# How does management accounting information affect women directors' contribution to corporate strategic decisions?

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## Abstract :

This study aims to investigate the impact of management accounting information on female directors' attitudes and contribution to strategic decisions at the upper management levels of corporates in Saudi Arabia's context as an emerging economy. A quantitative approach was used in this investigation; the required data has been collected through an electronic questionnaire sent to 130 individuals in 26 corporates with different economic activities. The valid, received responses were 71 (approximately 55%), constituting the sample and a reasonable representative sample of the study population. The findings revealed that women directors in the upper management levels positively impact corporate strategic decisions, and the information generated from management accounting practices plays a crucial role in supporting strategic decisions made by women directors even when they are a minority. This study contributes to the literature on the impact of gender diversity on corporate strategic decision-making from the management accounting perspective, as it focuses first on identifying the impact of

women leaders on corporate strategy decisions, second on exploring the use of women directors in the upper management levels of management accounting outputs (the pattern of information) needed for strategic decisions making in Saudi Arabia's context. Current research is built on the main assumption that women directors at the upper management levels are different from their male peers in some of their skills and visions, but similar in others. Therefore, out-group bias could exist. Previous literature has stated that gender diversity can provide different perspectives, which benefit decisions making process, however, the gender-based groups are similar in other ways.
**Keywords:** gender diversity – upper management levels - management accounting – corporate strategy

**JEL codes:** G30, L25, M41

## 1. Introduction

Corporate strategy setting and implementation is the major responsibility of the upper leadership levels of the corporate hierarchical structure. The director board, the executive committee or top management, and the middle management. This mission becomes more sophisticated due to the increase in complexity, uncertainty, pace of change, and competition in today's global marketplace.

A corporate-level strategy is a multi-tiered corporate plan that directors on the board and senior managers used to define, outline and achieve business goals, in response to many changing internal and external factors.

In their position as strategic analysts, management accountants can effectively lead the strategic analysis process. As they need to deeply understand the basic business factors to become reliable strategic advisors and partners. The main factors affecting the business are the customers' needs and purchasing preferences, and the opportunities and threats of competitors. These external powers could be handled by managing internal operations and resource allocation effectively and building good relationships with all types of personnel by setting up weekly staff meetings or receiving regular reviews of achievements vs. targets, including financial and non-financial metrics. This enables management accountants to create value in various leadership roles using strategic analysis.

The Chartered Institute of Management Accountants (CIMA, 2005)[1] defines management accounting as the practices to measure, identify, accumulate, analyze, prepare, interpret, and communicate information to management to support decision-making, regarding controlling, performance evaluation, and strategy formulation. In addition to ensuring the efficient use of resources "accountability". Therefore, management accounting

[1] https://www.cimaglobal.com/Documents/ImportedDocuments/Cima_Annual_Review_2005.pdf

practices can be a helping tool in providing an effective evaluation of the corporate's value.

CIMA (Insight, 2009)[2] also defines management accounting as it is an information system that aims to create added value. This objective cannot be achieved unless there is no effective corporate governance. Verhezen (2010) defines corporate governance as the interactions between the interests of all stakeholders and the director board in guiding the corporate to value creation. effective corporate governance is an ongoing strategy and process of creating, maintaining, and improving value for stakeholders.

An effective corporate governance system has main five responsibilities that should be executed by the director board represented in corporate strategy formulation and execution, financial decisions, and performance evaluation. CEO and senior executive team plans and operations management assessment, consultations with the CEO, and ensuring compliance, management accounting practices facilitate corporate governance operations as it can provide the relevant information to the board. This study will focus only on the role of management accounting practices accordingly to the director board characteristics in the process of strategy formulation and implementation. Ramazanali and Bahareh (2013)

[2] https://www.cimaglobal.com/PageFiles/360032658/cimareport09_01.pdf

Research work on the interaction between management accounting information and strategy has developed in the last two decades, as there is a stream of research addressing and examining this relationship at the level of the top of executive management Daily et al. (2003).

The effect of management accounting practices on the board of directors' performance, especially women directors' contribution to strategic decisions, has been limitedly addressed in the literature. The boards are made up of independent members with different experiences, ages, backgrounds, and recently gender diversity Parker (2008). Consequently, the board of directors can use the outputs of the management accounting system in different patterns regarding their strategic-based role Massicottea and Henrib (2021), Kanadli (2018).

This study is applied to the Saudi context as an emerging economy, which witnesses a lot of motivating changes to develop and grow so rapidly. One of the major changes in the recent few years is women's empowerment and equality in the work marketplace, especially, in leading and upper management positions. Statistics showed that women directors on boards of directors of companies listed on both the main stock market "TASI" and the parallel market "Nomu", does not exceed 2% only, which is equivalent to 35 seats out of 1705 seats, according to the "East" accounts for company data on the financial market website (Tadawul) for the year 2022 ), which showed that out of 209 companies listed in TASI, only 31 companies include women in the board of directors, while out of 18 companies in Nomu, there are female board members in only two companies.

In the same context, the percentage of women occupying senior and middle management positions in Saudi Arabia increased from 25.6% in 2017 to 31% in the third quarter of the year 2021. Noting that the rate of women's participation in the Saudi labor market has exceeded the target of the Kingdom's Vision 2030, which is 30%.

For what has been discussed above, in addition to the evidence provided by past studies of the positive impact of women directors and managers on the financial performance of the corporates. The author will focus on one of the main characteristics of the director board which is gender diversity and expand the investigation to include gender diversity in the two levels next to the board, the executive committee and the middle management. To explore how women directors and managers use management accounting outputs in corporate strategy decisions making.

Accordingly, this study aims to investigate the use of women directors in the upper management levels of management accounting outputs (the financial and non-financial information), needed for strategic decisions making in Saudi Arabia's context as an emerging economy.

This paper is structured as follows: Section 2 addresses the literature review and research questions development. Section 3 describes the methodology and sample identification, followed by the results and further robustness checks in Section 4, Section 5 provides conclusions and contributions, and finally, section 6 concludes the limitations and future research.

## 2. Literature review and research questions development

Gender diversity in director boards and top management is seen as the percentage of female members in the corporate's leadership. Gender diversity literature depends on multiple theories that contribute to a better understanding of its impact from various perspectives. Gender diversity is seen as a double-edged influencer on corporate performance Campbell& Mínguez-Vera (2008), some theories view gender diversity in director boards positively as they argue that female existence on boards can influence corporate performance, governance, and strategic issues in a positive way such as agency theory, resource dependence theory, critical mass theory, social psychological theory, and social identity theory. However, on the contrary, some theories state that gender diversity could impact negatively corporate performance and strategies due to the miscommunication and lack of cohesion between the different gender groups such as social psychology theory and social identity theory Ali et al. (2014), Carter et al. (2010), the author will focus only here on perspectives of the theories that support the positive influence of board gender diversity on the corporate performance, more specifically, on resource dependence theory and critical mass theory as they are much related to the current research objectives.

