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The Interplay of Coercive Institutional Pressures, Environmental Attitudes and Perceived Behavioural Control in Adoption of Environmental Management Accounting Among Tanzania's Manufacturing Firms

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Abstract

Environmental Management Accounting (EMA) facilitates firms' ability to identify, collect, record and evaluate environmental information critical for informed decision-making. EMA adoption is vital in controlling environmental costs, fostering innovation in eco-friendly technologies/products, and improving overall environmental performance. This study examined the drivers of EMA adoption, focusing on the influence of Coercive Institutional Pressure (CP), the mediating role of environmental attitudes and the moderating role of Perceived Behavioural Control (PBC). Data were collected from 146 manufacturing firms in Tanzania and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS v.4.0.9.5. Findings indicates that CP significantly and positively influences EMA adoption while environmental attitudes partially mediate this relationship. PBC positively moderates this relationship. For practitioners and policy makers study provides relevant recommendations on how to harness CP, foster positive environmental attitudes and enhance PBC, supporting EMA adoption in developing countries like Tanzania. Directions for future research are also discussed.

Keywords: Environmental Management Accounting, Perceived Behavioural Control, Coercive Pressure, Environmental Attitude.

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Introduction

Owing to the global increase in environment degradation, environmental management has become one of the most highly discussed topics among business communities, environmental activists, politicians, researchers and the public at large (Suluo & Christopher, 2024; Chen et al., 2020; Herzig & Schaltegger, 2006; KPMG, 2020). Manufacturing activities, due to their significant resource consumption and waste production, have been identified as among the major contributors to environmental pollution (Wansi, 2022; IPCC, 2018; WB, 2019). Thus, mounting pressure from various stakeholders (community, customers, regulators etc.) calls for dedicated efforts to manage their environmental footprints and protect the environment, hence contributing positively towards sustainable development. Manufacturing firms have devised different plans that lessen their negative impacts on the environment while remaining competitive. One such strategy is Environmental Management Accounting (EMA), a critical tool for fostering sustainability and enhancing firms' environmental performance (Chen et al., 2020; Latif et al., 2020).

EMA is a specialized branch of accounting that integrates environmental factors and costs into business planning process aimed at generating revenues and profits (Herzig & Schaltegger, 2006; Baba, 2012). It enables detailed analysis of costs associated with resource usage, such as materials, water, energy and other environmental expenses, utilizing both physical and monetary measures to enhance management reporting. By adopting EMA, firms

can take a systematic approach to decision making that incorporates environmental consideration into their operations (Herzig & Schaltegger, 2006). Effective implementation of EMA can improve firms' ability to monitor environmental costs, drive innovation in greener technologies and products, and enhance overall environmental performance (Hajian & Kashani, 2021). However, there is limited adoption of EMA practices, particularly in developing countries, despite its benefits (Jalaludin et al., 2011; Zandi, 2019).

Studies have examined the different factors driving the adoption of various environmental management practices such as EMA, using different theories e.g., Institutional Theory (Amoako et al., 2021; Iredele et al., 2020), contingency theory (Mady et al., 2022) and stakeholder theory (Latip et al., 2022; Christopher & Chalu, 2019). This study primarily draws from institutional theory and the Theory of Planned Behaviour (TPB) due to their compatibility and ability to provide valuable insights to the key issues of interest.

Institutional theory emphasizes the importance of external factors, such as coercive pressures from regulatory authorities, which compel firms to implement specific practices to survive and gain legitimacy (DiMaggio & Powell, 1983; Scott, 2008). In contrast, TPB focuses on internal drivers, particularly key actors' capacity, as reflected in factors such as attitudes and perceptions of their ability to implement such practices (Ajzen, 1991, 1985).

The use of institutional theory also considers manufacturing industries as entities facing strict environmental regulations with potential legal consequences such as fines and penalties (Chen et al., 2018; URT, 2004; Lugwisha et al., 2017). These coercive pressures have been identified as significant drivers, which does not only impact external aspects of organizational behaviours and practices but also internal organizational behaviours and practices such as adoption of EMA (Latif et al., 2020; Jain et al., 2020; Asiri et al., 2020; Che Ku Kassim et al., 2022). However, contradictory results suggest that this theory by itself might not explain fully adoption of environmental management practices such as EMA. This indicates the needs to integrates internal factors such as the psychological attributes of organizational actors, articulated in TPB.

TPB underscore the critical role of individuals in interpreting institutional demands, and translating them into actions, thereby achieving desired outcomes (Chen et al., 2020). For example, positive environmental attitude coupled with Perceived Behavioural Control (PBC) reflected in one's confidence in their skills and knowledge, is likely to influence significantly the adoption of environmental management practices such as EMA (Chen et al., 2020; Raab et al., 2018; Thoradeniya et al., 2015). However, empirical studies have produced mixed results – some indicating strong positive effects while others, reporting moderate or even no effects (Kwakye et al., 2018). This indicates the need for further research, particularly in under-researched contexts such as Tanzania.

