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Women Directors: Revisiting Critical Mass Hypothesis

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Abstract

Purpose: This paper offers a descriptive assessment of Critical Mass Theory (CMT) application and the relevance of Collective Action Hypothesis (CAH) in board diversity research. The paper distils salient features that may address empirical inconsistencies and potentially unlock alternative methodologies for model constructs to aid future research. This paper aims to add a rational perspective that sharpens the ongoing conversation regarding gender justice, with emphasis on the legitimacy of business context and attainment of contingent-based gender threshold in pursuit of boardroom equality.

Methodology: This paper deploys an explanatory approach in distilling critical mass theory within the context of human and relational capital orientation and what the key features of collective action model represent in board role and task performance.

Findings: The paper accentuates impediments in spurring collective action, and the importance of achieving "spark threshold" with quintessential cognitive, sophisticated women directors for noticeable influence of gender diversity.

Originality and Value: This paper offered an extended CMT ("Board Spark Theory") for robust empirical testing and the "Club Rule" proposition as substitute for gender quota directives. In addition, the paper makes a case for integration of new models specifically the CMT with existing theoretical frameworks in gender diversity research. The paper outlines how women – as a critical mass variable - should be defined in research model constructs, and the unique features which differentiate directors who are likely to behave differently. Finally, the case put forth for women directorship threshold provides further clarity in deepening research conversations and understanding the dichotomy of business-equality case for board diversity.

Keywords: women directors, board diversity, critical mass hypothesis, collective action, spark threshold

Paper type *– General review*

1. Background

The advent of scandals in elite corporations around the world has led to significant focus on internal firm corporate governance and issues of board structural characteristics in corporate discourse (Arnaboldi, Casu, Gallo, Kalotychou, & Sarkisyan, 2021; Booth-Bell, 2018; Farag & Mallin, 2017; Hutchinson, Mack, & Plastow, 2015; van Staveren, 2014). It is therefore not surprising that board composition has been the most researched internal governance mechanism in recent times (Kirsch, 2018; Lawal, 2012). Studies on board dynamics such as size, leadership, and independence have been well documented (see García and Herrero, 2021). Most of these studies were built on the notion of self-serving executives and the need for increased board vigilance through active monitoring (Hillman & Dalziel, 2003; Guest, 2009; Carter, Simkins, & Simpson, 2003). Researchers have relied on agency, resource dependency and human capital models in drawing and testing empirical hypotheses regarding how these dynamics drive board task and corporate performances (e.g., Saeed & Sameer, 2017; Lawal, 2016; Nguyen, Locke, & Reddy, 2015).

In recent years however, board diversity - supported by gender parity activists - has garnered even more headlines. Growing agitation against the concept of *"old boys' club"* and continuous male dominance of corporate boardrooms has spotlighted the issue of diversity in board composition, with significant emphasis on the need for increased female participation (Dowling & Aribi, 2013; Joecks, Pull, & Vetter, 2013). According to advocates, corporate "*male dominated*" boards suffer from sub-optimal configuration syndrome, with less diverse viewpoints. This fundamentally affects quality of boardroom deliberations and decisions due to absence of female representation (Ben-Amar, Chang, & McIlkenny, 2017).

As tough corporate monitors, women directors are viewed as a key symbol of board effectiveness (Jia & Zhang, 2013; Zalata, Ntim, Choudhry, Hassanein, & Elzahar, 2019). Chen, Eshleman, & Soileau (2016) opine observable variation in patterns of behaviour between male and female directors because of their distinctive value composition. Among such unique behavioural traits is the "nerve," which protracts decision on points of indifference. Overconfidence of male directors may create blind spots that impair quality of board decisions; yet the potential exposure from this inherent deficiency in board effectiveness may easily be mitigated with the injection of more female directors into boardrooms (Menicucci & Paolucci, 2022).

Board gender diversity proponents have advanced both business and equality cases in support of involving more women at apex corporate decision-making bodies (Hutchinson et al., 2015; Torchia, Calabrò, & Huse, 2011; Campbell & Mínguez-Vera, 2008). Interestingly, the business and equality justifications have evolved into two streams of diversity research, with some focusing on demographic variables, and others on cognitive imperatives (e.g., Lawal, 2016; Hodigere & Bilimoria, 2015; Kim & Cannella, 2008; Nicholson & Kiel, 2004).

From an empirical viewpoint, research trends do not seem as linear as may have been conceived by the proponents and justifications advanced in favour of board diversity (Hutchinson et al., 2015). Although prior studies have focused on demographic and cognitive attributes fixated mostly on roles of women directors, the research is significantly skewed in favour of the former which accounts for most of the studies (see Conyon & He, 2017; Sila, Gonzalez, & Hagendorff, 2016; Adriaanse, 2016; Jia & Zhang, 2013; Torchia et al., 2011). Interestingly and just as it were in the case of other board attributes before it, most previous research on diversity suffered methodological deficiencies including defective model constructs, loose variable definitions, moderating variables indifference and disregard for gender representation threshold, amongst others (Kirsch, 2018; Chauhan & Dey, 2017). As a result, past research findings failed to provide consistent resolution to the key questions specifically as to: (1) *whether the participation of women is critical in promoting board effectiveness and specific role play;* and (2) *if attainment of numeric threshold of women directors really matters in engendering collective actions as critical mass?*