According to resource dependence theory, the director board is considered one of the main resources of the corporate Carter et al. (2010). Therefore, it can be suggested that well-diversified boards could be wiser and more rational at securing access and using the natural and intellectual resources required for activities implementation, due to the different backgrounds, opinions, and skills between female directors and male directors. Female directors may have more ability to deal with and improve the intellectual capital capabilities through their special vision to the corporate strategic objectives. Gul et al. (2011)

If the critical mass theory is applied to the gender diversity of boards, it states that "one is a symbol, two is an existence, and three is a voice" Gul et al. (2011). Inconsistent with this, many studies indicated that the existence of women members (three or more) can influence the board work and enhance corporate innovations. Kristie (2011), Torchia et al.(2018), Ammerman and Groysberg (2020).

## 2.1 Women Directors and Corporate Strategy

There are scarce studies that addressed the relationship between director board diversification and corporate strategy, more specifically the impact of women directors on the strategic change of the corporates, in the meanwhile, many studies in the corporate governance literature have investigated the relationship between board gender diversity and financial performance and provided evidence of the positive influence of the well-diversified boards on corporate performance. However, Liu et al. (2014) indicated that the findings of those studies applied in emerging and developed economies cannot be generalized due to their implications. For example, Brahma et al. (2021) stated that female participation in the director board can enhance company performance. Also, Arvanitis et al. 2022, provided empirical evidence that the more female presentation on the board can lead corporate to higher market value and financial performance. in line with this, Achkar & Bouri (2020) and Terjesen et al. (2015) indicated that there is a positive influence of board gender diversity on corporate financial performance. However, there are some findings showed insignificant relationships between board diversity and corporate performance, for instance, Nguyen et al. (2015) state that the positive impact of gender diversity on performance turns out to be negative if the presentation of women on boards exceeds 20%, due to the increased and unjustified of the costs of diversity. In addition, the findings of

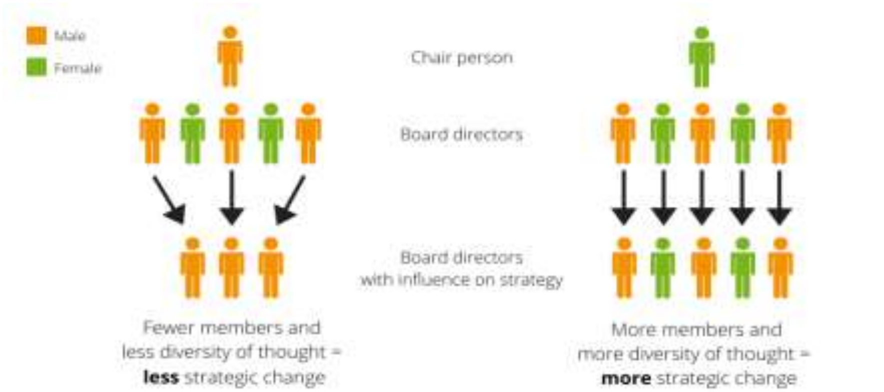
Mohsni et al. (2021) study that applied in a developing country, showed that gender diversity has an insignificant influence on risk management, especially operating and financial risks, while it is significantly related to corporate performance. Furthermore, Bennouri et al. (2018) revealed that women on boards can improve financial performance (ROI and ROA), however, contrary to other study findings- they reduce the value or market share performance (Tobin's Q) in France.

The organizational hierarchical structure contains four main levels: board of directors, executive committee or top management, middle managers, and staff.

The upper level of the structure is composed of the board of directors - the representatives of shareholder interests- whose main task is to participate in identifying, formulating, and approving business strategies, then monitoring their implementation. Boards usually consist of a limited number of directors 10 - 20 members. Thus, gender distribution can be flexibly changed. For instance, a board of ten directors with one woman on board can be modified by increasing the fem director's presentation percentage from 10% to 30%. Even if gender diversity at the board level affects firm performance as proved in previous literature, due to its easy modification to be more diversified and as it can be applied in competitor's structures, it cannot be considered as a strategic change key or sustainable competitive advantage. Consequently, this may explain the distinct results of empirical research on board gender diversity and firm performance Hoobler et al. (2018), Post & Byron (2015); Velte (2017).

Conversely, Sidhu et al. (2021) state that if a board chair is a woman, and there is gender equality and legitimacy, then women directors have opportunities to influence strategy as l as male directors do.

**Figure 1, the impact of diversity gender in chairperson on strategic change**




**Source: Sidhu, (2020)**

The second hierarchy, the executive committee, includes the CEO, functional senior managers (e.g. finance, marketing, HR), and senior operational managers (e.g. production, sales, R&D). The executive committee is responsible for formulating and executing corporate strategy, there is limited evidence of the impact of gender diversity in executive committees on corporate performance or corporate strategic change Velte (2017); Caliendo et al. (2015), Kaplan & Norton (2008).

The middle management level is responsible for implementing and controlling the corporate strategy through daily activities and operations Ferrary & Déo (2022). Gender diversity at this management level may have a significant impact on corporate performance for several reasons, the most important one is that corporate performance depends basically on the level of strategy implementation, not strategy identification, which is the main role of middle management Ferrary & Déo (2022), Middle management gender diversity brings different visions, experiences, interests, to enrich decision-making process. Consequently, gender diversity at the middle management level has a strong positive impact on operations efficiency and corporate performance, Johnson et al. (2008) argued that in large firms, there are a very large number of middle managers, where gender diversity is more difficult to be modified in the short term. Therefore, balanced gender diversity could be a unique and distinguished resource that cannot be copied by competitors and provides a sustainable competitive advantage.

Based on the above discussion, the current study will attempt to investigate the impact of women directors in the main upper levels in the hierarchal structure of the corporate on its strategic change, then the following research main question can be proposed:

Do women directors and managers at the upper management levels have a significant impact on strategic decisions?

And it could be divided into the following sub-questions:

Do women directors and managers at the upper management levels have a significant impact on strategy setting?

Do women directors and managers at the upper management levels have a significant impact on strategy implementation?

Do women directors and managers at the upper management levels have a significant impact on strategy evaluation?

## 2.2 Management Accounting and corporate strategy

In addition to the strategic role of the top and middle management, the director board may have a more important participant role in the corporate strategy developing process as recommended by the King III report (2009)[3]. UKCC (FRC, 2010) [4] indicated that the board's main role is to ensure transforming the strategic plans into actions, to achieve this, all

[3] https://cdn.ymaws.com/www.iodsa.co.za/resource/resmgr/king_iii/king_report_on_governance_fo.pdf

[4] https://www.frc.org.uk/getattachment/0fd41356-1dbb-41ec-a9fa-87e02b404330/FRC-Annual-Report-2010-11-final2-(1).pdf

management upper layers have to identify the company's strategic objectives to be able to evaluate if the strategy can be achieve long-term added value for shareholders at the normal multiple risks in the corporate environment.

