are most vulnerable to climate change. As shown from the given table, until the year 2018 Pakistan faced 152 bad weather events and suffered losses in lives and economy as well (Abubakar, 2020). Therefore, the EMA appears as a magical decision-making instrument that helps the decision-making bodies to envision the vulnerability and take it seriously by encouraging pro-environment activities.

Table 1
Pakistan Amongst Top 10 Most Vulnerable Countries (Germanwatch Report)

Death Toll	499.45
Deaths per 100,000 inhabitants	0.3
Total loss in million US$ PPP	3792.52
Losses per unit GDP in %	0.53
Number of events (Total 1998-2018)	152

The grounds of research have been covered with an idea of Environmental management accounting hugely (Burritt & Schaltegger, 2014). Nevertheless, all the members who are directly or indirectly associated with the organizations are highly concerned about the environment-related matters. Accordingly, they are striving to find solutions to prevailed problems. Moreover, environmental accountability and assessment are prioritized by them greatly (Burritt & Schaltegger, 2010; Rodrigue, Magnan, & Boulianne, 2013). The utilization of EMA has come out as a pivotal indicator for the management of the environment for getting competitive advantages. Most of the organizations have heeded towards the goals of environmental security (Sands, Lee, &

Gunarathne, 2015; Lisi, 2015). In this study, the EMA concept is understood as the accounting procedure which employs conventional accounting to identify, measure & evaluates the impacts of environment on both business entities and society at large (Sundin & Wainwright, 2010). This concept clarifies the difference between conventional accounting and environmental management accounting. This concept says that the companies should adopt variables and adopt standards & procedures to identify measure and disclose the environment-related problems in monetary terms so that all the related parties whether they are inside or outside the firm may get information quantitatively (Shaheer, 1998). Hence, while collecting; analyzing & monitoring the business operations regarding the environment, such type of accounting must include the categorization of environmental business operations (Akdoğan & Hicyorulmaz, 2015).

Top management commitment (TMC) is much important for the firms that are willing to be called as environment-friendly because this commitment can eventually result in the fulfilment of enhanced competitive advantage (Brown, 2015; Cheng, Hu, & Zhou, 2019; Colwell & Joshi, 2013). Because, if the top management itself is not interested in the enhancement of environmental performance(EP) then the firm's objectives regarding environmental friendliness will not be achieved. The Process in the direction of outstanding EP needs the involvement of firm resources that includes perfect planning which is capable enough to integrate the corporate strategy with that of environmental issues. The usage of TMC and EMA results ultimately in enhanced firms' environmental performance (Bouten, 2015). As most of the environmental issues are created by the pollutants of the manufacturing companies and these companies are also working on the control of these issues hence, the primary scope of this study is the manufacturing sector; all types of manufacturing companies. These companies can be influenced due to this study and also can get useful information about the variables of this research and the importance of EMA & environment management control system (EMCS). The manufacturing sector is very important for any economy as it contributes a major share in the capital of a country. In Pakistan, 20% of total revenue is generated by the manufacturing sector so; this sector can get more

benefit from this study. Trade and Exports are also dependent on manufacturing companies which are considered to be a major factor for economic growth. If the manufacturing sector is on the boom, then trading and exports will also be in surplus which means the economy is progressing. So, this research work can also be implemented on the economic growth of the country (Gondal, Masood, & Khan, 2018).

2. Theoretical Background and Hypotheses Development

According to the Former British Prime minster, Winston Churchill, "The price of greatness is responsibility". Similarly, the greater EP of the organization is linked with the responsible and legitimate environmental activities and accounting of it. EP is linked to the firm's control of its environmental characteristics such as the strategies employed to carry out the actions and the contribution as well as the commitment of overall management to achieve the goals of that firm. There are different indicators of EP and steps to determine it. Top management groups create strategic selections and therefore the merchandise of their deciding influence structure performance. EMA is as extensive in its scope, methods, and application as traditional methods of managing the accounting system. Techniques for management accounting including performance measurement, cost determination, and budgeting methods are used. EMCS contains internal structures and systems. It's vital to notice that the very important role of EMCS is to supply data that is beneficial for social control, higher cognitive process, planning, monitoring, and analysis of structure activities to vary worker behavior. According to Watts and Zimmerman (1986), legitimacy theory is a system-oriented theory which means that the firms either influence the society or society itself influences the firm. Legitimacy theory suggests that the firms continuously try to find whether they are operating within the norms and bounds of society or not. By adopting the legitimacy theory viewpoint, the management of the organization voluntarily reports those activities which they perceive are expected by society. This theory depends upon the idea of 'social contract' which means that there is a social contract among the society and organization (Deegan, 2002; Mathews, 1995). Legitimacy theory creates a relationship between the management accounting as well as the social responsibility of