Learnings from these inconsistencies and identified methodological flaws include inappropriate deployment of underlying theories to support research hypothesis (see Lawal, 2012). For instance, even though the principles behind agency and resource dependency theories are relatable to fundamentals of board diversity, they lack sufficient level of efficacy and sophistication that provide resolution to the central questions of board gender diversity especially when used on standalone basis (Zona, Gomez-Mejia, & Withers, 2018; Hillman & Dalziel, 2003). Consequently, few studies have turned to alternative theories including cross-study field knowledge adoption of related models (e.g., Torchia et al., 2011; Garcia-Meca, Lopez-Iturriaga, & Santana-Martin, 2022; Dobija, Hryckiewicz, Zaman, & Pulawska, 2022; Booth-Bell, 2018). One of such theories that has emerged strongly and perhaps holds key for future gender diversity research is the Critical Mass Theory (CMT) built on the concept of *collective action*. Surprisingly and despite its sophistication, the critical mass model has not received substantial attention in corporate governance research compared to the classical theories (Oliver, Marwell., & Teixeira, 1985). In the quest to gain further understanding of dynamics of board diversity, researchers need to be more open minded and take more risk by trying out alternative theories including possible integration of CMT with other dominant models to provide subterranean insight that may help address unanswered research questions around the effect of women directors.

Through illustrative review of previous studies underpinned by the CMT, this paper attempts to provide answers to the above central questions. At the end, the paper aims to identify knowledge gaps while charting directions for future research on women directorship in corporate governance. This paper contributes to the existing literature by providing robust clarity on the importance of women directors' cognitive and numeric threshold in deepening research conversation and understanding the nucleus of business-equality case for board diversity. Through distillation approach, the paper also creates more awareness on adaptability of CMT in board diversity research and offers substantial guidance on research model construct for robust empirical testing and validation.

The remaining sections of the paper are outlined as follows: Section two offers succinct description and distillation of CMT as an alternative model with suitable parameters for board gender diversity research. The third section provides a deep dive review of literature within the context of empirical findings supporting the efficacy of CMT and methodological constraints from past studies. The fourth section highlights key directions for future research and model constructs for predictive stability and reduced empirical equivocality. In the fifth and final section, the paper draws its conclusion and offers hypothetical recommendations.

2. Distilling Critical Mass Theory in Board Diversity Research

The emergence of critical mass theory has induced curiosity, and hitherto offered interesting insight regarding the distinctive features of board membership diversity that provoke the level of collective action needed for effective board performance. According to the proponents as summarised in the work of Oliver et al. (1985), *"collective action depends on a critical mass that behaves differently from typical group members."* Distilling this fundamental premise on board gender diversity, a simple deduction would be that female directors are likely to behave differently from their male counterparts because of their inherent difference and multi-tasking configuration. As such, the presence and involvement of women in board activities may stimulate collective action that promotes and increases the "*level of good*" in strategic areas (such as profit maximization, earning management, market value, dividend pay-out, debt-quality, corporate disclosure, social responsibility and environmental sustainability actions) and absorb "*start-up costs*" (through board vigilance and independence that steams excessive risk-taking and financial distress, supports internal controls, and enhances quality of audit) for extensive collective action.

First, women directors as critical mass provides "*level of good*" for inert members. Their existence may augment cohesion and prevent groupthink and passiveness that impair board effectiveness. As a unique mass women directors promote board activism, which may inspire inactive members to get involved in making their voices heard. From board effectiveness standpoint, these features incite participation in board deliberation and expand members' level of confidence, ownership, and independence of opinion (Zalata et al., 2019). It is interesting to note that ability of women to play these multiple roles is more pronounced in situations where board effectiveness declined due to diminished efficiency of board composition and members' performance – otherwise known as *collective good deceleration* (Congleton, 2015; Jia & Zhang, 2013; Oliver et al., 1985). Secondly, the theoretical principle that women absorb start-up costs is anchored on scepticism that women taking the lead in such collective actions may have reputational implication especially as minorities in male dominated arena. While collective action may likely promote acceleration of collective good through increased board independence for effective discharge of fiduciary monitoring and control functions, such actions may pose reputational risk for advocates - in this case, women directors. The reputational risk may result from inherent difficulties of rallying and spurring support action of other non-critical mass members who are most likely conflicted and perhaps submissive with less inertia to cause material change to status quo (see Chauhan & Dey, 2017; Oliver et al.,1985).

There are at least three conclusions that can easily be drawn from the above distillation. First is realisation that not all masses are and would be critical. In some instances, the presence of women directors may be a mere façade and or token configuration to fulfil regulatory compliance and possibly mitigate adverse social reaction (Garcia-Meca et al., 2022; Chauhan & Dey, 2017). If either scenario is to be the case, then, the effect of women directors may be benign, with no efficacy to cause collective action and absorb start-up costs. As a matter of fact, Bøhren and Staubo (2014) argue that having a cosmetic-based board gender diversity may radically increase cost of governance due to inefficient distortion in board structural composition. These additional costs, according to some studies, may vary across firms (Bøhren & Staubo, 2014).