Observed discrepancies may have been emanated from studying these variables (i.e. external and internal factors) in their isolation (Che Ku Kassim et al., 2020; Latif et al., 2020; Chen et al., 2020). Studies that have examined EMA adoption by considering the influence of both institutional pressures and internal factors, especially the psychological factors draw their evidence from developed economies such as USA (Raab et al., 2018), and other nations that have made significant strides in economic and technological development, such as China and the Philippines (e.g., Zhang et al., 2015; Roxas & Coetzer, 2012). The skewedness of produced knowledge has motivated other scholars (e.g., Latip et al., 2022; Chen et al., 2018) to argue for more contextualized research, taking into account country-specific regulations and enforcement mechanisms. For example, Iredele et al. (2020), highlight differing drivers of EMA adoption in South Africa and Nigeria. Moreover, extant literature has not examined how coercive pressure and behavioural factors interact in influencing EMA adoption in contexts like Tanzania, marked by regulatory challenges and resource constraints, where institutional enforcement and organizational capacities differ markedly from those in developed economies.

This study was designed to fill this gap by integrating institutional theory and TPB, examining the interplay between external drivers, such as coercive institutional pressures (CP), and internal psychological factors in driving EMA adoption in Tanzania's manufacturing

industries. Specifically, this study examined the direct effect of CP on EMA adoption, as well as its indirect effect via environmental attitudes and the moderating role of PBC. Tanzania's efforts to compel companies such as manufacturing firms, to engage in responsible environmental management practices are evident. The country enacted its Environmental Management Act in 2004 whose implementation and compliance are overseen by the National Environmental Management Council (NEMC) (URT, 2004; Baya & Mena, 2017). Despite these efforts, non-compliance by some business entities including, manufacturing industries, have been documented (Lugwisha et al., 2017). Furthermore, until the time in which this study was being conducted (May – September, 2024), the International Sustainability Standards issued by the International Sustainability Standard Board (ISSB) had not yet been adopted (NBAA, 2024).

The above country context provided a unique opportunity to explore the key drivers of EMA adoption, an important tool for facilitating responsible environmental management practices. Therefore, study findings provide a basis for advancing tools like EMA to promote best practices for both practitioners and policymakers such as incentive and training programs. Moreover, the study offers directions for future research considering evolving dynamics of EMA practices and their key drivers.

The rest of the paper is structured as follows: The following section examines the theoretical and empirical literature relevant for formulating research hypotheses. Thereafter, the methodology of the study is discussed, followed by detailed analysis and presentation of study results. The paper ends with a discussion, conclusions and recommendations.

Literature Review

Institutional Theory

Institutional theory, a branch of organizational theory, is useful for examining how institutions influence the behaviour and actions of organizations and their affiliated key actors (DiMaggio & Powell, 1983; Scott, 2013; Zucker, 1987). The theory considers the networks of social, political and economic entities and their interactions in influencing organizational practices. Three pillars have been identified as important to bring about order, stability and meaning to social life, which include regulatory, normative and cognitive elements (Palthe, 2014; Järvenpää, 2009). Regulatory elements encompass formal rules, laws and regulations that individuals and organizations must comply while normative elements define the norms, values and expectations, which guide what to be considered as appropriate behaviour. Normative elements are characterised by sense of professionalism such as standards, ethical codes of conducts for particular practice. Cognitive elements, reflect the presence of shared beliefs and cultural understanding of how things should be done by group of individuals or business entities (Osinubi, 2020; Scott, 2008).

Moreover, DiMaggio and Powell (1983) introduced three mechanisms through which the institutional pillars operate namely coercive, mimetic and normative pressures. Coercive pressures involve the enforcement of rules and regulations, compelling organizations to comply in order to avoid sanctions and penalties for non-compliance. Normative pressure arises from well-established professionalization (associations and boards enforcing adherence to industry norms and practices), while mimetic pressures ensue in uncertain environments where firms imitate successful competitors in order to gain legitimacy and competitive edge (Tjilen et al., 2021; Asiri et al., 2020; Herold, 2018).

In Malaysia and Pakistan, Che Ku Kassim et al. (2022) and Latif et al. (2020) found coercive pressures to be the strongest predictor of EMA adoption. However, organizations and individuals are not simply passive recipient to such pressures – they can respond differently either passive, reactive or in proactive manner (Moser et al., 2020). In Tanzania, non – compliance with environmental regulations has been noted (Lugwisha et al., 2017), suggesting that external pressure alone may not adequately explain EMA adoption. This underscores the relevance of internal factors like managerial attitudes and Perceived Behavioural Control (PBC), as framed by Theory of Planned Behaviour (TPB). Integrating TPB with institutional theory thus offers a useful lens that connect macro-level pressures and micro-level agency.