the organizations. That responsibility links towards the environmental, social, and economic factors that help the organization to grow meticulously and attain sustainable development in the current paradigms of the business world (Zyznarska-Dworczak, 2018). Similarly, based on the legitimacy theory, variables are associated in true sense. Such as, TMC is associated with the Firm's EP under the legitimacy theory. In addition to it, EMA and EMCS have an obligatory link with a firm's environmental performance. This means that the survival of any organization is threatened if the society perceives that the social contract has been breached by the organization. Society cancels the contract with the organization if it is found that an organization's operations are not acceptable and legitimate. This cancellation of the contract would be in the form of a demand reduction for products, increased taxes by the government, or fines for not conforming the society's expectations. This theory recommends that when the managers find that some resources are very important to the organization then they would decide to ensure the environmental performance of the firm.

2.1 Top Management Commitment and Environmental Performance

Previous studies and variant authors have urged the higher management to pave a ground field for the employees so they may contribute the environmental protection without any dictation given by the managerial body. Therefore, ISO 14001 has made it necessary for the employees and workforce to play their part addressing the environment-related matters quite comprehensively (Qian, Burritt, & Monroe, 2018). The outlined purpose can be accomplished when higher management becomes committed to it by incorporating workers diligently. Hence, the managerial commitment and dedication towards the environmental goals are in coherence with the attainment of efficiency as well as effectiveness (Otley, 2016). The managers exert a bridging impact on the pavement of EMCS in the organizations because they hold the authority to manage the control systems throughout the organizational sector. Another study has revealed that all the organizations and concerns would be ineffective in the case of a lower level of dedication from the corridors of the managerial

powers. They would be offering lower quality services to the customers and getting a lower level of performance in the organizations (Pasumarthi, Vaitheeswaran, Gupta, & Satpathy, 2015; Amir & Chaudhry, 2019). Moreover, all the managers get ensured about the fact the all the workforce is good at decision-making procedures. Studies have shown the fact that the performance of the organization gets hiked up due to the better environmental strategies made on the part of the managerial commitment in the firms by integrating them in business operations (Pinna, Demartini, Tonelli, & Terzi, 2018). Various other authors have explained the matter such as when the managerial commitment increases it leads towards the more environment-related strategies and ultimately better-performed organizations can be seen on the curtain.

H1: Top management commitment has a positive and significant effect on environmental performance.

2.2 Top Management Commitment, Environmental Management Accounting, and Environmental Performance

Management commitment can be defined as participation directly by the top-level management of an organization that affects the performance of natural environment by the processes, products as well as corporate policies like decrease the wastage and consumption of energy and by adopting suitable green resources along with EMA. According to (Ahmad & Mohamed Zabri, 2015), for consistent improvement of the environment, state basic three intangible assets, namely (1) planning of environmental strategies (2) top-level management focuses on environmental issues (3) the use of EMA. EMA system is helpful for managers to generate information so they may develop indicators for checking the EP. As, the study of (Latan, Jabbour, de Sousa Jabbour, Wamba, & Shahbaz, 2018) shows that commitment of the top management to the environment will lead towards implementing a procedure that can give information allied to the environment in terms of cost accounting material flow. The commitment of top-level management to the environment is considered to be an important element for enhancing environmental performance by the adoption of EMA. It is found that the organization's environmental committee shows the commitment of top-level management relating to

environmental issues. Due to this committee, there is an increase in environmental performance (Latan et al., 2018). Companies' top-level management has focused on the issue of environmental performance and also has focused on EMA policies so that by implementing this, EP can be increased (Burritt & Schaltegger, 2014; Burritt, Schaltegger, Ferreira, Moulang, & Hendro, 2010). All those companies, which have better environmental management policies and strategies are resolving the issues and increasing environmental performance that is only because of using better environmental accounting policies. Today, it's a requirement for every company to introduce better policies, EMCS, and environmental information systems (Gomez-Conde, Lunkes, & Rosa, 2019). Top management committee by understanding the importance of environmental initiatives (in terms of increased performance), decides for environmental sustainability; they will be considered as committed. Many researchers found that there is a significant or positive relationship within the commitment of top-level management and environmental performance (Spencer, Adams, & Yapa, 2013). EP has been an effective tool because of bigger cost on environmental operation; regulatory of markets as well as public pressure; due to this increased importance day-by-day, the government requires its reports from companies so top-level management commitment can highlight the issues and implement EMA systems to get information about issues, therefore, its performance can be increased.

H2: TMC has a positive and significant effect on the use of EMA.

H3: The Use of EMA has a positive and significant effect on EP.