### 2.2.1 Role of management accounting information in strategy formulation

A good strategic analyst – one of the most crucial roles of the director board - must have many various strategic tools and frameworks to find answers to strategic problems, overcome challenges, and create long-term added value. However, growth strategy in most corporates is often derived from routine decisions and short-term objectives, and there is no coherent vision of the future.

Strategic planning has to be focused on the organization's vision and core values. Thus, a company's mission and core values should be clearly defined consequently. External analysis is usually carried out using Porter's Five Forces framework, along with a risk management strategy. Additionally, a return-driven strategy and SWOT analysis should be included. Currently, corporations are constantly seeking innovation opportunities, such as blue ocean strategies.

SWOT analysis is frequently used to define corporate goals and options, as well as to discover opportunities for success in the context of threats. The next stage after determining the external environment's strengths, weaknesses, opportunities, and threats is to match the organization's strengths with market opportunities. Following that, safeguard and enhance the organization's internal strengths to make the most of market opportunities.

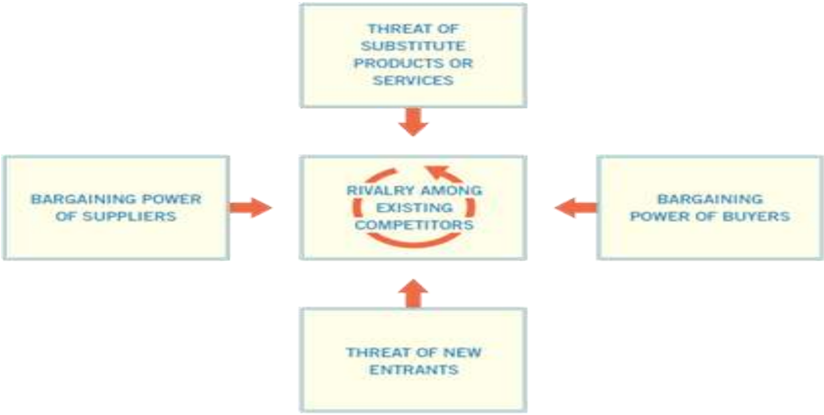
Management accounting practices could provide important forecasts and quantify the threats and risks and their effects on corporate performance and identify the risk management priorities to report to the board Adams and Ferreira (2009). Moreover, management accounting can also help in estimating the available opportunities' value in physical and monetary terms, and report to the board to identify how to use them to achieve added value to the corporate, management accounting practices in this stage could be cost estimates, cost measurements, and evaluation, cost/benefit analysis, lost opportunity cost, break-even analysis, lifecycle analysis, customer relationships evaluation, competitive position monitoring; strategic pricing; target costing; and value chain costing. Cadez and Guilding ( 2011).

In addition, Porter's Five Forces model, which has developed by Michael Porter Porter (1985)- as shown in Figure 1- illustrates that a corporation has to consider five sources of conflicting forces that can affect the existing or potential market, the threat of new competitors' entrants, and the relations with customers, the relations with suppliers, the threat of by-products, and the level of industry intensity.

Management accountants can ensure that business strategy is driven by five-force analysis and does not go astray. In addition, they can securely access and use real-time, reliable information needed for the enterprise's risk management activities. They can verify that the annual budget includes resources to help reduce the impact of risk. They can also identify needs for new or improved competitive intelligence and inform management of their need for an ongoing stream of relevant data for analysis and generation of financial and non-financial to develop and improve competitive intelligence practices.

The management accounting outputs and reports provided to the directors using Porter's five forces model shown in Figure 2, should contain costs and returns of the various changing internal and external variables affecting the business, to assist the board to identify the priorities and take rational decisions regarding the resources allocating while managing risks and maintaining corporate strategy. Management accounting practices in this stage could be budgeting, activity-based costing, performance measurement, risk management, control tools like standard costs, and balanced scorecards.

**Figure 2: five forces model**




**Source: Institute for Strategy & Competitiveness**

### 2.2.2 Role of management accounting information in strategy implementation

Since it enables managers to track financial performance, comprehend operational performance, and make appropriate modifications to the plan, management accounting is crucial for strategy implementation. Management accounting may also assist managers in promptly identifying opportunities and challenges to the plan. Overall, management accounting is a useful tool for making sure that a strategy is successfully implemented. Management accounting enables managers to make well-informed decisions that will help them accomplish their strategic goals by offering accurate data and insightful analysis.

An organization's strategy can be supported by information from management accounting. Making sure resources are allocated in a way that will support achieving the intended results aids in ensuring that they are. Moreover, management accounting offers insight into how well the plan is being implemented and can point out areas where. Overall, management accounting is critical in ensuring that results effectively reflect the strategy

Strategic risk management is used to assess and manage strategic risk as part of the strategic planning and strategic management processes. It's called enterprise risk management (ERM). Strategic risk management is the process of identifying, assessing, and managing risks and uncertainties that could prevent or adversely affect the achievement of the organization's strategic objectives, when shareholders, regulators, and other stakeholders increase, strategic risks do not exist or develop poorly. plans that can prevent the company from creating and protecting stakeholder value. Ullah et al. (2016)

Management accounting can support strategic risk assessments, as it can also play an important role in developing key performance indicators (KPIs) related to risks as part of the company's strategic risk management and performance measurement system. Kose and Agdeniz (2019).

### 2.2.3 Role of management accounting information in strategy evaluation

The implementation of a strategic plan depends heavily on management accounting information. As it helps in ensuring that resources are allocated properly to meet the strategic goals of the company. Also, it reveals important information on the effectiveness of the strategy's implementation and points out areas that may require improvement. Corporations may be certain that their strategy is implemented successfully and that outcomes are obtained by employing management accounting.

There are several causes for strategies to fail. One explanation is that the strategy might not have been well-conceived or implemented. Another issue is that the strategy might not be tailored to the unique circumstances or the strengths and weaknesses of the individual firm. Also, the strategy can be founded on inaccurate information, which is the third possible explanation. Lastly, strong entrenched interests may resist the strategy, Frigo and Anderson (2011).

It is important to learn from the experience and create a new strategy with a higher possibility of success, accordingly, there are many performance-based strategies such as Revenue-driven strategy, which is a platform that provides a structure for reviewing, evaluating, and refining business strategies to create long-term, sustainable value. The framework is based on extensive global research on successful companies that have achieved an outstanding and sustainable return on investment while adhering to ethical standards. Frigo and Anderson (2011).

Revenue-driven strategy framework can be applied by Management accountants to develop a focused growth strategy, evaluate these strategies, review corporate plans and risks, report the strategy implementation progress to the board of directors, and assess merger and acquisition opportunities. Also, there is another approach to strategic change or correction called the blue ocean strategy (innovation or differentiation strategy), it is a strategic planning approach that aims to develop a brand-new market. As a result of the blue ocean strategy, new market space is created and latent demand is unlocked. As the corporate aspires to satisfy the customers' needs that are not yet established or recognized, therefore, the corporate will need to create demand to create a new market. corporations can implement the blue ocean strategy only through innovation and being uniquely differentiated.

