The mutual impact between shareholder activism and green innovation efficiency on managerial overconfidence: Evidence from financial reports of companies listed on the Egyptian Stock Exchange

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Abstract:

The study aimed to identify the effect shareholder activism and green innovation efficiency on managerial overconfidence in the Egyptian environment. To achieve this goal, this study was applied to a group of companies listed on the Egyptian stock market in various sectors, through content analysis of the annual financial reports of these companies during the period, 2019-2023. Based on the results of the statistical analysis of the study data and testing the hypotheses, the researcher concluded that shareholder activity leads to reducing managerial overconfidence, the interpretation coefficient reached 46.4%. In the same context, the efficiency of green innovation also works to reduce managerial overconfidence. and the interpretation coefficient reached 36%, while when both shareholder activity and green innovation efficiency were entered together in the regression model, this led to a greater impact on reducing managerial overconfidence, as the interpretation coefficient reached 56.2%, which is greater than the explanatory coefficient in the case of entering each variable separately.

Key Wards: Shareholder activism, green innovation efficiency, Managerial overconfidence

Introduction

The Egyptian Stock Exchange encourages shareholders to "demand acceptable standards of corporate governance from management of the firms they invest in". Also encourages all investors who are in the position to influence firms to try to do so in order to boost compliance with corporate governance practices that have been put in place. This imply that the ESE encourages activism and longer.

Furthermore, Managerial overconfidence is an important area of study for both developed and developing countries. However, most of the previous studies were conducted in developed economies. In the case of developing countries, it is even more crucial due to the unique challenges they face. First, resource constraints in developing nations cause poor managerial decisions. Second, overconfident managers in developing nations may act unethically or harm the organization or its stakeholders due to weak institutional structures and regulatory environments. Finally, political, fiscal, and social instability are common in developing nations. This makes risk assessment and decision-making harder for managers, **(Hu et al,.2024).**

In general, Overconfident individuals tend to overestimate the expected payoffs, either because of a general tendency to expect good outcomes, or because they overestimate their own efficacy in bringing about success. Furthermore, people tend to be more overconfident about their performance on hard rather than easy tasks, we expect relatively overconfident CEOs to be especially enthusiastic about risky, challenging and talent and vision-sensitive enter**, (Li, 2024)**.

As a result, there is not hypothesize the direction of the effect of overconfidence on the effectiveness of the CEO in generating innovation for given R&D expenditures. The biggest puzzle raised by existing research on managerial beliefs and corporate policy is that firms often employ overconfident managers and give them leeway to follow their beliefs in making major investment and financing decisions. in spite of the tendency for these executives to destroy value through unprofitable mergers and sub-optimal investment behavior, **(Pratiwi, 2024).**

Managers tend to treat green innovation as an unnecessary investment because of its demand for tons of resource inputs, long-time lag for return and high-level risk**, Lev & Wang, (2024).** in spite of, green innovation provides firms with several benefits, but also incurs costs**. First**, one benefit is that green innovation helps send a signal that the firm is socially responsible, and improve the firm's reputation and social image. As a result, stakeholders may make favorable reaction and maintain long-term relationship with the firm. **Second**, green innovation can be used to reduce operating and financial risks, **(Zhou et al, 2024).**

On the other hand, Shareholder activism is considered to be essential for the proper functioning of a firm’s corporate governance system. It is not until 1946 that the US Securities and Exchange Commission (SEC) required firms to include shareholder resolutions in proxy statements, **Bajzik, (2023).** Common shareholder activist groups may include (individual shareholders, mutual and pension funds, non-governmental organizations).

Shareholder activism is a contemporary issue and has become important because of its effect on the firm and due to the media coverage, it receives when it is launched. In addition, some studies show that activists play an influential role in improving corporate governance and ultimately, firm performance, **Islam, (2020)**. Also, it became a necessary tool for shareholders as a result of the realization of the agency problem where the owners of the firm are separate from

the managers. This separation of control and ownership leads to agency problem which has to be managed, yet managing the agency problem attracts agency costs which has to be reduced, **(Islam, 2024).**

Turning to the reality of Arab and Egyptian research in this field, the researchers noted that the research efforts made do not reflect the same interest that Western studies paid to the same topic. Researchers did not have any studies that addressed the relationship between shareholder activity and managerial overconfidence, in addition to not specifically addressing the role of green innovation efficiency in this relationship.