Theory of Planned Behaviour (TPB)

Ajzen (1991, 1985) is credited with the development of Theory of Planned Behaviour (TPB). This theory focuses on beliefs and attitudes of individuals within a society or organization, and how these influence their intentions, and their actual actions. TPB specifies three key variables capable of influencing individual intentions and behaviour namely attitudes, subjective norms, and Perceived Behavioural Control (PBC). Attitudes involve people's evaluation of a behaviour, considering both positive and negative aspects of performing such behaviour. Conversely, subjective norms focus on perceived social pressure from one or more individuals or groups such as peers and significant others, capable of influencing one's intentions and behaviour. As for PBC, it reflects the self-efficacy or deep-seated belief in one's ability and commitment to perform a specific behaviour, considering the availability of the resources, skills, support and availability of opportunities. Positive or strong perceptions of these constructs increases the likelihood of one's intentions and performance of behaviour (Ajzen, 1985; 1991; Chen et al., 2020). This theory has been applied in different fields including, tax compliance (Mkenda et al., 2023; Khalfan et al., 2020), marketing practices (Alavion et al., 2017; Ferdous, 2010), as well as EMA adoption/practices (Chen et al., 2020; Tashakor et al., 2019; Raab et al., 2018; Thoradeniya et al., 2015).

In this study, two constructs – environmental attitudes and PBC were adopted as key psychological factors influencing EMA adoption, complementing CP as external drivers (Raab et al., 2018; Roxas & Coetzer, 2012). Subjective norms were excluded to avoid conceptual overlap with normative pressure – a similar construct within institutional theory – this helped in maintaining theoretical focus and clarity without compromising theoretical rigour.

Empirical Insights and Hypotheses Development

Coercive Institutional Pressure and EMA Adoption

Various studies have investigated coercive pressures as drivers of environmental management practices (Che Ku Kassim et al., 2022; Jain et al., 2020; Raab et al., 2018; Chen et al, 2018; Zandi, 2019; Wang et al., 2019). For instance, Chen et al. (2018) aimed at addressing question; does institutional pressure really foster corporate greener innovation in China? By using secondary data from 2008 to 2014 of top 100 listed companies, they indicate that coercive pressure positively and significantly influences the adoption of greener innovations (i.e., development products, processes or services that minimize environmental impact while efficiently utilizing natural resources).

Similarly, Che Ku Kassim et al. (2022) focused on EMA adoption in Malaysian LGAs, suggests that coercive isomorphisms were among the most influential factors on adoption of EMA. Jain et al. (2020) and Christopher and Chalu (2019) provide similar results in the Indian' construction industry and in Tanzania`s oil and gas sector. Regulatory forces acted as key drivers for waste recycling practices. Conversely, Raab et al. (2018) indicate in the USA's hospitality industry that coercive pressure played no significant role in driving sustainability practices compared to suppliers and their customers. Zandi (2019), focusing on the adoption of Environmental Management Systems (EMS) in Indonesian SMEs indicated that while friendly ecological practices may be encouraged by coercive institutional pressures, the effects may not be uniform across all industries and circumstances. Based on the substantial evidence discussed so far, the following hypothesis was formulated;

H1: Coercive pressures positively influence EMA adoption in manufacturing firms.

Environmental Attitudes and EMA Adoption

Numerous studies have examined the linkage between organizational actors' attitudes towards the environment and responsibility towards environmental management (Thoradeniya et al., 2015; Herath, 2010). Guided by TPB, studies indicate that positive attitudes towards environmental protection are more likely to influence actors' decisions to adopt and implement environmental management practices and their supporting tools such as EMA (Chen et al, 2020; Tashakor et al., 2019). For example, Chen et al. (2020) found that managers in Sri Lankan corporations with positive attitudes toward the environment, and who avoided irresponsible practices such water pollution, excessive energy consumption, and resource

wastage, were more willing to adopt environmental accounting and sustainability reporting. Similar findings were reported earlier in the same context by Thoradeniya et al., (2015).

Likewise, Tashakor et al. (2019) by focusing on EMA, indicate that positive environmental attitude strongly influenced EMA adoption in Australian large cotton farming. However, contradictory results are presented by Kwakye et al., (2018), drawing from Ghana, they indicate that attitudes towards Sustainability Accounting and Reporting (SAR) did not affect the intention to engage in the identified practices compared to resource availability. Based on the substantial body of literature, the following hypothesis was developed:

H2: Positive attitudes towards environmental management positively influence the adoption of EMA practices in manufacturing firms.

Mediating Effect of Environmental Attitude

As a mediator, environmental attitudes can also be treated as a conduit to explain the process through which an explanatory variable influences an outcome variable (Zhang et al., 2015). According to upper echelon theories, organizational actors' beliefs and attitudes can affect significantly different types of corporate practices (Hambrick & Mason, 1984; Shahab et al., 2020; Haule, 2024). Moreover, fear of penalties and legitimacy reasons could act like salient beliefs in explaining environmental attitude of managers (Ajzen, 1985, 1991). As such, studying the intertwined of these variables in explaining adoption of EMA practices, is off importance as suggested by Latip et al. (2022).

Nevertheless, empirical findings on the mediation link have yielded mixed results. According to Roxas and Coetzer (2012) regulatory pressure significantly shaped the environmental attitudes of the owner-managers within SMEs in the Philippines while Zhang et al. (2015) found insignificant effect of CP on managers' concerns for energy conservations among Chinese industries. This suggests that the influence of CP on environmental attitudes may be context specific.

In contrast, environmental attitude has been identified as an attitudinal factor with a significant positive effect on environmental accounting, sustainability practices and EMA in different contexts (e.g., Chen et al., 2020; Thoradeniya et al., 2015; Tashakor et al., 2019).