Alternatively, women directors may be an "active" mass given their inherent multitask distinctiveness, acquired cognitive competencies and social capital. These are a class of directors most likely to behave differently to induce collective action for collective good (Hodigere & Bilimoria, 2015; Seierstad & Opsahl, 2011; Zalata et al., 2019). Whereas most studies believe women directors are fairly risk averse, women directors with cognitive financial qualification may likely behave differently (Birindelli, Chiappini, & Savioli, 2020; Mohsni, Otchere, & Shahriar, 2021; Campbell & Mínguez-Vera, 2008). Oliver et al. (1985) touched on the challenges of galvanizing for collective action. For example, some active women directors may be "Capricorn", with high self-esteem, either because of their specialities or as acme entrepreneurs. Others, according to Ismail and Manaf (2016), are young, vibrant and may have social capital with external connections. These visible peculiarities may cause such directors to exhibit an outlier behaviour uncommon to typical women "in pursuit of collective good", which leads investors to place significant premium on their appointment into corporate boards (Ismail & Manaf, 2016).

With regards to level of good, ability of women directors to spur crystallization of collective action may largely be dependent on achievement of potent threshold in terms of having the right number of women directors ideally proportionate to board size (Oliver et al., 1985). Here, the critical mass model speaks to the relevance of optimal representation required to promote critical mass role play for board effectiveness and performance. Until the presumed threshold is reached, women directors with critical mass tendencies (in terms of their cognitive and social network) are unlikely to cause splitting explosion for collective action that support realization of collective good (see Garcia-Meca et al., 2022; Torchia et al., 2011).

Overall, in consideration of the propositions of critical mass theory, a key take away may be that fundamentals which drive board effectiveness and performance of directors aren't as broad as prior research had outlined. What is needed to spike collective action is having just a few fragments of a whole acting differently by exerting more effort over and above other board members. Oliver et al. (1985) argue that the more prevalent these categories of masses are, the more the prospective effectiveness of collective action. So, board diversity defined - whether in terms of directors' demographic and/or cognitive characteristics - need not be extreme but rather suited for purpose and overarching interest (Congleton, 2015). Joecks et al. (2013) offer an interesting perspective that encapsulates the strategic relevance and need for appointment of female directors with critical mass inclination, where they argue that cognitive impetus of female directors does not sufficiently indicate an effective board configuration; rather, what matters is their ability to act differently. The critical mass hypothesis in part lends support to business' case for board gender diversity, as only those women directors that would behave differently are more likely to influence outcome of board decisions.

To achieve the required level of numeric representation that forms critical mass for collective action, some proponents have advocated for quota system. Kogut, Colomer, & Belinky, (2014) assert that the imposition of a quota system would create the required critical mass for board structural equality, with women directors acting as self-sustained Capricorns and not having to depend on their male counterparts. Until this quota threshold is reached, female representation on the corporate board may not have critical mass efficacy for their action to affect performance. Farag & Mallin (2017) in their study pegged this critical mass threshold at 27 per cent of board size. They found the relationship between diversity and performance to be non-linear. Therefore, it is important to note that the threshold is not necessarily fixed but rather a moving ratio that changes with level of board size and independence.

3. Review of Literatures and Research Findings

3.1 Board Diversity and Women Directorship

Diversity of directors is one of the most evolving dynamics of board characteristics given the increased debate on gender parity and the growing call for more involvement of women at the top of the corporate decision-making hierarchy. In part, board diversity is fundamental in attaining board effectiveness, due to presumed benefits associated with diversity itself. Advocates of board diversity have argued to the fact that membership diversity enhances board efficiency in terms of resource utilization as different perspectives are exploited in arriving at any strategic decision. Diversity of views shared in the boardroom and quality of board deliberations owing to diversity of members' cognitive, demographic, and professional configurations are some of the rationales advanced in favour of board diversity (Dobija, et al., 2022; Conyon & He, 2017; Dowling & Aribi, 2013). Farag & Mallin (2017) opine that variety of experience and human capital due to membership diversity enhance board competence in the discharge of its responsibilities. From a gender diversity perspective, women directors are said to offer diverse viewpoints which provide boards with the opportunity to look at things differently, given domination of male gender (Konrad, Kramer, & Erkut, 2008). Because women are generally risk averse, board monitoring and control activities increase with more female representation and limits opportunity for perversive corporate malpractices (Dowling & Aribi 2013; Arnaboldi et al., 2021). This increased board vigilance, according to proponents, diminishes agency costs.

In the words of Ben-Amar et al. (2017), women directors play a significant interest-balancing role, which Garcia-Meca et al. (2022) said mitigate agency conflict among interested parties. However, other opposing perspectives point to the demerit factors associated with board diversity. Pluralisation attributable to divergence of opinion, and emergence of factions which increases the likelihood of group conflict and reduce cohesion among board members, are some of the key drawbacks anti-board diversity proponents have cited (see: Lawal, 2016).