Consequently, management accounting is a vital tool for the director board for formulating and controlling the corporate strategy. strategic management accounting has been developed since the 1990s as a response to the lacking of the functionality of traditional management accounting in the changing business environments and the increasing risks that corporates need to manage and control its harmful effects on their performance, strategic management accounting is a dynamic application of multiple tools, that need to be developed continuously in response to the contingent changes and effects in the business environment.

Mohamed & Jones (2014) indicated that corporate strategies have a significant impact on the overall performance of large companies in Thailand when strategic management accounting practices are used properly. Moreover, Visedsun & Terdpaopong (2021) states that management accounting is an effective tool that can assist directors to build up strategies and set corporate objectives and values, as it combines both financial and non-financial information and report it to the board to support decision-making regarding the essential activities such as budgeting, executive planning, performance evaluation, and decision-making.

Based on the previous discussion, the following main research question can be derived:

Does management accounting information have a positive effect on corporate strategic decisions?

And the following sub-research questions could be stemmed from it:

- Does management accounting information have a positive effect on corporate strategic formulation?
- Does management accounting information have a positive effect on corporate strategic implementation?

- Does management accounting information have a positive effect on corporate strategic evaluation?

## 2.3 Women Directors and their usage of management accounting information

Gender diversity has received substantial attention in academic literature recently. Most of the empirical research focused on women directors' relationships and firm decision-making and consider the investment as a long-term instrument, their conservation could misguide them to make the right investment decisions Vu et al. (2022). From the author's point of view, this result may be accrued due to a lack of information or lack of experience that women directors have in using and analyzing information.

Despite the crucial role of management accounting in corporate strategy setting and evaluation, which is one of the upper levels of management's main tasks, literature has overlooked the need and the uses of management accounting information by boards of directors, especially women directors, and whether the board diversification affect that use or not, Kanadli (2018), tried to establish a theoretical framework and proposed a measurement model of budget, financial and non-financial performance indicators by boards of directors to oversee the strategic plan. However, the author argues – based on the enormous research findings about the impact of board gender diversity on corporate performance - and in the same context, this study aims to explore the use of women directors at upper management levels in the organizational structure of management accounting information, and how it affects their contribution in strategic decision making, therefore, the following exploratory research questions can be derived:

- How do women directors and managers at the corporate strategy level use management accounting information for strategic purposes?
- Does management accounting information affect the contribution of women directors and managers in strategic decision-making?

## 3. Methods and research design

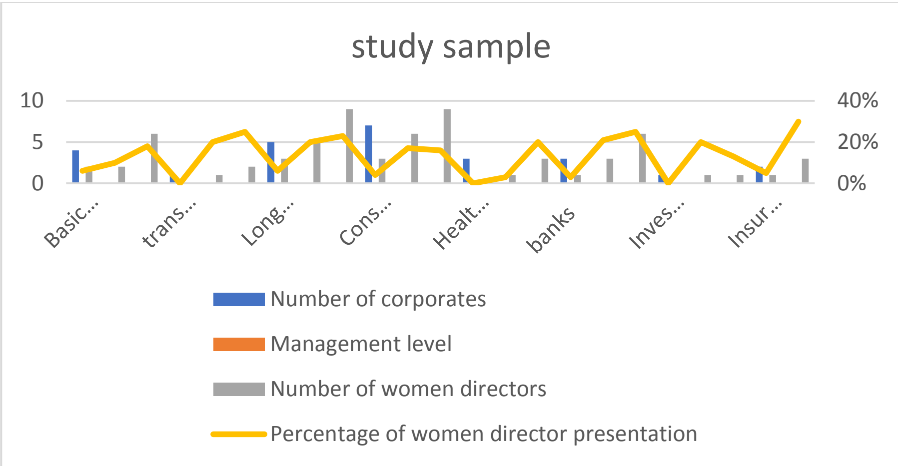
The research was applied to a sample of women directors in the upper management layers of the organizational structure of Saudi corporates included in the Saudi stock exchange in the year 2022. A quantitative approach in this study, a purpose-designed questionnaire was used for collecting the data. A 5-point Likert scale with anchors that ranged from one (1), depicting strongly agree, to five (5), depicting strongly disagree was employed for answering questions. The primary questionnaire version was sent to three academicians and three senior women managers in different corporates as professionals for reviewing, the questionnaire items were adjusted to their final edition based on their comments, then the questionnaire was initially tested on a small scale for reliability and validity confirmation purposes. It is worth to be mentioned that the respondents' communication language was Arabic, so translation from English to Arabic and vice versa of the questionnaire and responses, in addition to proofreading revision, were done by a language professional, the translated questionnaire was tested on 10 Saudi women managers and directors to ensure questionnaire clarity and to test the constructs' reliability, following the suggestion of Aiken & West (1991). The constructs' Cronbach's alpha all exceeded 0.70, which, according to Wise et al. 1984, indicates a good reliability level. Then the electronic questionnaire was sent to 130 female individuals in the upper management of 26 corporates with different economic activities (sample descriptive is shown in Table 1, and Figure 3), and respondents were encouraged to consult and inform freely, if they were unsure about any paragraph, to reduce the definition problems. The valid, received responses were 71 (about 55%), which constitutes the sample and is considered a reasonable representative sample of the study population, and then the researcher does not believe that the bias in non-response is a problem.

## 3.1 study sample descriptive

### Table 1: study sample

| The economic sector of the corporate | Number of corporates | Management level | Number of women directors | Percentage of women director presentation |
|---|---|---|---|---|
| **Basic material** | 4 | Director Board | 2 | 6% |
| | | Top management | 2 | 10% |
| | | Middle management | 6 | 18% |
| **transportation** | 1 | Director Board | 0 | 0% |
| | | Top management | 1 | 20% |
| | | Middle management | 2 | 25% |
| **Long term commodities** | 5 | Director board | 3 | 6% |
| | | Top management | 5 | 20% |
| | | Middle management | 9 | 23% |
| **Consumer services** | 7 | Director board | 3 | 4% |
| | | Top management | 6 | 17% |
| | | Middle management | 9 | 16% |
| **Health care** | 3 | Director board | 0 | 0% |
| | | Top management | 1 | 3 % |
| | | Middle management | 3 | 20% |
| **banks** | 3 | Director board | 1 | 3% |
| | | Top management | 3 | 21% |
| | | Middle management | 6 | 25% |
| **Investment** | 1 | Director board | 0 | 0% |
| | | Top management | 1 | 20% |
| | | Middle management | 1 | 13% |
| **Insurance** | 2 | Director board | 1 | 5% |
| | | Top management | 3 | 30% |
| | | Middle management | 3 | 19% |
| **Total number and the average percentage** | 26 | | 71 | 15 % |

**Figure 3: study sample**




## 3.2 Variables:

The variable measurement items were formulated based on previous studies as presented in (Appendix B).