Hence, this paper **aims to** put a building block in the research gap represented in determining Mutual influence between shareholder activism and green innovation efficiency on managerial overconfidence. by focusing on green innovation efficiency considering as an important institutional factor ,can help to promote managerial engagement in corporate sustainable transformation in the context of the Egyptian environment , provides a better understanding of the role of shareholder activism which in turn is reflected in the annual reports of Egyptian companies, and through analyzing managerial overconfidence in the Egyptian market which differs fundamentally in terms of language and culture from developed markets , also thus the possibility of generalizing the results to companies operating in similar environments .Our research will help academicians and users understand the phenomenon, and the regulator is reviewing the required regulations , To achieve this goal, this study was applied to a group of companies listed on the Egyptian stock market in various sectors, through content analysis of the annual financial reports of these companies during the period, 2019-2023.

The main contributions of our study are as follows. Firstly, to overcome the lack of refinement and precision measurement in previous studies, we use the corporate governance (CG) activities variables measure shareholder activism, and thus the corporate governance (CG) is better reflected in the quantitative indicators used measure shareholder activism. Secondly, we tested the effectiveness of the efficiency of green innovation. from two perspectives of green innovation (structure and integration). Past studies explore the green innovation from a quantitative , while standpoint The resource (structure and integration) concept is better reflected in our study's green innovation elements, Thirdly, we examine the possible mechanisms of shareholder activism and green innovation efficiency is

affecting managerial overconfidence, Fourthly, there is a great scarcity in the analytical literature, there is no previous study that directly relates shareholder activism and green innovation efficiency with managerial overconfidence ,as is done in the present study.

Based on the above, the essence of the research problem is to answer the following questions:

1. **What is the effect of shareholder activism on managerial overconfidence?**
2. **What is the relationship between green innovation efficiency and managerial overconfidence?**
3. **What is the moderating effect of shareholder activism and green innovation efficiency on managerial overconfidence?**

(2) Literature review and hypothesis development:

2.1. Related Literature:

2.1.1- Shareholder Activism:

Previous studies such as **(Chuah, et al.,2024)** indicate to Shareholders Activisms is a new evolving concept but well known in developed countries across the globe Though the instances of shareholder activism are rising, studies in the literature did not focus on assessing the impact of such activism. In the past, shareholding activism has been discussed by policymakers and academicians, but currently, we see actual events happening across companies. It is observed that rejections of proposals by institutional shareholders are increasing year on year, **Bajzik, (2023).** These enhanced activities can be attributed to the corporate governance framework, improving leaps and bounds experiencing the transformation in its corporate governance framework since introducing the new companies, **(DesJardine & Shi,.2023).**

whereas Various SEBI (Securities and Exchange Board) regulations have improved the corporate governance framework. Regu-latory framework and effective execution are the critical enabler of Shareholder activism, **Dao & Xu, (2024).** The new initiatives are taken by regu-lators such as e-voting facility, appointing a minimum number of independent directors, separation of Chairman and Managing Director (MD) role has given more power to the activist shareholders. The higher stake is associated with higher voting power and control policies, **Shingade, et al (2022)** It is noted that, the active involvement of shareholder activists derives from changes in legal regulations such as the US Securities and Exchange Commission's (SEC's) requirement of including shareholder resolution in proxy statements in 1946 and the passage of the Sarbanes-Oxley Act in 2002, **Barros, et al (2023)**.

Past studies as **(Diaz-Rainey, 2023**) indicated to, Shareholder activism refers to the responses of activists who are not satisfied with firms' management and operations. Even though shareholder activists attempt to make changes within the firm without changing the corporate control, activist shareholders play an important role in corporate governance through their submission of proposals and expression of their views over firms' performance. Activist shareholders also check management's tendencies to engage in opportunistic activities and thus promote effective corporate governance, Ganie**, (2023).**

Accordingly, it is this description suggest that activism is seen as a tool not pursuing to take over, but rather, to bring amendment and retain management. This form of activism can be described as defensive activism, **DesJardine, et al (2024).** Another approach is where shareholders buy shares in firms in order to have control and put pressure on the management of companies to effect change**, Islam, (2024)**. This means shareholder activism is normally initiated by dissatisfied shareholders who try to influence and improve the policies and strategies of their firms through negotiations, communication and pressure**, Rastogi, et al (2024).** In addition to that , Shareholder activism can therefore be defined as the actions taken by active investors who want to guard their investment to increase their wealth by engaging managers to meet their demands for reforms when managers are wasting resources**, Xie, et al, (2024)**, and they do so either by being hostile or using diplomatic means to ensure good corporate governance system are adopted and moral hazard is minimized so as to enhance firm performance**, Bajzik, (2023).**

In light of the above, the researcher see, the underlying concept in this definition is that this activity is triggered when shareholders are dissatisfied with the output from management and would want to change the result and typically, this activity is undertaken by active shareholders.