Numerous studies have been conducted to empirically validate the relevance of membership diversity – particularly directors' demographics which had attracted substantial share of research interest (Mohsni et al., 2021; Ben-Amar et al., 2017; Nguyen et al., 2015; Lawal, 2012). Over the past 20 years, successive studies have tested for the effect of women directors on a variety of performance indicators including internal controls (Chen et al., 2016); independence (Lawal, 2016); earning management (Fan, Jiang, Zhang, & Zhou, 2019; risk-taking (Chen, Gramlich, & Houser, 2019; Mohsni *et al.*, 2021), dividend pay-out (García-Meca et al., 2022; Saeed & Sameer, 2017); market value (Alharbi, Elnahass, & McLaren, 2022); board vigilance (van Staveren, 2014); corporate listing (Bernardi, Bosco, & Columb, 2009); audit quality and corporate disclosures (Akhtaruddin and Haron, 2010; Dobija et al., 2022); debt quality and bankruptcy (García & Herrero, 2021); CRS and environmental sustainability (Ben-Amar et al., 2017; Seierstad & Opsahl, 2011; Bear, Rahman, & Post, 2010) amongst others. Even though some of these and other related studies failed to find significantly consistent association between women directors and relevant performance indicators, few have reported an enhanced effect of gender diversity on overall board effectiveness (e.g., Martinez-Jimenez, Hernández-Ortiz, & Cabrera Fernández, 2020; Benkraiem, Hamrouni, Lakhal, & Toumi, 2017).

The surge in using the gender demographic may be attributed to the growing pressure on corporations for social inclusion, especially granting access to more female participation in corporate governance. In some jurisdictions, ground-breaking regulatory changes have been implemented in support of women directorship. The regulations range from severe to persuasive recommendations. For instance, the Norwegian quota system model which has become a profound single point of reference for legislation promoting women involvement in corporate boards with mandatory threshold ratio capped at 40 percent was historic and the first of its kind (Bøhren & Staubo, 2014). Similar mandatory guidelines with consequence management clause for non-compliant corporations are now practiced in Belgium, France, Germany, and Italy. Other jurisdictions like Spain and Denmark have opted for less stringent regulations. Interestingly, some concerns have been raised that these forced regulations on board diversity may brew inefficiency in boardrooms due to a reduced pool of cognitively sound directors, and thus hinder overall board effectiveness (Bøhren & Staubo, 2014). Chauhan & Dey (2017) found empirical evidence that points to growing inefficiencies in corporate boards with women directors, who – according to them – are more susceptible to absenteeism, which creates a vacuum in perspectives and shared viewpoints in board deliberations.

For whatever it is worth and compared to pre-gender legislation era, these regulatory changes have led to considerable increase in the nomination of women into boards of corporations and attracted more dialogue and research interest in the dynamics of women representation (Sila et al., 2016; Lawal, 2016). Most of these debates and studies have focused on understanding the implication of quota system adoption, performance variability between male and female directors, and whether women directors induce board effectiveness and overall corporate performance i.e., “the business case” (Dobija et al., 2022; Kirsch, 2018; Lawal, 2012). There are also groups of attempts aimed at dousing the positive tension with conjecture that women involvement is cosmetic based and merely designed to prevent public and regulatory scrutiny i.e., “equality case for diversity” (Chen et al., 2019; Sila et al., 2016; Wang & Clift, 2009; Campbell & Mínguez-Vera, 2008; Carter et al., 2003).

3.2 Theoretical Eccentricity of Critical Mass Hypothesis

Because a large portion of prior research has adopted a variety of theories, empirical findings have not only been equivocal but correspondingly diverse in terms of the outcomes they signify (Ben-Amar et al., 2017). These inconsistencies resulted from vague model constructs based on perceived relevance of individual corporate governance theories (i.e., agency, resource dependency, stewardship, and stakeholders’ theories). Key shortcomings from each of these theories used in previous research lie in the lack of clear distinction between demographic and non-demographic related characteristics, as well as how they fundamentally affect individual disposition regarding a given course and/or collective action. So, from the onset there is an inherent incongruity between theoretical presumption and how those models have been applied in board gender diversity studies, hence, the resulting ambiguous outcomes (see: Lawal, 2012). Nielsen & Huse (2010) argue that some of these classical theories may not offer the required usefulness in revealing the strategic relevance of having women in boardrooms. The excessive standalone use of agency theory in place of integrated approach that leverage on other dynamic model such as critical mass theory is a typical example of such inappropriateness (Zona et al., 2018).

Agency theory is a model that is premised on addressing self-interest of corporate executives (and the inherent distrust therein) through effective monitoring and control by the board of directors regardless of their demographic (gender) configuration (Ben-Amar et al., 2017). Therefore, when it comes to measuring how these directors differ in the discharge of their statutory responsibilities as well as human and social capital contribution to board discourse and tasks, agency model may not have the required level of efficacy to track potential disparities in demographic characteristics as a combination of agency and CMT would. Interestingly, this intrinsic mismatch may partly explain why even studies that had adopted identical theories, still differ significantly in their reported findings. A classic example is the case of Carter et al. (2003) and Campbell & Mínguez-Vera (2008). The Carter et al. (2003) and Campbell & Mínguez-Vera (2008) studies are two of the most referenced board gender diversity research projects in corporate governance. Both studies adopted agency theory in examining the effect of women directors on firm value and corporate performance yet arrived at different outcomes. Whereas Carter et al. (2003) found a significant statistical positive relationship between representation of women directors and firm value based on a sample of 797 companies drawn from Fortune’s 1,000, Campbell & Mínguez-Vera (2008) run similar empirical analysis using data drawn from 68 non-financial listed companies and found no significant evidence to suggest that the presence of women directors affects firm value.