Based on the theoretical and substantial body of evidence, the following hypotheses were formulated:

H3a: Coercive institutional pressures positively influence managers' environmental attitudes in manufacturing firms.

H3b: Environmental attitudes mediate the relationship between coercive pressure and EMA adoption in positive manner.

Moderating Effect of Perceived Behavioural Control (PBC)

PBC can be considered as a moderating variable, potentially affecting the strength and direction of the relationships between exogenous and endogenous variables (Yzer, 2007; Baron & Kenny, 1986). While coercive pressures may serve as external incentives for EMA adoption (Che Ku Kassim et al., 2022; Jain et al., 2020), their effectiveness is seen as contingent upon managers' confidence and strong perceptions regarding their ability to respond well to such pressures (Liu et al., 2021; Roxas & Coetzer, 2012).

Moderating role of PBC can be better understood by examining its salient features, such as self-efficacy, reflected in the confidence and the ability to perform organizational practices, as well as controllability of actions (Ajzen, 1985, 1991). Higher PBC has been linked to greater capacity, resource access and responsiveness to external pressures for adopting environmental management practices whereas low perceptions of these factors are closely associated with low confidence or constrained resources, hindering the ability to translate coercive pressures into desired outcomes (Liu et al., 2021; Roxas & Coetzer, 2012).

Ho et al. (2022) investigated scientists' willingness to engage with the public and found that PBC significantly moderated external drivers, such as societal norms and media views influences on these scientists to effectively engage with the public in Singapore. On the other

hand, Liu et al. (2021) focused on the effectiveness of public service announcements in motivating people to engage in paper recycling in the USA. Their findings indicate a positive and significant moderating impact of PBC.

These and other insights gained so far motivated the development of the following hypothesis:

H4: Perceived Behavioural Control moderates positively the relationship between coercive institutional pressure and EMA adoption in manufacturing firms.

Moreover, key ideas from this and other literature review were further synthesized to highlight the key constructs and hypothesized relationships, as captured in Figure 1.

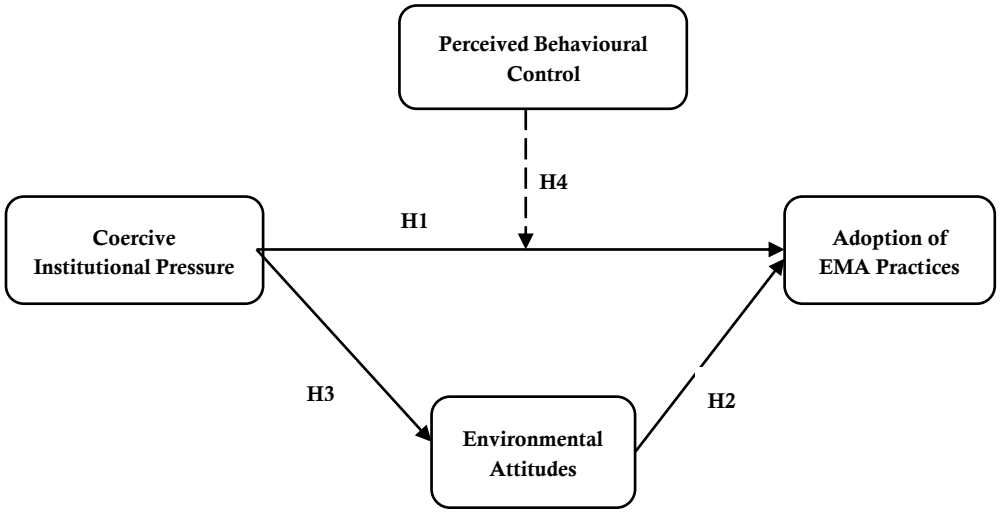


Figure 1: Study's Conceptual Framework

Figure 1 reflects the nature of the study and hypothesized relationships using different types of arrows and visual representation of study constructs. The use of solid arrows captures the direct relationships: Influence of coercive pressure on EMA adoption (H1), influence of environmental attitudes on EMA adoption (H2), and the influence of coercive pressure on environmental attitude (H3). Conversely, dashed arrow signals a moderating variable – a conditional relationship in which PBC modifies the strength and direction of relationship between coercive pressure and EMA adoption. As for the mediating role, depicted in the placement of environmental attitude between coercive pressures and adoption of EMA. This underscores the basic idea that coercive pressures first influence environmental attitudes, which in turn affect EMA adoption.

Research Methodology

Sample Selection and Data Collection

Data for this study was collected over a period of five months from May to September, 2024 from Tanzania's manufacturing firms. According to the National Bureau of Statistics (NBS, 2018), there are about 1,931 manufacturing firms in Tanzania. The focus was on firms with their headquarters or operations in three highly concentrated industrialized regions including Dar es Salaam, Pwani and Morogoro, resulting in a sampling frame of 836 firms. Based on Yamane's (1967) formula, the sample size was determined to be 270 firms.

The unit of analysis was the manufacturing firms while unit of enquiry included organizational actors, such as accountants, finance managers, and other personnel who actively are involved in environmental management in their respective firms. Each firm was represented by one respondent. A questionnaire was employed to collect data using parallel means, the electronic media (google forms sent through WhatsApp), and direct physical visits to manufacturing firms to maximize response rate. Before its use, this research instrument was subjected to different procedures to ensure its validity and reliability.