2.3 Top Management Commitment, Environmental Management Control System and Environmental Performance

The environmental performance of the business sectors demands appropriate assessment and monitoring for the best performance of the organizations. The current condition of the organizations is also appraised through this mechanism. So far, it is an instrumental technique that helps in estimating and assessing the performance of the organization (Deutsch, 1992; Gibassier & Alcouffe, 2018; Gomez-Conde et al., 2019; Pinna et al., 2018). International organization for standardization (ISO) has outlined numerous regulations for the EMCS and they help the various other countries

to level their policies and tasks accordingly to stop other misapplications there. In other words, ISO 14001 has given standards that are followed by the firms by referring to economic control. By the managerial hands, it is made sure that all the resources related to economy and ecology are gathered and incorporated in the operation with efficiency and effectiveness. Various authors have defined EMCS by Simons (1990) and Simons (1987), a set network of methods which revolves around the utilization of ecology as well as economy-related matters that are instrumental for the development of the firms and their performances by sustaining these activities (Henri & Journeault, 2010). EMCS through appropriate information of accounting supports effective management resources and contributes to EP. In addition, the management environmental control system is used for an organization to quantify environmental actions and participate in organizational routines and environmental concerns. By observing the importance of environmental performance, top-level management committees monitor the activities by the use of EMCS as a tool that plays a role of communication between managers and subordinates about the information of environmental issues (Pondeville, Swaen, & De Rongé, 2013). Also, higher environmental performance provides a foundation for developing a competitive benefit as well as allows raising the income by satisfying the wants of customers so, managers' focus to resolve the issues of environmental activities. EMCS is an effective tool for measurement and providing information about its issues (Arjaliès & Mundy, 2013). It also has argued that the commitment of top managers to increase environmental performance has a positive and direct relationship with EMCS. Therefore, its expected EMCS implications indirectly and directly influence environmental performance. It is also argued that EMCS not only improves environmental performance it also has affected economic performance which comes through a change in environmental performance (Guenther, Endrikat, & Guenther, 2016). EMCS is also important for environmental performance it is used when it gives data for reporting. Certainly, for an organization, environmental reporting means to answer several stakeholders' pressures (e.g. shareholders, customers, and investors, etc.) by showing the non-financial and financial impacts of environmental matters

(Pondeville et al., 2013). In addition, EMCS allows taking information feedback frequently. After comparing gap within the results the environmental performance permits managers to (i) improve communication which is required to achieve these results (ii) maintain or adjust strategies and actions when results are lower than standards (iii) motivate employees to perform well (iv)understand link among actions, objects and results better (v) direct their areas of concern. Hence, environmental issues are highlighted and can be resolved by the use of EMCA to enhance environmental performance (Burritt et al., 2010).

H4: TMC has a positive and significant effect on EMCS.

H5: EMCS has a positive and significant effect on EP.

2.4 Mediating Role of Environmental Management Accounting and Control System

There have been studies on environmental management accounting (EMA) and EMCS but very few have studied their relation as mediators. According to researchers, there has been a positive impact of the strategic position of the company, managerial willingness towards strategy as well as environmental uncertainty on EMA (Latan et al., 2018). This study was conducted in Indonesia as it has been approved as a vital tool to enhance the performance of organizations and businesses. In another study, on the Iranian organizational structure, it has been revealed that there is not a full mediation however, a partial form of mediation is found between EMA and the performance of the organization. It has been positive because of the significant impact of EMA on the commodities and their innovations. Hence, the performance of the organization is increased sagaciously (Saeidi & Othman, 2017). Moreover, an investigation has highlighted the role of an economic oriented control system and its influence on the performance of the organization in terms of economics as well as environmental performance is applied as a mediator in the study. Hence, partial mediation has been determined through the analysis (Henri & Journeault, 2010). The impact is in terms of a greater level of public visibility and a greater level of concern regarding the environment. Thus, previous literature lacks in investigating the mediation role of EMA and EMCS sufficiently, but they impact the performance of

the organizations also. That's why the following hypotheses are proposed:

H6: EMA significantly mediates between TMC and the firm's environmental performance

H7: EMCS significantly mediates between the TMC and the firm's environmental performance

On the base of theoretical discussion and development of hypotheses in the light of existing literature the following model of the study is proposed;