Due to a theoretical misfit, these, and several similar studies after them, suffered two major methodological defects (Lawal, 2012; Wang & Clift, 2009). The first is the postulation that all female directors are the same – which failed to differentiate between critical and non-critical mass female directors. The presumption that female directors would behave the same way is somewhat untrue and misleading. Our current understanding of critical mass hypothesis shows that not all female directors are critical to affect and/or provoke the required collective action due to constraints in their human and social capital (Gharbi & Othmani, 2023; Menicucci & Paolucci, 2022; Birindelli et al., 2020; Elmagrhi, Ntim, Malagila, Fosu, & Tunyi, 2018; Torchia et al., 2011). Secondly, because there were no distinctions made between the two categories of female directorships, no comparative assessments were conducted to establish whether there is significant (or otherwise) relationship between the presence of each class of directors and performance indicators.

On the contrary, board gender diversity studies with CMT linkage fared relatively well when compared to those that had used lone alternative (classical) models (Leyva-Townsend, Rodriguez, Idrovo, & Pulga, 2021; Noguera, 2020; Martinez-Jimenez et al., 2020; Arena et al., 2015). To demonstrate the relevance of CMT in explaining the relationship between gender diversity and corporate governance and performance, the paper highlighted key empirical evidence from a sample of selected past studies drawn using a simple filtering criterion. These include *(i) board (gender) diversity focused, (ii) deployment of CMT and or collective action as underlying model, (iii) researched within the past 15 years (2008-2023), (iv) published on Scopus indexed peer review journal with no less than 1.0 impact factor, and (v) must covered topical firm level performance/market value based variables.* After the review of over 50 qualified related articles and being a modest descriptive study, a sample of eighteen (18) empirical studies were drawn as best fit for use in the illustrative review.

Though the literature coverage is relatively small, indications from reviewed studies showed that proponents of critical mass hypothesis have offered interesting research evidence that highlights the roles women directors play in engendering specific collective actions, as against the generic role play advanced in alternate theories (Garcia-Meca et al., 2022; García & Herrero, 2021; Saeed & Sameer, 2017; Torchia et al., 2011). For instance, on dividend pay-out as a measure of market value, whereas Campbell & Mínguez-Vera (2008) in their Spanish study of non-financial listed firms built on agency theory orientation, found no significant connection between the presence of women directors and market value, alternative studies from Spain that focused on similar firm groups but had adopted critical mass hypothesis recorded contrary outcomes. Garcia-Meca et al. (2022) examined a sample 131 non-financial listed firms in Spain over a14-year period and found significant U-shaped relationship between the presence of women directors and dividend pay-out policy. According to this study, the direction of causality was largely a function of whether female director optimal threshold had been reached. They also found empirical evidence that linked the presence of women directors to decline in agency problems, at the attainment of required numeric threshold. Evidence from this study further validates our earlier assertion regarding the strategic relevance of having the required minimum number of women director representation for their critical mass effect to be noticeable.

Corporate boards with women directors have been linked to increased oversight and institutionalisation of effective internal control systems that checkmate executive excesses and enhance quality of corporate decisions. Because women are natural monitors and thorough, their exploratory instinct, in addition to cognitive skills they possess, supports agency role play, which, according to Zalata et al. (2019), mitigate managerial opportunism. Chen et al. (2016), using a data set consisting of a staggering 4267 firms' year observations, found robust statistical evidence that linked the presence of women directors to reduced internal control weaknesses, validating the notion of women directors as incredible corporate gatekeepers when given the required numeric strength. The Chen et al. (2016) study offers empirical support for the claim that male – and not female – dominated boards are more likely to engage in corporate malpractices, including but not limited to control system overrides. Their result offers farfetched insight on the issue of critical mass threshold as they found evidence that shows as low as one female director may be sufficient to induce collective action of common good in the boardroom. The conclusion drawn from the Chen et al. (2016) study is consistent with earlier postulation in Nielsen & Huse (2010) and Elstad & Ladegard (2012), where they argued that the presence of women directors enhances the effectiveness of board decision-making processes due to increased group participation, depth of deliberations and exchanges of decision-support information.

The safeguarding roles women directors play in corporate boardrooms are somewhat connected to the dynamics of behavioural (individual) differences. Whereas male directors are reactive by nature and thrive under pressure, female directors tend to be easily broken when faced with stiff competition, and to mitigate that inherent weakness they tend to be more proactive in their approach. Amorea & Garofalob (2016) reported that women executives underperform with increased competition, while performing better under reduced competitive intensity – which again is consistent with Conyon & He (2017) findings, where statistical tests showed significant linkage between women directors and dispersion of firm performance.

Women directors promote adherence to professional ethics. Bernardi et al. (2009) found empirical evidence that suggests percentage of women directors in corporate board is linked to high Ethisphere quotient ranking, across governance, risk and compliance program, corporate citizenship and responsibility performance, and leadership and reputation measures. Their findings reflect the theoretical notion that women (as critical mass) are not only likely to comply with business ethics but exert compliance to ethical conduct (Zalata et al., 2019; Jia & Zhang, 2013).