For example, lecturers and practitioners from manufacturing firms reviewed the tool, and their feedback on the adequacy, relevance and clarity of the questions were incorporated. A pilot study with 31 participants was also conducted, yielding satisfactory results, with Cronbach's alpha (α) for all constructs exceeding the threshold value of 0.7 (Cronbach, 1951; Hair et al., 2019). Additionally, some constructs were rephrased to enhance clarity of key issues under investigation.

Complying with ethical consideration, research permits were secured from the University top management. This facilitated access to the government regional administrative officials, and from Confederation of Tanzania Industries (CTI), which in turn, facilitated further access to various manufacturing firms. Moreover, informed consents were obtained from study participants – they were also assured of their confidentiality and proper use of collected data. In total, 270 questionnaires were distributed – out of these, 146 questionnaires were returned and usable – providing response rate of 54.1%, which is consistent to other studies (e.g., Jain et al., 2020; Tashakor et al., 2019). Moreover, 146 responses are justified based on minimum sample in PLS –SEM as computed by using G-power software (Hair et al., 2021).

Variable Measurements

This study focused on four latent variables, each captured using multi–construct indicators to adequately capture their meanings. Coercive pressure was measured using nine construct indicators, which were adapted from previous studies (Jalaludin et al., 2011; Latif et al., 2020; Raab et al., 2018). These indicators captured the influence of customer, regulatory and public organizations. For environmental attitudes, seven items were also adapted from previous studies (Chen et al., 2020; Kwakye et al, 2018; Thoradeniya et al, 2015). Similarly, PBC was captured using five indicators, adapted from Cordano and Frieze (2000), Tashakor et al. (2019) and Zhang et al. (2013). For EMA Adoption, eight items were adapted from Jalaludin et al. (2011) and Latif et al. (2020). All variables other than the adoption of EMA were measured using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Example of statements used includes; EMA 3 statement reading as "measuring amount of water usage" and EMA 6 being "measuring cost of preventing environmental pollution".

Data Analysis

Both descriptive and inferential statistics were used to analyse data. Descriptive statistics were carried out using SPSS (v. 27), while inferential statistics were performed using PLS-SEM via SmartPLS v. 4.0. 95. Descriptive statistics aimed to analyse the profile of participants and their firms while inferential statistics were mainly used as tests for the hypothesized relationships.

PLS–SEM was chosen due to its robustness in handling complex models involving both moderation and mediation, small sample sizes and non-normal distribution of the data (Hair et al., 2019). The use of this tool is also consistent with its increased usage in business and environmental accounting research (e.g., Zandi, 2019; Tashakor et al., 2019; Jain et al., 2020). The analysis utilized a total of 146 usable questionnaires as two questionnaires were found to be incomplete.

Study Results

Respondent and Firm Profiles

Of the 146 respondents, most were male (77%, 112), aged between 26 and 35 years (58%, 85), and held a first-degree qualification (82%, 120). The majority were accountants (74%, 108) with an average of 3 years of experience (45%, 66). Nearly half (47%, 67) had earned a professional qualification, such as CPA, which matched the proportion of those with other certifications.

These features, suggested a young, well-qualified, and experienced group capable of providing valuable insights into the study's key issues, particularly the adoption of EMA. Furthermore, their education and qualifications indicated their understanding key issues of interest to study. Specifically, Table 1 provides detailed views of the visited manufacturing firms.

Table 1: Firms' Characteristics

Firm Characteristics		Frequency	Percentage
Firm Size	TZS 5 M – TZS 200 M	12	8%
	TZS 200 – TZS 800 M	14	10%
	Above TZS 800 M	120	82%
Type of Product Produced	Food Processing	17	12%
	Beverage Industries	19	13%
	Tobacco Processing	2	1%
	Chemical, rubber and plastic	51	35%
	Fabricated metal products	5	3%
	Textile and leather	6	4%
	Basic metal products	13	9%
	Wood products	3	2%
	Paper/paper products	9	6%
	Mineral Products	14	10%
	Other industry	7	5%
Environmental Policy	Yes	139	95%
	No	7	5%
Environmental Department	Yes	99	68%
	No	47	32%

Table 1 shows that most of the firms were large, with capital exceeding TZS 800 M (82%, 120). A significant portion were involved in chemical, rubber and plastic manufacturing (35%, 51), followed by beverage (13%, 19) and food processing (12%, 17). Most firms (95%, 139) had an environmental policy and dedicated environmental management department (68%, 99).

The predominance of large firms with environmental policies and departments makes the findings particularly relevant for understanding the adoption of EMA practices within larger organizations.

Descriptive Statistics of Study Constructs

Descriptive statistics were interpreted based on a 5-point Likert scale: 1.00–1.49 (Strongly Disagree/Very Low), 1.50–2.49 (Disagree/Low), 2.50–3.49 (Neutral/Moderate), 3.50–4.49 (Agree/High), and 4.50–5.00 (Strongly Agree/Very High) (Haule, 2024). Summarized descriptive statistics of the study's key constructs are presented in Table 2.