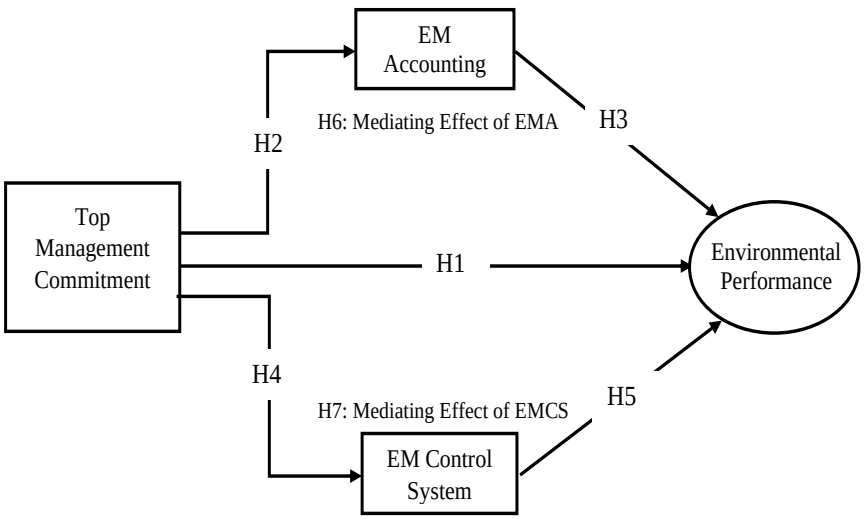

Figure 1. Theoretical Research Mode

3. Methodology

The primary data was utilized to test the study hypotheses and a self-administered questionnaire was used to collect data. Online questionnaires were sent to managers of different firms through e-mails and self-administered questionnaires were personally taken to the different manufacturing firms. Five Point Likert scale was used comprising of "strongly disagree, disagree, neutral, agree and strongly agree" and "never, seldom, sometimes, usually & always" were used to collect responses (Iyer & Kashyap, 2009; Saeidi & Othman, 2017). The items which were included in the questionnaire were adopted from prior studies (Latan et al., 2018; Pondeville et

al., 2013). The sample size can be determined through various methods such as, applying the formula and using online sample calculators where the population is known, but in the current study, the population is unknown because data was collected from individuals, and purposing sampling techniques have been adopted in this study (Alshibly, 2018). Based on purposing sampling Kline (2015) formula (number of questionnaire items * 10) has been used to determine the sample size of the current study. According to this formula, there were 33 items in the questionnaire of this study which were multiplied by 10 hence, 330 responses were required to satisfy the generalizability of the results of this study. A total of 350 questionnaires were distributed by personal visits to the manufacturing firms and 324 are received back out of which 304 are valid responses. So, the total useable questionnaires were 304 which were enough for the analysis to run according to the researcher (Hulland, Ryan, & Rayner, 2010).

3.1 Measurement and Scales Adaption

In this study, there were three parts in the instrument which were used to measure the variables. The first part described the objective and purpose of the research along with a request to the respondent for showing their willingness to participate in the survey. The second section was about the demographic information of the respondents like gender, experience, and education. The third part consisted of the questions regarding the variables and the scale used for all the items was five-point Likert scale. To measure the environmental performance, 7 items were included in the questionnaire which was adapted from (Latan et al., 2018) and they adopted these items from (Lisi, 2015) and (Spencer et al., 2013). One sample item from those questions is “Firm is preparing annual environmental performance report” consisting of strongly disagree to strongly agree on a scale. To measure EMA, the scale of 13 items was used which was adopted from (Latan et al., 2018) and they used the scale of Burritt et al. (2010). One sample question from those items is “Creating & use of environment-related costs account” and the scale which was used consisted of never, seldom, sometimes, usually and always. To measure TMC, 9 items scale was utilized and one of them is “Top management try to improve the company's environmental management system” and this was also adapted from

Roetzel, Stehle, Pedell, and Hummel (2018) study and also used by Spencer et al. (2013). About this variable, the managers were asked to give feedback about their commitment towards the environment and it was assumed that the views shared by the top management would not be the same but are matching the vision of the firm. Furthermore, to measure EMCS the scale of Pondeville et al. (2013) was used which consisted of 4 items and one sample item is "Organization provides a detailed description of environmental functions". The score of reliability through Cronbach's alpha for all these variables reported greater than .70 in prior studies.

4. Empirical Analysis

The particular study has gathered data and presented analysis because it is quantitative data. For this purpose, SPSS, as well as AMOS, has been utilized by the researcher of the study. The data screening process is completed through the SPSSv20 software by confirming the normality, outliers, and missing data tests. Furthermore, sophisticated analysis is run via AMOSv21 for confirming correlation, regression as well as the mediation of the data. Nevertheless, sophisticated analyses such as path and SEM are performed through the utilization of AMOS. (Hair, Black, Babin, Anderson, & Tatham, 2006; Tabachnick & Fidell, 2007). In addition to that, SEM is a multivariate function model for regression analysis as well as factor analysis is also the part of it. It also helps to determine the significant relationship and association amongst the variables and constructs as well as theoretical backgrounds. It is a system whereby all the hypotheses are tested, and their relationships are significantly confirmed amongst all the variables such as, exogenous, endogenous as well as mediating variables and constructs.