According to Garcia-Meca et al. (2022) women directors tend to be more enthusiastic, which increases their level of work ethics and commitment to corporate common good. Because of this gender-induced board vigilance, top executives of such corporations are unlikely to engage in high-risk behaviours. There are documented empirical outcomes that fairly validate the above, especially when it comes to women directors' attitude towards corporate risk-taking. Farag & Mallin (2017) used critical mass hypothesis to examine a sample of over 200 public listed private European banks between 2004 and 2014 and found that the presence of women directors was associated with reduced bank vulnerability to financial crisis. They further documented that non-executive women directors behave differently from their executive women counterparts when it comes to attitudinal disposition towards corporate risk-taking. A clear deduction from this study points to the fact that critical mass roles are significantly played by independent non-executive female representative as both grey non-executive and executive female directors are likely to exhibit similar behavioural pattern as their male executive folks, due to their inherent conflict of interest. Interestingly, this finding is not surprising but rather validates presumptions that female non-executive directors as outsiders hold no substantial allegiance to the executives and thus are more likely to be independent of the overbearing influence of CEOs (Garcia-Meca et al., 2022). In a similar study, Mohsni *et al.* (2021) affirmed that the presence of women directors leads to less corporate risk-taking because they act as an instrument of control that checkmates executive excesses in post-financial crisis era.

There are equally documented findings on how critical mass women directors prevent financial distress and facilitate corporate disclosure in terms of quality of financial reporting and on global emerging themes such as environmental sustainability initiatives, climate change and corporate social responsibility (CSR). Dobija et al. (2022) found that increased share of women directors was linked to effective financial function role plays, including financial reporting, audit quality and management of corporate earnings. In a study of non- banking EU firms, García & Herrero (2021) found a link between high proportion of independent non-executive women directors and enhanced debt quality and reduced potential for financial distress. On environmental sustainability, while it is a known fact of significant societal menace stem from business activities (resulting from stakeholders' value extraction scrambles), only a handful of corporations acknowledge these veracities and contribute towards addressing them. For corporations giving back to the society, evidence points to the role of women directors in activating those strategic collective actions. Corporations found to be actively in support of sustainability initiatives tend to have critical mass of active female directors on their corporate boards. Ben-Amar et al. (2017) found that voluntary corporate disclosure on carbon footprint grew as women's board representation grew. One interesting finding in their study was the threshold of critical mass activation for collective action, which they found to be two female directors. Similarly, Bear et al. (2010) found CSR ratings to be positively linked to corporate reputation as mediated by the existence of female directors.

Overall, a key takeaway from the observed consistency of these selected findings is that critical mass models are more effective in tracking the effect of gender diversity – particularly women participation on board performance – using role-based approach (García & Herrero, 2021). Studies may find it difficult to attribute an improved corporate performance directly to women directors' activism at board level, but when measured in the context of specific role play (e.g., audit quality, corporate disclosure, risk-taking), it is easier to gauge the efficacy of their participation if the required numeric threshold is achieved.

4. Future of Board Gender Diversity Research

Significant public policy grounds have been covered illustrating the importance of and need to increase women participation at top corporate levels. However, research on women directors has lagged in providing consistently robust empirical evidence that support the regulatory and somewhat rhetorical assertions – the main reason being overreliance on traditional theoretical frameworks and models such as agency, managerial hegemony, resource dependency, stewardship, and stakeholders (Nielsen & Huse, 2010). Future studies must come to the realisation that these generic classical theories have already been over flogged, in addition to their distinctive hypothetical weaknesses. Hence, corporate governance needs fresh models for integration with existing theories in studying and explaining the intrinsic characteristics of key board dynamics in relation to board effectiveness and performance. New theories are necessary to augment and perhaps unlock unobserved variables missed by the existing theories, but which are relevant in understanding the characteristics of board dynamics for reliable construct of research framework and hypothesis testing. Typical example of such new viewpoints is the CMT which has so far showed significant research prospect. For instance, integrating CMT theory with resource dependency model built on business case for gender diversity may offer avenues for robust empirical examination and findings. While making a case for combined theoretical approach, Hillman & Dalziel (2003) argue that human and social capital of directors influence the effectiveness of corporate boards in the discharge of agency and resource dependence roles. Therefore, in a diversified board, female directors may behave differently and act contrary to male directors because of differences in their social and human capital. According to Booth-Bell (2018), the distinctive social capital contribution of female directors may "*translate into external influence that creates additional resource for the firm*". The strategic relevance of directors' human and social capital in promoting board effectiveness is well documented in corporate governance research (see: Kim & Cannella, 2008; Felício, Couto, & Caiado, 2014; Tian, Haleblian, & Rajagpalan, 2011; Nicholson & Kiel, 2004). For instance, Felício et al., (2014) found robust empirical evidence that suggests that firm performance is highly driven by human and social capital of those involved in the management of the firm. Tian et al., (2011) found positive market reaction to the appointment of directors with higher levels of human capital and social network. As the board of directors provides agency oversight for the corporate managers, their cognitive and relational abilities influence corporate performance (Yousaf, Ullah, Wang, Junyan, & Rehman, 2022; Tian et al., 2011). Hence, numeric critical mass representation of specific gender alone would not suffice without consideration of business case especially the cognitive and social capital characteristics that ensure that only qualified and merited directors are selected into boards (Kanadlı, Alawadi, Kakabadse, & Zhang, 2022; Martinez-Jimenez et al., 2020; Hodigere & Bilimoria, 2015; Kim & Cannella, 2008).