Table 2: Descriptive Statistics of Study Key Constructs

Variable / Construct	Mean	SD	Insights
Coercive Pressure (CP)	3.98	0.86	Regulatory pressures are perceived as highly driving EMA adoption, with substantial agreement among respondents.
Perceived Behavioural Control (PBC)	3.80	0.85	Respondents exhibit high confidence in their ability to adopt and implement EMA practices, though variability suggests differing confidence levels.
Environmental Attitude (Att)	3.62	0.96	Respondents demonstrate a generally positive attitude towards environmental practices, with moderate variability in perceptions.
Adoption of EMA Practices (EMA)	3.60	1.08	EMA adoption is slightly above average; however, significant variability indicates uneven adoption across firms.

Results in Table 2 indicate high levels of agreement across all constructs, with some variability reflecting differing perceptions among respondents regarding specific aspects. The subsequent PLS-SEM results showcase the model's explanatory power and predictive relevance, providing evidence to support or refute the hypothesized relationships.

PLS-SEM Analysis and Tests for Hypothesized Relationships

Measurement Model Evaluation

Following the standard PLS-SEM procedures outlined by Hair et al. (2021; 2019), data analysis was conducted to evaluate both measurement model and structural model. Starting with measurement model's reliability and validity, the study first assessed indicator reliability using factor loadings, with a threshold of 0.7 as the benchmark. Table 3 shows that the lowest

factor loading, 0.577 for CP7 (coercive pressure indicator), met this threshold, thus all indicators were retained. According to Hair et al. (2019), any indicator with loadings below 0.40 should be removed. However, no such issues were found in this study.

Additionally, construct reliability was assessed using Composite Reliability (CR) and Cronbach's alpha (α), both of which exceeded the recommended value of 0.7, indicating adequate internal consistency reliability for all constructs. Table 3 presents statistical test results that supported measurement model evaluation in this study.

Table 3: Tests for Measurement Model Evaluation

Constructs	Items	Factor Loadings	AVE	CR (rho_c)	Cronbach Alpha (α)
Coercive Pressures	CP1	0.890	0.553	0.915	0.895
	CP2	0.824			
	CP3	0.872			
	CP4	0.593			
	CP5	0.809			
	CP6	0.608			
	CP7	0.577			
	CP8	0.590			
	CP9	0.830			
Environmental Attitudes	Att1	0.703	0.527	0.886	0.852
	Att2	0.720			
	Att3	0.706			
	Att4	0.808			
	Att5	0.739			
	Att6	0.722			
	Att7	0.677			
Perceived Behaviour Control	PBC1	0.610	0.559	0.861	0.798
	PBC2	0.835			
	PBC3	0.598			
	PBC4	0.898			
	PBC5	0.752			
Adoption of EMA Practices	EMA1	0.807	0.600	0.921	0.903
	EMA2	0.907			
	EMA3	0.596			
	EMA4	0.614			
	EMA5	0.585			
	EMA6	0.847			
	EMA7	0.916			
	EMA8	0.835			

Additional tests for model quality were carried out to determine convergent validity using Average Variance Extracted (AVE), and discriminant validity using Heterotrait-Monotrait (HTMT) ratio, as recommended by Hair et al. (2021). Moreover, multicollinearity was assessed using Variance Inflated Factor (VIF), with test results indicating no threat to this problem since all VIF values were less than 5, which is the strict criterion recommended by Hair et al. (2021). Statistical test results for HTMT and VIF are presented in Table 4.

Table 4: HTMT and VIF Statistics

	Attitude	Coercive	EMA	VIF
Attitude				1.409
Coercive	0.520			1.647
EMA	0.595	0.487		-
PBC	0.390	0.370	0.303	1.209

As shown in Table 4, all HTMT values did not exceed 0.85, which confirmed that each construct in the study is distinct. Favourable test results enabled the next step, focusing on structural model valuation; essential for testing the study's hypothesized relationships.

Structural Model Evaluation

The structural model evaluation was useful for testing both the model's explanatory power using R^2, and its predictive relevance using Q^2. The results yielded an R^2 of 0.409, indicating that CP and environmental attitude, when analysed together, explained about 40.9% of the variance in EMA adoption. Based on established benchmarks (Hair et al., 2021, 2019; Falk and Miller, 1992; Cohen, 1988), this was considered moderate explanatory power. For Q^2 statistic, values of 0.227 and 0.119 were obtained for EMA adoption and environmental attitude, respectively. These indicated satisfactory predictive power, as $Q^2 > 0$, indicates the model's predictive relevance (Shmueli et al., 2016).

Tests for the Hypothesized Relationships

Bootstrapping was conducted with 5000 resamples for hypothesis testing, as recommended by Sabol et al., (2023). This study used significance levels of 1% ($p < 0.01$) and 5% ($p < 0.05$), which were analysed and interpreted in conjunction with *t* – values – values greater than 2.576 considered highly significant (at 1%) and 1.96 considered significant (at 5%). Table 5 below provides results for the hypothesized relationships.