3.2.1 Independent variable – women directors in the upper management levels in the study corporates, identified with number and percentage in each level, women directors on boards in the study corporates were about 5% of the total board numbers, some director boards are still homogenous and others have one women director at most, women directors' presentation on the executive committee or top management were in average 18%, while their percentage in the middle management level was about 19 %. The overall average of women present in the upper levels of corporate management was approximately 15%.

3.2.2 Dependent variable – women directors' contribution to corporate strategy formulation, implementation, and evaluation, each stage of corporate strategy was measured by five Likert questions to explore the application of the strategic process in the corporate and the extent of the contribution of women directors and managers to it. (Appendix A)

3.2.3 The moderating variable – management accounting information, financial analytics, financial estimates, and nonfinancial analytics, was measured also by 5 Likert questions in the research survey, to investigate the women directors' and managers' usage of the information generated from management accounting practices.

3.2.4 control variables

- Women director characteristics
  - Age
  - No. of years of experience as a director or a manager
  - Period in the current position
  - Accounting education or financial background
- Firm characteristics
  - Size of the board (number of members)
  - The economic sector of the corporate

## 4. Analysis and Results

The proposed hypotheses have been tested using ordinary linear regressions applied with two levels: without the interaction mode and then, the analysis will be developed to the interaction mode to explore the potential moderation Aiken & West (1991).

The analysis tests two-way interactions by regressing the dependent variable Y (corporate strategy decisions) on the independent variable X (number of women directors in each level of the upper management hierarchy), the moderator variable Z (management accounting practices), and the product (interaction) term of X and Z (XZ) Wise et al. 1984. The model tested is shown below:

$$Y = b_0 + b_1X + b_2Z + b_3XZ + \mathcal{E}$$

**Table 2: Descriptive statistics of women directors in the upper management levels of 16%**

| **Variables** | ***Name of the variable*** | **Mean** | **Standard Deviation** |
|---|---|---|---|
| women directors on the board | *% of womenDirectors on the board* | 0.92 | 1.86 |
| women directors in the executive committee or top management | *% of women Directors in top management.* | 2.24 | 2.14 |
| women directors in the middle management | *% of women Directors in middle management* | 3.38 | 2.01 |
| MA: financial information analytics | *Fin info analytics* | 4.65 | 1.78 |
| MA: financial estimates | *Fin estimates* | 3.47 | 1.69 |

| | | | |
|---|---|---|---|
| MA: nonfinancial information analytics | *Nonfin info analmplementationytics* | 4.16 | 1.31 |
| Contribution of women directors to corporate strategy | *CWS* | 3.94 | 1.48 |
| Age of female director | *Age* | 48.32 | 7.99 |
| No. of years of experience as a director | *experience period of current position* | 3.65 | 3.58 |
| previous experience | *Years of previous experience* | 7.04 | 2.21 |
| Accounting education or financial background | *Acc. background* | 3.74 | 13.15 |
| Size of the board (number of members) | *Board size* | 7.16 | 0.96 |
| The economic sector of the corporate | *Economic sector* | 0.39 | 0.48 |

Saudi Arabia is a fast-growing economy with an ambitious plan and objectives to be achieved by 2030, one of the most important objectives is women empowerment incorporates leadership, therefore, women directors' presence will be growing at a rapid rate very shortly, however, their existence in the upper levels of corporates management is still weak and presented as a minority, this was an important motive to conduct this study.

Table 2 presents the descriptive statistics for the current study variables. The mean of women directors on board was less than one-woman director on board with an average of 5% as mentioned previously, and the mean of women directors in the executive committee was 2.24 which means that if the average number of the executive committee is 5 – 8, women could represent 18 % in average, while the mean of the women managers in the middle management was 3.38 with the average percentage of 19%.

Management accounting outputs were measured using a five-point Likert scale (1 = Disagree; 5 = Agree). The mean of financial information analytics was 4.65, the mean of financial estimates was 3.47, and the mean of nonfinancial information analytics was 4.16. The dependent variable (corporate strategy) was also measured with a similar Likert scale indicating an average contribution of women contribution to strategy formulation at 2.75, while the mean of their contribution to strategy implementation was recorded at 3.89 and the mean of their contribution to strategy evaluation 4.21.

The average characteristics of the women directors at presentation percentage (16%) at the upper three levels of corporate management, is approximately 48 years old, with 3.65 years of experience in the current position, and they have previous experience in management positions of 7 years in average, also, the women directors who have accounting or financial backgrounds were about 40 %.

Results shown in Table 3 reveal the validity of the study constructs using Pearson's correlation analysis.

**Table 3: Pearson's correlation coefficients.**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.Women directors in the upper levels of management | .312 *** | | | | | | | | | |
| 2.Management accounting information | .102 | . 222 *** | | | | | | | | |
| 3.women directors' contribution to corporate strategy | .116 | . 248 *** | . | | | | | | | |
| 4.Age of female director | .108 | .024 | .346 *** | . | | | | | | |
| 5. No. of years of experience as a director | .115 | .114 | .049 | .232 *** | . | | | | | |
| 6. previous experience | -.013 | -.111 | .267 *** | .239 *** | .014 | .010 | . | | | |
| 7. Accounting education or financial background | .041 | -.109 | -.039 | .196* | .019 | .158 | .138 * | . | | |
| 8. Size of the board (number of members) | -.192 ** | -.197 ** | -.210 ** | .154 * | .076 | .364 *** | -.059 | .294 ** | .266 *** | |
| 9. The economic sector of the corporate | -.074 | -.036 | -.001 | -.223 | .029 | .206 | -.051 | .153 * | -.119 | -.217 *** |

***Correlation is significant at the 0.01 level (two-tailed),
**Correlation is significant at the 0.05 level (two-tailed)
*Correlation is significant at the 0.10 level (two-tailed)

The current study variables are subjected to several steps of analysis, to evaluate the various effects of the independent variables and control variables to test the hypotheses. Gabrielsson (2007).

The first model attempts to evaluate how women directors in the upper levels of management influence corporate strategy decisions when they are the minority gender (i.e., less than 20%). It demonstrates the positive effects of the mean-centered percentage of female managers or directors (see Table 4).

Models 2 and 3 incorporated the independent variable (women managers in the upper level of corporate management) and the potential impact of the management accounting outputs used by women directors (Model 2). Then we developed the analysis to explore the interaction between the percentage of women directors at the upper management levels and the management accounting outputs used by them is also included (Model 3) to identify which type of reported information generated by management accounting practices that women directors depend on in their strategy setting decisions. The author followed the [39] procedure to assess the interaction effects, as it suggested that we can identify interaction terms by multiplying the mean-centered values of the interacting variables and then including these terms in the second stage of the regression equations. This procedure reduces the multicollinearity probability.