2.1.2. Green Innovation Efficiency:

Enterprises pay more attention to the relationship with corporate stakeholders, whether it is the green innovation activities based on technology or market-oriented business models, and put more emphasis on the creation of multiple integrated values based on innovation-led economic, social, and environmental which are all associated with the ESG performance **Sun, et al (2024)**. While others see that, green innovation is a type of innovation where businesses try to use resources more efficiently and use less energy, and employ cutting-edge

techniques to accomplish the twin objectives of economic and environmental performance, Chen**, et al (2024).** Through green process product innovation, businesses can reduce emissions and save energy, **Song, et al (2024).**

In general, green innovation aligns with long-term-orientated behavior. It requires many resources, including technology, labor and financial investments**, Jia, et al, (2023)**. However, scholars argue that green innovation helps firms address environmental regulation, mitigate stakeholder pressure, develop legitimacy and improve technical efficiency in the long run, **Gu & Yuan, (2024**

In the same context, a study (**Huang ,2024)** showed that green innovation includes innovative changes in product design, manufacturing, process optimization, management, marketing, and service assurance. With this innovation, enterprises strive to minimize waste, increase productivity, enhance reputation and competitiveness.

While a study (**Liao & Li, 2023**) added that green innovation positively affects corporate competitive advantage. Firms engaging in green innovation can minimize production waste, increase their reputation, and thereby increase their competitiveness under consumers' pressures and regulations of policymakers.

Furthermore, a study **(Jia, et al., 2023)** Noted that the competitive advantages result from two main benefits of green technologies: the commercial rewards of creating environmentally-friendly products and the financial benefits. Thus, successful green innovation helps firms to strengthen their core competencies and to enhance their green image**, Zhou, et al. (2024).**

argues that companies that take the lead in green innovation will enjoy the "first-mover advantage." However, due to the limitations of environmental regulations and government systems in promoting enterprise green innovation, as well as the positive externality of green innovation knowledge spillover and the negative externality of environmental benefits, green innovation has a high degree of information asymmetry and income risk uncertainty, **Wang, et al. (2023).**

2.1.3. Managerial Overconfidence:

In general, Overconfidence is a personality trait that can be defined as behavioral bias and having unrealistic (positive) beliefs about any aspect of an event under uncertainty conditions Most overconfident managers are very optimistic about their decisions and their results,

especially in terms of investment decisions **Mashayekh, & Morshedi, (2020).**

While the study of (**Wang, et al,.2022**) indicates that overconfidence is a kind of irrational behavior that company managers tend to exhibit when making decisions about their business.

Meanwhile, that overconfident executives are more prone to overestimate their abilities in examining highly profitable investment opportunities, **Wang, (2021)** In the same context, Managerial overconfidence is defined as the possibility of the CEO to anticipate highly positive results, with the overestimation of the probability of results occurring, **Carvalho, et al (2024)**. An overconfident manager will systematically overestimate the future returns from investment projects, or one might say that they overestimate the probability and effect of favorable events and underestimate the probability and effect of adverse events on the corporate cash flows. Therefore, overconfident managers are expected to have higher capital expenditures and overinvest in investment projects Cheng**, Y. (2023).**

Based on the above, there three main overconfidence types**, Choi, et al (2024)**: overestimation, over-placement, and over-precision. Overestimation means that the decision-maker believes their abilities are higher than they really are, over-placement means decision-makers believe themselves to be better than others, and over-precision means excessive certainty about the accuracy of one's beliefs. Overestimation is the most common and has received much attention from researchers. Some studies **(Li, 2024)** show that overconfidence can lead to suboptimal choice, inventory imbalance, and low investment efficiency**.** However, Overconfidence is usually considered destructive for companies, **Hu, et al (2024).** Also Study **(Zhang, et al ,2024)** show that overconfidence has a negative influence on a firm's acquisition premiums, financial strategies, and the risk appetite of managers. The conventional risk management theories suggest that lower risk may increase shareholder wealth by reducing the expected taxes, information asymmetry, and bankruptcy costs.

some previous studies have shown that overconfident managers are more destructive because of their biased optimism toward investment opportunities, such as loss-making mergers and suboptimal investments**, Makpotche, et al, (2024)**. Despite the significance of R&D expenditures, the agency theory suggests that it is unusual for executives to invest in R&D activities due to conflicts of interest, as it affects the firm's short-term profitability. R&D activities are input for

innovation and bear long-term results**, Pratiwi, (2024)**. In general, the tenure of top managers is usually short, and their wealth depends on the firm's performance during that tenure. Top managers prefer higher performance in both the short and long run. In such cases, top managers increase their annual salary and bonuses by boosting only the firm's short-run performance, Choi**, et al (2024)**. Therefore, top managers are more likely to underinvest in research and development activities because the outcomes of these activities are usually realized after the top manager's tenure, **Listiani et al., (2024).**