Despite the equivocality of findings on board diversity, reasonable number of studies that had used CMT in conjunction with existing classical theories found the influence of women directors to contingently vary, based on actual ratio of their representation to board size, and whether the representation threshold is reached in terms of cognitive female gender participation (Gharbi & Othmani, 2023; Menicucci & Paolucci, 2022; Birindelli et al., 2020; Elmagrhi et al., 2018). Gharbi & Othmani (2023) found statistically significant evidence that shows positive effect of female directors on firm performance, with results turning negative when gender ratio dropped below threshold. Future studies should leverage this new paradigm especially the relationship between numeric threshold and board specific role play (collective action) by women directors. The CMT is built on multiple subtle factors, so that should offer avenues for comprehensive research. For instance, since the proponents have hypothesised that critical mass causes different kinds of collective actions (see: Oliver et al., 1985), future research should aim at answering key questions such as what ideal number of women forms critical mass, what practical methodology should be used in determining such value and whether there is a link between that minimum threshold and specific collective action(s). There is need to equally investigate whether ratio of independent non-executive women board members matters in critical mass role play in the corporate boardroom.

This paper recognises the growing equivocality in studying board gender diversity. As a matter of fact, the application of CMT is a reality check that has truly brought into question our understanding of diversity and heterogeneity, and how the variables are used interchangeably in building and testing research models. It is worthy to note that diversity and heterogeneity have conflicting connotations. Nonetheless, these variables have been defined and used interchangeably in numerous prior studies. So, one of the ways to enhance future empirical prospects would be to address these methodological defects – including, but not limited to, adoption of best-fit theoretical frameworks, quality data, robust model constructs and cohesive variable definition and measurement.

From a theoretical perspective, understanding and attributing the right relevant theories to specific (or collection of) board dynamics is crucial in designing appropriate research framework for achieving the desired consistency, regardless of study jurisdiction. For instance, this paper offers a modest description and highlight of research backings on how the use of CMT in board diversity and heterogeneity knowledge streams may offer favourable prospect for robust hypothesises development and findings that justifies the growing support for women participation and their strategic relevance in the boardroom. Future studies on other aspects of non-diversity dynamics may perhaps rely on alternate theories that are more suitable to understanding the nature and characteristics of such dynamics.

Data quality and defective model constructs are another area of interest that future studies must address. When it comes to empirical validation, data quality, in terms of stationarity, is core to robust statistical valuation and testing. Conducting pre-diagnostic tests (e.g., Unit root and Augmented Dickey Fuller testing) to ascertain level of stationarities of data sets may help limit potential use of unstable data series. Future studies may equally adopt integrated data sourcing and collection methodology using both primary and secondary sources, and cointegrate them for viable empirical testing. Data collected via secondary sources, such as financial reports and other public database, remained dominant. Nevertheless, there are subtle nonvisible characteristics in some of these board variables whose inherent disparities are more noticeable only through primary data sourcing (see: Elstad & Ladegard, 2012). Formulation of an effective predictive model is another aspect that had posed a serious challenge in most prior studies. The observed imperfections range from cases of omission of key variables to adoption of disproportionate variables that adversely affected predictive power and stability of models due to endogeneity and collinearity effects.

With regards to variable definition and measurement, future research should avoid oversimplification of parameters and pursue sophistication in definition and assignment of value to measurement parameters. This is so important as relationship between board dynamics such as gender diversity and board task performance indicators seem to be more complicated than the simplistic narratives showcased in prior studies. For instance, using simple absolute or ratio of women directors as a measure of gender diversity is unsophisticated and narrow, especially when it comes to defining and explaining fundamentals of collective action as entrenched in the critical mass theorem (Chauhan & Dey, 2017; Saeed & Sameer, 2017; Lawal, 2012; Nielsen & Huse, 2010). Conyon & He (2017) found the effect of director gender diversity on corporate performance to be non-homogeneous and thus could not be standardized as past studies depicted. Therefore, future studies need to move a step further by differentiating and accounting for the effect of potential behavioural disparity between critical and non-critical female directors, to substantiate empirical validity regarding the importance of gender diversity in promoting board effectiveness – this being so, as the equivocality of previous studies may in part be attributable to lack of depth in appropriate delineation of gender variables in model construct and testing. In ascertaining whether women directors are dependent or independent as defined by their financial and social affiliation with top executives, perhaps their cognitive distinctiveness is crucial to locating potential behavioural disparity for collective action. Conclusively, Farag & Mallin (2017) argue that cognitive non-executive female directors are more susceptible to be critical mass, as they are likely to behave differently.

5. Conclusion and Recommendations

From equality to business case-based standpoints, significant justifications have been advanced in support of women involvement in corporate boardrooms. But how their presence engenders board effectiveness is dependent on whether they have sufficient quorum – in terms of numeric size – to cause an upset for collective action. To be clear, appointing women that are likely to behave differently (critical mass) is a key determinant in bringing about collective action beyond their individual cognitive competence (Joecks et al., 2013). Achieving the required quorum in women director representation should create the needed balance of power between genders. This is consistent with the outcome of the Ben-Amar et al. (2017) study where they noted that gender efficacy was only noticeable when the number of women directors reached the relevant critical mass.