**Table 4: Ordinary linear regressions in two steps: effects of women directors in the upper management levels ( when it is less than 20% ) on corporate strategy (N = 71)**

| | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|
| Constant | 0.000 | | 0.004 | | 0.003 | |
| | (0.063) | | (0.062) | | (0.062) | |
| % of women Directors and managers in the upper management levels | 0.120 | * | 0.127 | * | 0.132 | * |
| | (0.053) | | (0.042) | | (0.037) | |
| Age | | | 0.070 | | 0.085 | |
| | | | (0.046) | | (0.052) | |
| No.of experience years in current post | | | 0.109 | * | 0.112 | * |
| | | | (0.045) | | (0.046) | |
| Previous years of experience | | | 0.211 | * | 0.210 | * |
| | | | (0.035) | | (0.036) | |
| Accounting or financial background | | | 0.259 | ** | 0.147 | * |
| | | | (0.044) | | (0.047) | |
| Board size | | | | | 0.065 | |
| | | | | | (0.071) | |
| The economic sector of corporate | | | | | 0.031 | |
| | | | | | (0.062) | |
| $R^2$ | 0.046 | | 0.109 | | 0.122 | |
| Adjusted $R^2$ | 0.34 | | 0.080 | | 0.088 | |

All variables are normal-centered. Robust standard errors are in parentheses. The coefficient's significance is based on the value of a z-statistic.*, **, and *** are statistically significant at 10%, 5%, and 1%, respectively.

The first research question tries to explore whether women directors in the upper levels of corporate management ( even if they are a minority ) have a positive impact on corporate strategy, according to the results shown in Table 4, there is a significant relationship between women directors in top management levels and corporate strategy decisions, so even when they are gender minority in the corporate different levels of management ( less than 20%), have a positive and significant effect on corporate strategy formulation and implementation. Then, this result provides an answer to the first research question. Also, results showed that model 1 has no significance when control variables related to the firm characteristics are included.

The second and third research questions had driven to investigate the extent and the nature of management accounting outputs ( reported information ) used by women directors in the upper management levels, which is why the author used forward stepwise regression to test the relations in this hypothesis, as it is a good exploratory approach.

## Table 5: forward stepwise regression results coefficients

| Model | Unstandardized coefficients | | Standardized coefficients | t | Sig. | 0rder of predictors |
|---|---|---|---|---|---|---|
| | B | Std. error | Beta | | | |
| Contestant | 4.523 | 0.211 | | 14.212 | .000 | |
| • **Financial information analytics** | .157 | .041 | .169 | 4.451 | .000 | 1 |
| • **Nonfinancial information analytics** | .136 | .037 | .178 | 3.132 | .003 | 2 |
| dependent variable: women directors on board usage of management accounting outputs | | | | | | |
| Contestant | 4.321 | 0.137 | | 12.282 | .000 | |
| • **Financial information analytics** | .151 | .039 | .182 | 4.102 | .003 | 2 |
| • **Nonfinancial information analytics** | .147 | .035 | .193 | 5.087 | .000 | 1 |
| • **Financial estimates** | .132 | .036 | .154 | 3.795 | .001 | 3 |
| dependent variable: women directors in the executive committee usage of management accounting outputs | | | | | | |
| Contestant | 5.014 | 0.174 | | 13.352 | .000 | |
| • **Financial information analytics** | .207 | .049 | .169 | 5.624 | .003 | 1 |
| • **Financial estimates** | .183 | .037 | .191 | 4.038 | .001 | 2 |
| dependent variable: women directors in the middle management usage of management accounting outputs | | | | | | |

*** insignificant predictors were excluded automatically from the analysis**

In the stepwise regression, the relation between women directors or managers in each of the three upper management levels and management accounting types of information was tested, results shown in Table 5, revealed that female directors on the board may depend on financial and nonfinancial information analytics rather than financial estimates as it was excluded, while female directors in the executive committee or top management seem to use all types of information reported by management accounting with great emphasize on financial estimates, while the women managers in the middle management pay more attention to the financial analytics and estimates than nonfinancial analytics.

Observing the results in Table 6, there is evidence that the interactive effect of the three variables percentage of women directors, management accounting information, and the dependent variable which is the efficacy of the women directors' contribution in corporate strategy setting, obtained a significant regression coefficient ($\beta = 0.03$, $p < 0.01$), showing a positive linear relationship with the dependent variable Y. Likewise, the third model presented an increase in the index of adjustment about the second one of 0,354 ($\Delta R2 = 0.834 - 0.480$), significant at the level of 99% ($p < 0.01$). These results support the hypothesis of triple moderation, as the results show that management accounting outputs enable and enhance the efficacy of the contribution of women directors in the upper management levels in corporate strategic decisions even when they are a minority. The effect is significant and much higher than without this interaction. Management accounting has a significant moderating impact on the relationship between women directors and corporate strategy setting and implementation.

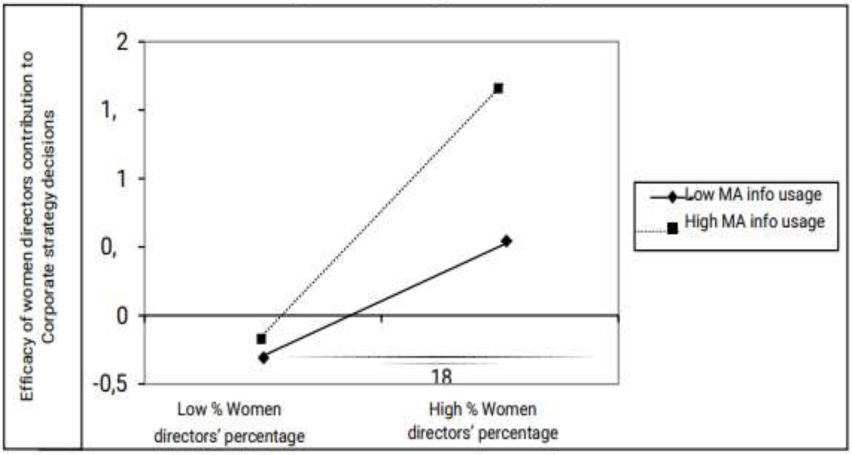
When it comes to controlling variables, there is a significant and negative effect of the variable (number of years the current position), while there is a significant positive impact of the variable ( accounting or financial background ), which means that the accounting or financial education and experience can enhance the women directors ability to use the management accounting outputs effectively, therefore they can contribute significantly in making corporate strategy decisions.