4.1 Outcomes of Research

The initial test of the current study has manifested that both males and females were the participants in the survey with the numbers of 162 and 142 respectively. Most of the participants were from the range of 31-40 years. Then ranges from 20-30, 41-50, as well as above 50 years, were also the part of the responding members during the survey. Further, most of the participatory members were graduates with a figure of 134. Then the respondents

were ranging from masters, undergraduate as well as miscellaneous educational departments

4.2 Descriptive and Normality Test

The measure that helps in determining the normal distribution of the data, as well as the positive or negative sides of the distribution of data, is enumerated as Skewness. Moreover, there can be no skewness as well and cut-off values range from +1 to -1. If the data is positively skewed than it is considered on the left hand of the distribution, similarly, when data is negatively skewed then it is deemed as the data is on the right hand of the distribution. All the initial descriptive values are mentioned in Table 2 such as mean values, SD, Minimum, Maximum as well as Skewness values etc.

Table 2
Descriptive Statistics and Normality

	Min	Max	Mean	SD	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	SD
FEP	1.00	5.00	3.3012	1.15940	-.345	140
EMC	1.00	5.00	3.3709	1.31646	-.416	140
TMC	1.00	5.00	3.4200	1.28402	-.483	140
EMA	1.00	5.00	3.2556	1.22705	-.398	140

Note: *"FEP=Firms' Environmental Performance, EMC= Environmental Management Control System, TMC= Top Management commitment, EMA= Environmental Management Accounting".*

Results of Table 1 have indicated that minimum value for each construct is 1 and maximum is 5 which shows that there is no outlier in the data, while skewness is also under the threshold range from -1 to +1; therefore, overall data is normal.

4.3 Reliability and Validity

All the variables along with their items and constructs must be reliable for further analysis so, their reliability ensures the internal consistency for the data. It also describes the fact that tests are reliable or not. It also assesses the concept that multitudes of constructing items are varied along with their variables. Cronbach's Alpha is the test used for testing the reliability and its values range from 0 to 1. The more the reliability the more the consistency is available internally. The cut-off standard for the reliability revolves

around the value of 0.7. Furthermore, the values nearer to 0.80 and 0.90 show a higher level of reliability for ensuring higher internal consistency. After assessing the reliability, validity is measured such as convergent and discriminant validity. Convergent validity recounts the fact that all the characters are greatly measured through their factors (Kim & Kim, 2010).

Table 3
Reliability and Convergent Validity

Constructs	No of Items	Cronbach Alpha	CR	AVE	MSV
FEP	07	0.966	0.976	0.851	0.187
EMA	13	0.909	0.918	0.861	0.230
TMC	09	0.889	0.897	0.826	0.234
EMC	04	0.941	0.945	0.908	0.234

Note: *"FEP=Firms' Environmental Performance, EMC= Environmental Management Control System, TMC= Top Management commitment, EMA= Environmental Management Accounting. CR= Composite Reliability, AVE= Average Variance Extracted, MSV=Maximum Shared Variance".*

Table 3 has fundamentally depicted the findings of Cronbach's Alpha reliability analysis and proven that all the values are exceeding the value of 0.70. Moreover, these figures are closer to the value of 0.90. Thus, there has been revealed an internal consistency amongst the variables as well as data. In addition to the reliability, Convergent validity is also tested by confirming the data through the values of CR (Composite reliability) as well as AVE (Average Variance Extracted). As it is evident from the table, CR values are ranging above the 0.7 as well as MSV is lower than the AVE. Nonetheless, convergent validity is significantly manifested.

4.4 Discriminant Validity

The validity that ensures that all the variables have strong relationships within own more than any other variables and are different as well as distinct variables. Further, it probes the relational difference among the variables (Kim & Kim, 2010). All the measures are cross-loaded and help in analysis. These factors which have been cross-loaded in bolded forms should be higher to determine the discriminant validity of all the measures. According

to the researchers, the benchmark value should be greater than 0.70 for the discriminant measure (Kim & Kim, 2010).

Table 4
Discriminant Validity

Constructs	FEP	EMA	TMC	EMC
FEP	**0.922**			
EMA	0.411	**0.928**		
TMC	0.433	0.366	**0.916**	
EMC	0.363	0.480	0.484	**0.953**

Note: *"FEP=Firms' Environmental Performance, EMC= Environmental Management Control System, TMC= Top Management commitment, EMA= Environmental Management Accounting".*

Hence, table 4 has shown that there is a prevailing "Discriminant validity" in the analysis. Moreover, all the constructing factors are distinct from each other about their data as well as association. All the values are lower than the highlighted values as per the data shown in table 4. FEP which is 0.922 is evident from itself; EMA which is 0.411, TMC which is 0.433 as well as EMC which is 0.363, etc are self-evident from each other and hence ensure the discriminant validity in their relational aspects. This measurement indicates that all the constructs are not correlated with other constructs. In the sum and substance, it is concluded that all the latent constructs are distinct and diverse from one another because they all share their variance levels.