However, none of the current gender quotas issued across different jurisdictions clearly outline how those percentages were derived –hence, it is difficult for researchers to conclude whether the recommended gender ratios are ideal threshold for critical mass effect of female directors to be noticeable. Thus, there is the need for policy overhaul around gender quota guidelines. Specifically, the Corporate Governance Codes (CGC) should be more explicit and pragmatic on gender diversity rules and their applications in board composition. The paper recommends replacement of current gender quota policy with the "*Club Rule*" model, a hybrid board composition mechanism anchored on the business case of gender diversity. Unlike the quota system, the proposed club rule focuses on key aspects of board human and social capital such as the mechanisms for appointment and replacement of directors, CEO/board chair succession plan and attainment of active gender representation.

First, appointment and replacement of directors should follow a defined rule that offers right of first refusal such that for every three male directors appointed, the fourth appointment should be a female director, and that circular process should continue until the total board size is achieved. Secondly, the replacement of directors following tenure expiration or death should be based on "*gender for gender"* succession plan. Hence, out-going male and female directors should be replaced with male and female directors respectively – except for the position of board chair where succession plan should be "*opposite gender-based"*. In this case, a male board chair should be succeeded by female chair and vice versa. The club rule model is premised on the notion that given an average board size, an optimal gender representation threshold for attainment of equality and improved board effectiveness (Spark threshold) often lies between 1st and 2nd quartile, with maximum not above half of the 2nd quartile. Theoretically, at an average of eight (8) board membership, this methodology will result in a maximum board gender share of 33/67. Interestingly, the proposed methodology is empirically supported and consistent with findings in prior studies (e.g., Gharbi & Othmani, 2023; Dobija et al., 2022; Adriaanse, 2016; Joecks et al., 2013). The adoption of club rule would provide rational mechanism for selection of cognitive female directors with vital human and social capital into corporate boards.

To test empirical validity of club rule, this paper proposes an extended CMT model called "*Board Spark Theory (BST)"* for determining the ideal quorum for women directors that would likely increase chances of having those with critical mass tendencies. The BST is a suggested board gender composition model that is premised on meaningful directorship segmentation that allows cogent women representation on corporate boards without significant distortion to the optimality quotient of board size. Ceteris paribus, BST model is anchored on key fundamental assumptions that: *(i) gender composition affects board effectiveness; (ii) board effectiveness is a function of board independence; (iii) board independence is a function of directors' composition; (iv) compensatory gender composition is mandatory for all corporate boards; and (v) board membership size is capped at an ideal numeric level.*

Working based on the above conditionalities, the paper theorises appointment of one women director for every three male directors employed, subject to a standard board size of 8 directors, which translates into a shared gender diversity of 33/67 called *"Spark threshold*". Beyond board size of 8 directors, the gender ratio share should be fixed and kept constant to check the potential effect of diminishing marginal efficacy of women directors. Board size cap is essential to limit possible influx of boardroom by insider directors. This assumption is supported by past studies that have found noticeable effect of female directors as critical mass from numeric representation between 1 and 3 on an average board size range between 8 and 18 (see; Menicucci & Paolucci, 2022; Garcia-Meca, 2022; Leyva-Townsend et al., 2021; Noguera, 2020; Elmagrhi et al., 2018; Ben-Amar et al., 2017; Chen et al., 2016; Torchia et al., 2011). Spark threshold mechanism is designed to augment critical mass hypothesis by accounting for minimum number of women directors that must be present for noticeable critical mass role play. Interestingly, the model being proposed here is similar to the recommendation in the work of Farag & Mallin (2017), where women representation was capped at 27 per cent. However, this paper offers a closed end-based methodology for determining the ratio of women representation with capped maximum board membership to safeguard critical mass potency from inherent adverse effect of large board size (see: Nguyen et al., 2015; Guest, 2009; Lipton & Lorsch, 1992). Again, support for the proposed closed-ended representation can be found in most recent empirical studies. Dobija et al. (2022), in their study anchored on critical mass hypothesis, found that the efficient frontier for effective women representation lies between 10 and 40 percent share of board size. Joecks et al. (2013) and Adriaanse (2016) suggested a gender quotient of 10 to 30 percent.

Given the suggested numbers in prior studies, which ranges from 1 to 2 women directors (Ben-Amar et al., 2017; Chen et al., 2016) for which Garcia-Meca (2022) and Torchia et al. (2011) argue are more likely to be tokenism based, the proposed BST approach would offer prospects for emergence of more critical mass from women directors' population in boardrooms. High cognitive women directors left alone with required numeric strength are more likely to exhibit non-conforming behaviour that challenges status quo set by male-dominated boards (Elstad & Ladegard, 2012; Staveren, 2014; Konrad et al., 2008). Hence, BST theorem provides an avenue for reassessment of potential effects of augmented shared participation of women directors on board effectiveness. The paper recommends future testing to ascertain empirical validity of the proposed club rule and that of BST hypothesis and to determine whether its application induces collective action role play by women directors in corporate boards.

Finally, the case for women participation at top corporate management level is not only valid but empirically strong prospect-wise, particularly within the context of promoting sustainable board effectiveness. There is great consensus regarding the actual and potential value women directors bring to the corporate table. Even though access to boards remains comparatively limited for women in most jurisdictions, series of assessments show that those who achieved the fit most times outshined their male colleagues (see: Staveren, 2014).

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