**Table 6: Ordinary linear regressions in two steps: effects of women directors in the upper levels of management ( less than 20% ) on corporate strategy formulation interaction (N = 71)**

| | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|
| | Stage 1 | Stage 2 | Stage 1 | Stage 2 | Stage 1 | Stage 2 |
| | Coeff | Coeff | Coeff | Coeff | Coeff | Coeff |
| Constant | 0.322 ** | 0.371 ** | 0.270 | 0.328 ** | 0.336 * | 0.395 ** |
| | (0.155) | (0.156) | (0.163) | (0.165) | (0.174) | (0.176) |
| MA outputs | 0.337 ** | 0.298 ** | 0.113 | 0.275 ** | 0.207 ** | 0.374 *** |
| | (0.087) | (0.126) | (0.092) | (0.130) | (0.104) | (0.140) |
| % of Women Directors | 0.584 *** | 0.622 *** | 0.510 *** | 0.557 *** | 0.569 ** | 0.609 *** |
| | (0.182) | (0.162) | (0.172) | (0.193) | (0.221) | (0.220) |
| Age | | | 0.070 | 0.094 | 0.125 | 0.160 |
| | | | (0.093) | (0.093) | (0.105) | (0.106) |
| No. of years in current post | | | 0.112 | 0.095 | 0.127 | 0.103 |
| | | | (0.090) | (0.090) | (0.090) | (0.091) |
| Previous experience years | | | -0.186 * | -0.199 ** | -0.178 * | -0.203 ** |
| | | | (0.097) | (0.097) | (0.1) | (0.1) |
| Accounting or financial background | | | 0.207 ** | 0.235 ** | 0.244 ** | 0.247 ** |
| | | | (0.104) | (0.103) | (0.107) | (0.106) |
| Board size | | | | | 0.122 | 0.157 |
| | | | | | (0.133) | (0.134) |
| Economic sector | | | | | -0.163 | -0.124 |
| | | | | | (0.115) | (0.117) |
| Interaction: women directors*management accounting information | | 0.258 ** | | 0.031 ** | | 0.004 ** |
| | | (0.148) | | (0.157) | | (0.163) |
| $R^2$ | | 0.14 | | 0.139 | | 0.193 |
| Adjusted $R^2$ | | 0.288 | | 0.480 | | 0.834 |
| F-change | | 0.69 *** | | 2.349 | | 1.998 |

All variables are normal-centered. Robust standard errors are in parentheses. The coefficient's significance is based on the value of a z-statistic.*, **, and *** are statistically significant at 10%, 5%, and 1%, respectively.

**Figure 4: Three-way moderating effect**




The three-way interaction is represented in Figure 4, When the level of model 2 is low, the relationship between X and Mod1 is positive (increasing) for both high levels and low levels. In other words, the larger the combination of X and Mod1, the greater the tendency of the dependent variable Y will be affected more. This increasing behavior is greater when there is a low level of X.

## 5- conclusion and implications

This study attempted to highlight the nature and the extent of the use of management accounting reports or information by women directors and managers at the upper management level and how it affects their contribution to corporate strategy setting and implementation, accordingly, four research questions were developed in the current study to investigate the relationships between women directors and corporate strategic decisions and the management accounting information as a moderator of this relationships.

The findings of the conducted analysis revealed that women directors in the upper management levels have a positive impact on corporate strategic decisions even though they are a minority which supports the agency, resource dependence, and the critical mass theories,  as they state that women directors could provide new perspectives or thoughts for development,  and the information generated from management accounting practices plays a crucial role in supporting the efficacy of women directors' contribution to corporate strategy processes. Tahir et al. 2021.

The exploratory analysis of the type of management accounting information preferred and most used by women directors showed that women directors on boards tend to use financial and nonfinancial analytics in corporate strategy formulation and monitoring its implementation rather than financial estimates, this could be due to the conservative nature of women directors that is proved in enormous studies,  as they need to depend on reliable and relevant information to draw the corporate strategy, in addition, they pay attention to the nonfinancial as much as the financial information, and this could refer to their skills in analyzing markets, customer relationships, and product life cycle. Hillman et al. (2002).

Women managers in the executive committee or top management according to the findings use all types of information generated from management accounting, as this hierarchical level of management is the main chain in corporate strategy formulation and implementation, so all types of management accounting are needed in this stage, while women managers in the middle management focus on the financial analytics and estimates rather than nonfinancial information, and that could be due to their responsibility of implementing corporate strategy and assessing its progress in achieving the corporate objectives. Campbell & Mínguez-Vera (2008).

5.1 Implications of the study :

Building on previous studies that indicate women directors' differences from their male peers, in terms of skills, perspectives, and vision Huse & Solberg (2006); Zelechowski & Bilimoria, (2006); Triana et al. (2013). I argue that women minorities have the potential to influence corporate strategy decisions at the upper management levels. As findings showed a positive association. One explanation can be that irrespective of their numbers, minorities of women directors could have individual power Zhu et al. (2014) that influence corporate strategy decisions.

I adopt a different approach from the notion that the least number of women directors on boards is three to be influential on the decision-making, based on the critical mass theory. It ought to be noticed that raising the number of women directors at the upper management levels is extremely challenging, particularly in some emerging economies like Saudi Arabia, despite there being more initiatives to empower women in leadership positions, male directors as corporate leaders are still preferred and selected by shareholders. Pugliese & Wenstøp (2007).

## 6- Limitations and Future Research

Limitations of this study may be considered as research gaps for future research. Current research is built on the main assumption that women directors on the upper management levels are different from their male peers in some of their skills and visions, but similar in others. Therefore, out-group bias could exist, moreover, the results could not be generalized due to the application in the Saudi Arabia context which differs in its features and culture from other contexts. Previous literature has stated that gender diversity can provide different perspectives, which benefit decisions making process, however, the gender-based groups are similar in other ways Zhu et al. (2014), therefore, the author goes along with what scholars have argued that diversity research in organizations needs further investigation with multiple methodologies Triana et al. (2013). Thus, future research could apply mixed methods, combining qualitative and quantitative research designs, and applications in different contexts for a better understanding of current study findings, moreover, it is important to acknowledge that strategic decision-making is a complex process influenced by various other factors, such as organizational culture, leadership styles, and the external environment. Future research could examine the interaction between management accounting information and these additional factors to provide a more comprehensive understanding of women directors' contribution to strategic decisions.

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# Appendix A

## PROFILE QUESTIONS

### a- Board size:

| Total number of members | Number of women directors | Percentage of women directors |
|---|---|---|
| | | |

### b- Executive committee

| Total number of members | Number of women directors | Percentage of women directors |
|---|---|---|
| | | |

### Middle management level

| Total number of members | Number of women directors | Percentage of women directors |
|---|---|---|
| | | |

## The economic sector of the corporate:

| | |
|---|---|
| Basic material | |
| transportation | |
| Long term commodities | |
| Consumer services | |
| Health care | |
| Banks | |
| Investment | |
| Insurance | |

## c- Age

| Less than 40 years old | 40 -50 years old | 50 - 60 years old | More than 60 years old |
|---|---|---|---|
| | | | |

## d- No. of years of experience as a director or a manager

| Less than 5 years | 5 – 10 years | 10 – 20 years | More than 20 years |
|---|---|---|---|
| | | | |

## e- Period in the current position

| Less than 5 years | 5 – 10 years | 10 – 20 years | More than 20 years |
|---|---|---|---|
| | | | |

## f- Accounting education or financial background

| An academic degree in accounting | An academic degree in financial management | Training courses in any of them | None |
|---|---|---|---|
| | | | |