4.5 Confirmatory Factor Analysis

CFA is a test used to determine the fitness of the model and recognize the fact that either the model is a good fit or a bad fit. The test of confirmatory factor analysis is used to identify either model of this study is a good fit or not. CFA is "a multivariate arithmetic process which is utilized to examine how good the studied constructs signify the figure of variables. In confirmatory factor analysis (CFA), the researcher can identify the figure of aspects needed in the data and which studied construct is linked to which latent construct". Table 5 has depicted the resulting values along with the cut-off values as suggested by the previous researchers such as threshold and finally observed figure.

Table 5
Confirmatory Factor Analysis

Indicators	CMIN/DF	GFI	IFI	CFI	RMSEA
Threshold range	Less than 3	≤ .80	≤ .90	≤ .90	Less than .08
Observed Value	3.185	.741	.812	.812	.085
After Modification	2.545	.812	.960	.960	.071

Notes: *"CMIN= (χ^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".*

Whenever there occurs a problem in the observed values as demonstrated from Table 5, the solution in the form of modification is also there. Results have shown that all the values of observed constructs are differing from the standardized values. Therefore, these values of observed variables are co-variations using their error terms Harrington (2009). Hence, after the covariation, all the values are meeting the given ranges such as CMIN/DF is around 2.545, GFI 0.812, IFI, as well as CFI 0.960 and RMSEA, is around 0.071. All of these are meeting the set criteria and hence, the model is a proven good fit for the next analysis. The diagram of CFA along with its co-variation is presented below as well as it shows factor loading accordingly (Brown, 2015).

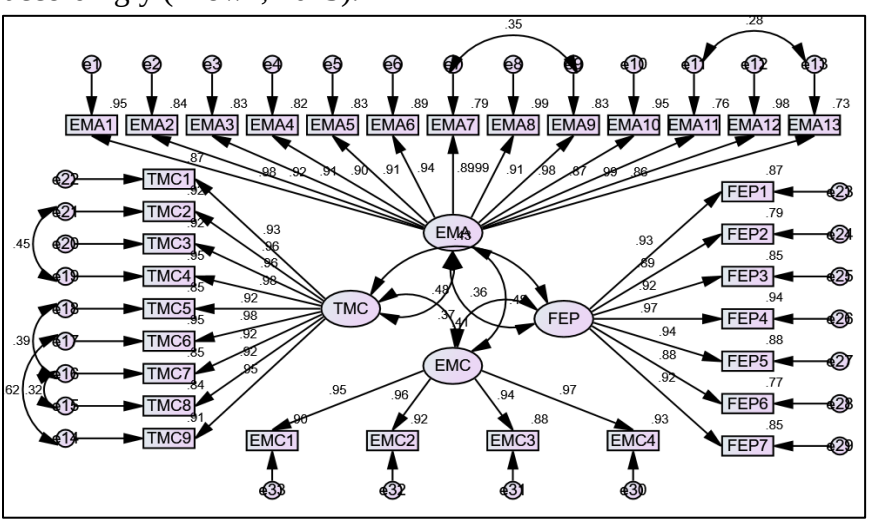

Figure 2. CFA Measurement Model

4.6 Structural Equation Modelling

It is a sophisticated analysis tool for the multivariate form of regression tests to assess the association amongst all the variables (Blunch, 2012). It is the combination of various analyses such as CFA and regressions tests for the agenda of testing the relationships among observed and latent indicators of variables. SEM is functioned for testing and determining the association amongst the entire variable. Hence, all the regression weights amongst the observed and latent constructs are mentioned in tabular form, as shown in table 6. Further, they indicate the final findings of the regression analysis in that table. According to the estimates of the analysis, variables such as, TMC, EMA, and EMC have P-values lower than 0.05 which show the significant associations amongst the independent and dependent variables. Hence all of the hypotheses are accepted.