Table 5: Test Results for the Hypothesized Relationships

Direct Effect	Original Sample (O)	STDEV	*t* - statistics (|O/STDEV|)	*p*-values	f^2	Supported?
H1: CP→EMA	0.272**	0.085	3.223	0.001	0.076	Yes
H2: Att→EMA	0.424**	0.061	6.972	<0.001	0.216	Yes
Mediation Effect						
H3a: CP→Att	0.511**	0.036	14.194	<0.001		Yes
H3b: CP→Att→EMA	0.217**	0.033	6.500	<0.001		Partial Mediation
Moderation Effect						
H4: CP x PBC→EMA	0.147*	0.072	2.024	0.022	0.027	Yes

*p < 0.01**, p < 0.05*, CP – Coercive Pressure, Att – Environmental Attitude, PBC – Perceived Behavioural Control, EMA – Environmental Management Accounting Adoption.*

Coercive Pressure Influence on EMA Adoption (H1)

As shown in Table 5, coercive pressure (CP) significantly and positively influences EMA adoption ($\beta = 0.272$, $p = 0.001$). This finding indicates that external pressures such as regulations and compliance mandates drive EMA adoption. However, the effect size ($f^2 = 0.076$) is small, suggesting that while *CP* is significant, its overall impact on EMA adoption is relatively limited.

Environmental Attitude Influence on EMA Adoption (H2)

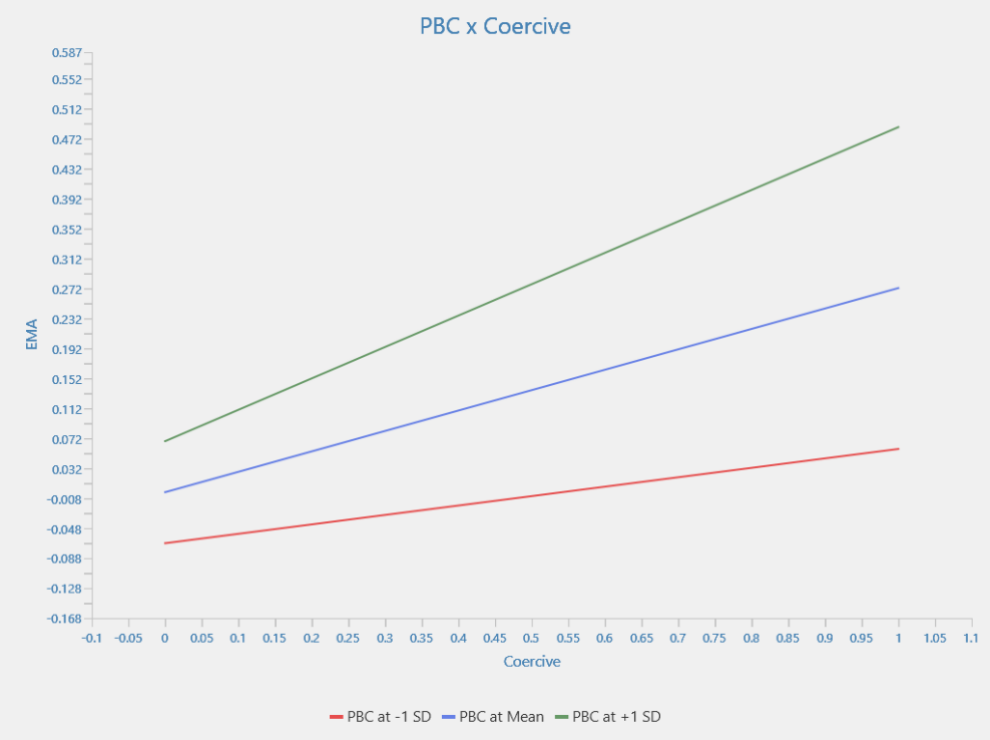
Table 5 indicates that, environmental attitude (Att) also exhibits a significant and positive effect on EMA adoption ($\beta = 0.424$, $p < 0.001$). Managers with stronger pro-environmental attitudes are more likely to adopt EMA practices. The medium effect size ($f^2 = 0.216$) highlights the critical role of *Att* in driving EMA adoption.

Mediation Effect of Environmental Attitude (H3)

Following Zhao et al. (2010), the study tested whether environmental attitude mediates the relationship between CP and EMA adoption. Results for H3a (CP → Att) as presented in Table 5 reveal that CP significantly and positively influences environmental attitudes ($\beta = 0.511$, $p < 0.001$). This suggest that external pressures foster stronger pro-environmental attitudes among managers. For H3b (CP → Att → EMA), the results demonstrate partial mediation ($\beta = 0.217$, $p < 0.001$). This suggests that while CP affects EMA adoption directly (H1), it also exerts an indirect influence through environmental attitudes.

Moderation Effect of PCB (H4)

As shown in Table 5, moderation is captured via H4, examining the moderating role of PBC on CP -> EMA adoption relationship. Presented results indicate a significant positive moderation effect ($\beta = 0.147$, $p = 0.022$). Moderation analysis was further analysed using simple slope analysis as reflected in Figure 2.