## g- Accounting education or financial background

| An academic degree in accounting | An academic degree in financial management | Training courses in any of them | None |
|---|---|---|---|
| | | | |

## h- Respondent's position in the corporate:

| Director on the board | Member of the executive committee | Senior Manager | Executive manager |
|---|---|---|---|
| | | | |

## RESEARCH VARIABLES MEASUREMENT QUESTIONS

(Please rate according to your situation or opinion: 1 indicates strongly agree, 2 indicates agree, 3 indicates neutral, 4 indicates disagree, and 5 indicates strongly disagree)

### 1- Strategy Formulation

### 1-1 Vision setting

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Did you contribute to your corporate vision formulation? | | | | | |
| Is the vision statement relevant to the corporate's activities and mandate? | | | | | |

## *1-2 Mission Statement*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Did you contribute to your corporate mission statement? | | | | | |
| Do you feel that your current mission statement is compatible with the activities being carried on by the corporate? | | | | | |
| How would you rate your participation in developing the mission statement? | | | | | |

## *1-3Understanding Values*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Has your corporate defined a set of value statements? | | | | | |
| How would you rate your understanding of the corporate's values? | | | | | |

## *1-4 Strengths, Weaknesses, Opportunities, and Threats Analysis (SWOT)*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Has your corporate conducted a SWOT analysis | | | | | |
| How would you rate the competencies of your corporate to conduct a SWOT analysis? | | | | | |
| How would you rate your corporate's priority on the SWOT analysis process? | | | | | |
| How would you rate the importance of the SWOT analysis process to the effective operation of your corporate? | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Is a SWOT analysis employed when dealing with significant issues outside of strategic planning? | | | | | |

## 1-5 *Understanding Issues that Influence the Association*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| How would you rate your understanding of issues that influence the corporate? | | | | | |
| Relative to the decision-making process, how would you rate your corporate's attention to issues that influence its performance? | | | | | |

## *1-6 Establish Long Term Objectives*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Has your corporate established long-term objectives? | | | | | |
| Do you participate in identifying your corporate long-term objectives? | | | | | |

## *1-7 Generate Strategies*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Rate your corporate's success/practice of generating strategies to deal with issues. | | | | | |

## *1-8 Selecting Strategies to Pursue*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Does your corporate select strategies to confront issues influencing its performance? | | | | | |
| Rate the importance of selecting the following strategic solutions that suit your corporate circumstances:<br>• The blue ocean strategy ( innovation or differentiation strategy)<br>• Porter's Five Forces<br>• Strategic risk management<br>• Revenue-driven strategy | | | | | |
| Rate your participating role in selecting one or more of the following strategies during your current position: | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| • The blue ocean strategy ( innovation or differentiation strategy)<br>• Porter's Five Forces<br>• Strategic risk management<br>• Revenue-driven strategy | | | | | |

# 2- Strategy Implementation

## *2-1 Policy Support*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Does your corporate maintain a policy manual? | | | | | |
| Are corporate policies updated regularly? | | | | | |
| Rate the relevance of your corporate policies to current association activities. | | | | | |
| Rate your understanding and support of formal policy development and implementation Financial Capacity | | | | | |
| Rate your corporate's financial capacity to implement strategies. | | | | | |
| Rate the commitment to providing financial resources to support the implementation of strategic initiatives. | | | | | |

## *2-2 Board Support*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Rate your board's commitment and support to the implementation of strategic initiatives. | | | | | |
| Rate the performance of your Board as it relates to the delivery of support to strategic initiatives. | | | | | |

## *2-3 Organizational Structure*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Rate how appropriate the current structure of your corporation is to support the implementation of strategic initiatives. | | | | | |
| Rate the effectiveness of your current governance model as it relates to the implementation of strategic initiatives | | | | | |

## *2-4 Openness to Change*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Rate your corporate's readiness for organizational change. | | | | | |
| Rate the willingness to accept and implement change if you are:<br>- Member of the Board of Directors<br>- Member of the executive committee<br>- Senior manager | | | | | |
| Rate your capability as a woman director to manage and implement a change process or new strategic direction | | | | | |

# 3- Strategy Evaluation

## *3-1 Assessment*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Rate your corporate's current practices as they relate to the ongoing assessment of strategic initiatives. | | | | | |
| Rate your corporate's performance in communicating assessment results to the stakeholders: | | | | | |

## *3-2 Measure Performance*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Has your corporate developed a set of key performance indicators or some other form of accountability to track the success of strategic initiatives? | | | | | |
| Rate your corporate's ongoing evaluation practices as it relates to strategic initiatives | | | | | |
| Rate your role in setting key performance indicators to track the success of strategic initiatives | | | | | |
| Rate your role in evaluating practices | | | | | |

## *3-3 Identify Where Corrective Action is Necessary*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Rate your corporate's success at identifying corrective action when strategic initiatives are failing or could be improved. | | | | | |
| Rate your corporate's response time, after they acknowledge that a strategic initiative is failing. | | | | | |
| Rate your role in setting corrective action plans | | | | | |
| Rate the attention paid to abandoning, adjusting, or developing new strategies after the evaluation of the initial strategies | | | | | |
| Rate your corporate's effectiveness at evaluating the impact of changes after initial strategy formulation. | | | | | |

# The role of management accounting information

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Rate the level of your usage of the following financial information analytics<br>•cost measurements and evaluation<br>•cost/benefit analysis<br>•break-even analysis<br>•Budgeting<br>•activity-based costing<br>•strategic pricing; target costing<br>• and value chain costing<br>• control tools like:<br>- standard costs<br>- balanced scorecard (financial) | | | | | |
| Rate your usage of financial estimates (costs and revenues) for strategic settings and evaluation<br>• cost estimates<br>• lost opportunity cost<br>• customer relationships evaluation<br>• risk management | | | | | |
| Rate your dependence on Nonfinancial information analytics for strategic settings and evaluation<br>• Customer relationships analysis<br>• Product or customer life cycle analysis<br>• Competitive advantage plans<br>• Value chain analysis<br>• Risk management plans<br>• control tools like:<br>- balanced scorecard (nonfinancial)<br>- performance measurement KPI | | | | | |

# Appendix b

| Variables | ***Name of the variable*** | ***Data sources from previous studies*** |
|---|---|---|
| women directors on the board | *% of womenDirectors on the board* | annual Published data in the board's reports for the year 2022 |
| women directors in the executive committee or top management | *% of women Directors in top management.* | |
| women directors in the middle management | *% of women Directors in middle management* | |
| MA: financial information analytics | *Fin info analytics* | - Visedsun & Terdpaopong (2021).<br>- Vu et al. (2022) |
| MA: financial estimates | *Fin estimates* | |
| MA: nonfinancial information analytics | *Nonfin info analmplementationytics* | |
| Contribution of women directors to corporate strategy | *CWS* | - **Ferrary & Déo ( 2022)**<br>- Sidhu et al. (2021) |