Structural equation modeling was applied to test the hypotheses of this study. Findings have demonstrated that the direct effect of top management commitment on environmental performance is 30.3% which means the increment of one unit in Top management commitment leads 33.3% positive influence on environmental performance. This result supports the hypothesis of the study because this relationship is significant at the point 0.001 significance level. Moreover, the direct effect of TMC on EMCS is 47.1% and on EMA is 33.1% hence; H4 and H2 are also accepted. Moreover, the outcome has indicated that the EMCS has 11.9% positive and direct impact on EP. Whereas, EMA has a positive and significant impact on EP. Here, H5 and H3 are accepted. Moreover, mediation variables such as, EMA and MCS have also shown significant relation with the Firm's environmental performance by having an alpha value lower than 0.05. The indirect effect of TMC on EP through EMA and EMCS is 13.3%. Findings show that EMA and EMCS significantly and positively mediate between TMC and EP as AMOS has provided the Indirect results of the mediators, therefore, path A and Path B are multiplied to get the result of a single mediator (Thien, 2019).

Table 6
Structural Model Results

Path Direction	**Coefficient estimation**		**SE**	**P-value**	**Hypothesis**	**Conclusion**
Direct Effect						
TMC→FEP	.303		.053	***	H1	Accepted
TMC→EMA	.331		.052	***	H2	Accepted
EMA→FEP	.233		.049	***	H3	Accepted
TMC→EMC	.471		.052	***	H4	Accepted
EMC→FEP	.119		.049	.034	H5	Accepted
Mediation Effect	**Path a**	**Path b**	**a X b**	**SE**	**p-value**	**Hypothesis**	**Conclusion**
TMC→EMA→FEP	.331	.233	.075	.028	.010	H6	Accepted
TMC→EMC→FEP	.471	.119	.056	.024	.010	H7	Accepted
Total Indirect Effect	-	.133	-	.032	.010	-	-

Note: *"FEP=Firms' Environmental Performance, EMC=Environmental Management Control System, TMC=Top Management commitment, EMA=Environmental Management Accounting.*
** $p < 0.01$, ** $p < 0.05$, *** $p < .001$".*

According to the study of Thien (2019) EMA significantly mediates between the TMC and FEP with the combined path value of 0.75 and shows that with the 1% increase in the independent variable TMC would impact FEP indirectly through 75% mediation level of EMA. Similarly, EMCS also mediates between the TMC and FEP with the combined path value of 0.56 which indicates that 1% increase in the independent variable TMC would indirectly impact the FEP with a 56% mediation level of MCS. Hence, mediation hypotheses are accepted. Below provided figure 3 presents the path analysis of the research model and shows the standardized coefficients.

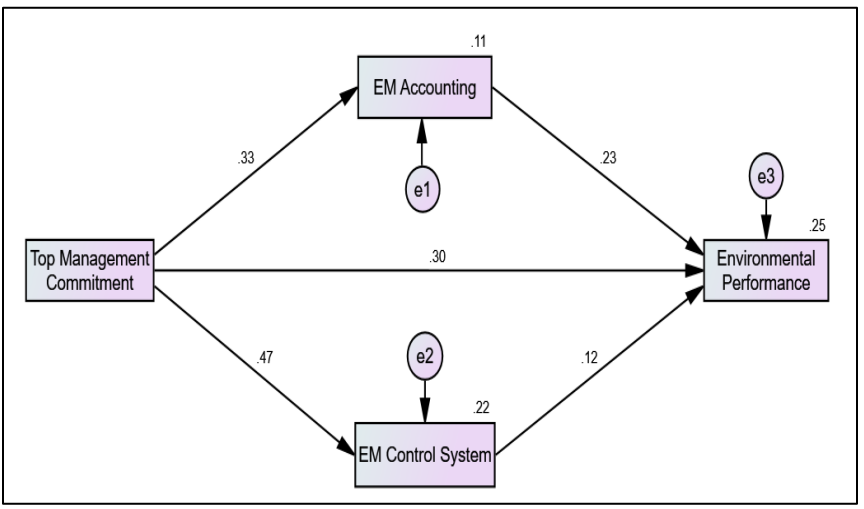

Figure 3. SEM (Path Analysis)

5. Discussion and Conclusion

5.1 Discussion

The first hypothesis has been accepted through analysis and results have been inferred in a way that has proven the correlation between the variable such as, TMC significantly influences the EP of the organizations in an upward slope. This hypothesis and its outcomes have been consistent with the previous studies and their findings (Colwell & Joshi, 2013; Daily & Huang, 2001; De Brentani & Kleinschmidt, 2004; Latan et al., 2018). It is also implied that higher managerial dedication leads to higher performance in the organization. According to a study which has been carried out in Australia shows that the managerial commitment in the business