Source: Data Analysis (2024)

Figure 2: Simple slope analysis of the moderating effect of PBC

As shown in Figure 2, the slope of the line between CP and EMA adoption is steeper when PBC values are above +1 standard deviation, indicating a stronger relationship under high PBC. Conversely, when PBC values are below -1 standard deviation, the slope is gentler, suggesting a weaker relationship. This confirms that as PBC increases, the influence of CP on EMA adoption becomes more pronounced.

Discussion and Implications

Guided by institutional theory and Theory of Planned Behaviour (TPB), this study examined how coercive institution pressure (CP) influences the adoption of EMA practices taking into account the mediating effect of environmental attitude and moderating role of Perceived Behavioural Control (PBC). Primary data from 146 manufacturing firms in Tanzania were analysed through Partial Least Square Structural Equation Modelling (PLS– SEM), revealing several noteworthy relationships.

Results indicate that CP has a positive and statistically significant direct effects on EMA adoption. Similarly, environmental attitude exhibits a strong, positive and significant influence on EMA adoption. Mediation analysis shows that PC positive and significantly influences environmental attitude, which partially mediates the relationships between CP and EMA adoption. Moreover, moderation analysis confirms that PBC positively and significantly moderate the relationship between CP and EMA adoption.

The results align well with the theoretical foundations of Institutional Theory and TPB, used in the study to emphasize the interplay of external institutional pressures and internal psychological factors in driving EMA adoption. Findings also corroborate with prior research and provide valuable insights regarding the mechanisms that can be used to leverage CP useful for promoting EMA adoption in developing economies like Tanzania. For example, the significance influence of CP on EMA adoption underscores the critical role of external motivation, as highlighted by Che Ku Kassim et al. (2022) in Malaysian LGAs. Similarly, studies by Jain et al. (2020) and Chen et al. (2018) show the critical role of regulatory forces in driving responsible environmental management practices such as waste recycling and green innovations. However, Raab et al. (2018) found CP has insignificant effect on adoption of

sustainability practices in the hotel industry, since this study focused on environmental part of sustainability, that could explain the conflicting results.

The strong direct effect of environmental attitude on EMA adoption further underscores the importance of organizational actors' roles in driving EMA adoption – the finding that aligns well with Tashakor et al. (2019), who emphasized that positive attitude towards reducing energy consumption and water usage significantly influence EMA adoption. Supporting evidence from Chen et al. (2020) and Thoradeniya et al. (2015) also highlights the influence of pro-environmental attitude on environmental accounting and sustainability reporting in their studies.

The partial mediation effect of environmental attitude indicates that perceptions of organizational actors play a crucial role in translating external pressures into internal practices. This result aligns with Tashakor et al. (2019) and Chen et al. (2020) who found that favourable environmental attitudes within business entities enhanced adoption of EMA and environmental accounting in different contexts. This finding implies that, targeted training sessions and sensitization campaigns to promote positive environmental attitudes are critical.

Similarly, moderating role of PBC highlights the importance of key actors' confidence and behavioural control in adopting environmentally friendly practices such as EMA. This finding implies that organizational actors with strong sense of behavioural control may consider CP as opportunities rather than challenges. This result is consistent with Ajzen's (1991, 1985) TPB and findings by Tashakor et al. (2019).

Conclusion and Recommendations

This study offers empirical evidence and insights regarding EMA adoption in Tanzanian manufacturing firms, focusing on the role of CP as a key driver, environmental attitude as mediator and PBC as a moderator. The findings confirm that both CP and environmental attitudes positively and significantly influence EMA adoption. Environmental attitudes partially mediate the relationships between CP and EMA adoption while PBC positively moderate this relationship.

Theoretically, this study integrates Institutional Theory and TPB, addressing knowledge gap in literature, as highlighted by Latip et al. (2022). The study findings underscore the significance of both external institutional drivers and internal psychological factors in influencing EMA adoption, particularly in developing economies like Tanzania.

For practitioners and policymakers, the key takeaways include the following: Coercive institutional pressure (CP) serves as key driver for EMA adoption. However, its effectiveness depends on integrating external pressures with internal organizations factors such as environmental attitudes and PBC. Secondly, positive environmental attitudes among organizational actors is a critical conduit for EMA adoption – therefore, trainings and sensitization campaigns should be in place to cultivate these attitudes. Thirdly, Perceived Behavioural Control (PBC), should be strengthened through resource allocation, capacity building programmes and organizational support tailored to enhance organizational actors' confidence and positive response to CP.

Moreover, policy maker should note that, enactment and enforcement of environment management laws should be complemented by promoting internal organizational factors, such as environmental attitude and PBC. Similarly, organizations should prioritize creating a supportive environment by providing training opportunities and allocating sufficient resources to enhance competencies for implementation of EMA practices. Academically, this study contributed to the growing literature on EMA adoption by examining the dynamics of CP, environmental attitudes and PBC in developing country context.

While this study provides valuable insights, certain limitations may affect the generalizability of the findings. Specifically, the use of large sample, reliance on a single respondent per firm and the potential for sampling bias are acknowledged. Furthermore, by the time of this study Tanzania had not yet adopted or enforced International Sustainability Standards (ISS), future studies should explore EMA adoption under the evolving influence of ISS and other sustainability initiatives. Additionally, methodological enhancements such as triangulating

survey data with archival records and incorporating multiple informants per firm where feasible.

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