concerns elevates the performance in the firms as well as exert significant shades on the EMA. This study has taken 304 responses on board during the survey procedure. Moreover, the significant effect on EMCS has been proven by the upper managerial commitment. Hypothesis four has also been supported by the resultant findings. As well as the relation between managerial commitment, environment as well as EMCS has also been verified by the findings of the current study. Further, these findings are supported by past researches as well (Bouten, 2015; Henri & Journeault, 2010; Pondeville et al., 2013). Next hypothesis five has also been verified through the findings of the results. As the association between the variables has been proven such as EMCS as well as EP of the organizations. This relational verification impliedly narrates that when the managerial control is strong without any biasness in the organizational corridors then the performance of the organization escalates in terms of the environment. This particular revelation of the study is in coherence with the studies of past researchers (Arjaliès & Mundy, 2013; Pondeville et al., 2013). Hypothesis 6 is accepted as there is found an indirect effect of the TMC on the firm's EP and EMA has significantly mediated between the variables of TMC and firm's EP. This finding is consistent with the study of previous researchers (Saeidi & Othman, 2017). Hypothesis 7 is also accepted as EMCS has proven its mediation between the TMC and FEP because the EMCS significantly mediates between TMC and FEP. This finding is in coherence with the study of the past authors (Henri & Journeault, 2010).

5.2 Research Implications

This is the first study that has investigated the mediation role of EMA and EMCS. Therefore, it has opened new horizons of research and has contributed a holistic piece of literature. On the practical grounds, this study would be advantageous for the managers while making decisions. Moreover, policymakers of countries would be able to consider the importance of EMA and control system, especially in Pakistan. The rapid threat to the environment would be catered in light of this phenomenal research. Furthermore, the decision-makers would formulate such strategies that are environment-friendly that would help firms' for their sustainable

growth. As theoretical implications, this research tested the concept of organizational resources like top management commitment as the stimulators of a firm's performance in a new context of the manufacturing sector of Pakistan and it is proved to be effective. Applying environmental accounting and environmental management control system will lead to a higher performance of the organization. Moreover, the role of EMA and EMCS was shown to have a positive and significant effect on the performance of manufacturing firms. This depicts that by applying EMA and EMCS in the organization; it can improve firm performance by taking the competitive advantage over competitors and bring increment in organizational performance. Practically, the findings of this research give a deep insight and understanding of how the companies which are certified by ISO 14001 in Pakistan can improve the environmental performance by developing the commitment of top management for the environment by using EMA and EMCS tools. The results of this research can be helpful for the decision-makers of the organization to improve EP.

5.3 Conclusion

In the sums and substances, it can be said that this particular study has evidently shaded the blank space which has been prevalent in the literature previously as indicated by past authors (Latan et al. (2018). The researcher also has followed up the gap of using EMCS as a mediator variable along with EMA for the study purposes. The current study has aimed to find the impact of the organizational assets which are not tangible on the performance of the organization in terms of the environment. It has aimed to find out the long term benefits for the firms in terms of achieving the unstoppable growth of the organizations. The claim of the current paper is the attainment of the best environmental performance in the organizations and business concerns is associated with some of the indicators such as higher managerial dedication, best adoption of EMA strategies as well as EMCS in the organizations. This study renders distinct revelations by supporting all the propositions as well as arguments. The suppositions have been comprised of the variables and ensure that a well-defined combination of resources, strategies, and commitments on the behalf of upper managerial body lead towards the tremendous performance of the organizations and business

enterprises and organizations grow by leaps and bounds. Furthermore, the findings have been concluded on a note that EMA, as well as EMCS, are the fundamental mediating variables that are pivotal for the betterment of the organizational performance with regards to the environment significantly.

5.4 Limitations and Future Recommendations

As every research has to encounter certain confinements and limitations so, this study has to encounter obstacles as well. Firstly, Pakistani manufacturing concerns are the unit of analysis so; the short sample size has been selected owing to the confined time period for the study. Secondly, as the manufacturing concern has been targeted therefore, various other sectors could not be made the part of the research due to cost issues. Thirdly, the methodological issue occurs as a limitation such as it is a one-shot study in pursuant of cross-sectional procedures for methodological purposes. Fourthly, the deep aspects of the research could not be addressed. Moreover, lastly, the performance of the firms has been explored in terms of environment mainly and economic aspects have remained unearthed in the current paper (Journeault, 2016; Saeidi & Othman, 2017; Wang, Li, & Zhao, 2018).

So far, the mediating role of EMA, as well as EMCS, has emerged as a new wonder in this particular ground of research by depicting their impact on the ultimate EP of the organizational concerns. Therefore, the author has endorsed some of the recommendations for conducting the next researches in this area and coming up with new outcomes to cover the gaps that have remained unfulfilled by the current study. Over and above, more than one endogenous variable can be utilized by future researchers such as; financial performance might be adopted as another dependent variable to be able to find a more comprehensive analysis. Further, this variable can be explored through a variant of aspects and a coast-to-coast study can be conducted by the future investigators as well as academics.

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