In this regard, a study (**Mashayekh, & Morshedi, 2020**) find that overconfident managers are more likely to issue optimistically biased forecasts. While **(Li, 2024)** find that overconfidence is associated with a greater likelihood of earnings management and financial fraud. document a relation between managerial traits, including confidence, and a variety of corporate policies. find that overconfident managers are less likely to use external finance, and issue less equity. While, a study **Marietza, (2024)** find that CEO overconfidence is associated with making acquisitions, and with more negative market reactions to acquisition announcement. Most of these findings add to the puzzle of why firms are willing to hire overconfident managers. Nevertheless, overconfidence can negatively affect managers in that it can lead them to accept highly convex compensation contracts that expose them to additional risk**, Shelih, & Wang, (2024).**

2.2- Hypothesis development:

2.2.1. Shareholder Activism and Managerial Overconfidance:

Risk-taking," a key feature of entrepreneurial orientation, refers in the present context to the strategic decision-making behaviors of managers in uncertain environments, **Li, (2024)**. However, large shareholders who practice strategic intervention are more likely to rely on formal control measures (e.g. financial controls and monitoring) to influence managerial behaviors, which can lead to managerial myopia and low-risk orientation large shareholders' cooperative participation behaviors can help foster managers' positive attitudes and behaviors toward risky innovation, **Islam, (2024).** Research has shown that the presence of large shareholders is beneficial in enhancing managers' risk-taking behaviors**, Shingade, (2022)**, and we further contend that strategic consensus behaviors of large shareholders may have a positive effect on managers'risk-taking, (**Zhang, et al., 2018; Anzilago**, **et al.,2024).**

First, as strategic decisions are often not exhaustive and accompanied by unexpected circumstances, strategic consensus helps managers to

fully convey information and knowledge of the initial strategy to large shareholders, and in turn, managers tend to feel more supported and more confident in dealing with potential uncertainties **Second**, under strategic consensus, managers are more likely to maintain close cooperation and collaboration with large shareholders. Thus, managers can more easily access important resources and knowledge as required for innovation-related strategy formulation and implementation. This, in turn, making innovation decisions and in selecting projects.

Shareholder activism uses ownership position to influence the management and, eventually, firm policies and behavior. Shareholder activism is discussed in connection with corporate governance, or we can say primarily issues in corporate governance are the drivers of shareholders activism**, Bajzik, J. (2023).** Therefore, it is crucial to understand the linkages between these two phenomena. The connection between shareholder activism and corporate governance can be established theoretically through agency cost, **Dao & Xu, (2024).**

Whereas Key corporate governance parameters which affect the firm performance are ownership stake and type, CEO duality, independence of the directors, the appointment of directors, and legal systems **Ganie, et al (2023)**. For a single owner, it is easier to monitor the management and replace if not satisfied with the performance, which is not possible in the case of dispersing ownership structure, **Chuah, et al., (2024)**. whereas that non-coordinated activism, i.e. individual shareholders, does not yield desired results, **Rastogi, et al (2024).**

In addition to that, corporate performance and governance have been the target of shareholder activism Activists " have grabbed the middle ring and are controlling the main event ", according to some observers**, Islam, (2020)**. The pledge to hold corporate executives accountable to the shareholders of their companies and stakeholders has been personified by shareholder activism, a social movement that sprang from the outlier behaviors of corporate gadflies, **Makpotche, et al. (2024).**

The Previous studies also reveal that shareholder activism has a significant impact on other corporate policies. find shareholder activism influences governance practices; that is, activist shareholders can pressure managers to adopt a preferred accounting method. **Therefore, the first hypothesis is generated:**

H1: There is a significant impact of shareholder activism on managerial overconfidence.

2.2.2. Green Innovation Efficiency and Managerial Overconfidence:

Innovation is a core means to maintain a competitive advantage, yet it often requires numerous resources, primarily, time and capital, and may not contribute to the achievement of short-term goals, Wang**, et al., (2023)**. Agency theory conceives that manager, focused on their personal reputation and career development, will be liable to invest more in performance-oriented projects and will lack commitment to long term investment projects, **Yang & Chen, (2024).**

While a study **(Thi, & Nhu,.2024)** indicated to Innovation practices are undertaken to achieve market and production-based goals, such as market share, exploiting the niche market, enhancing product quality, and reducing the production cost. Recently, innovation activities have become the center of attention for many firms because it helps them to create differentiation, attain a competitive advantage, and become the market leader**, Huang,(2024).**

On the other hand, Risk-taking is a key influencing factor in decisions concerning innovation and has a correspondingly important effect on firm performance and long-term development Prior research has found that resource allocation decisions pertaining to innovation activities are ultimately the responsibility of a firm's managers and as managers' risk-taking reflects a firm's risk-taking tendency, its importance for firm innovation performance is clear, **Lv, & Wang, (2024**).

Risk-taking is manifested in managers' efforts and willingness To pursue and utilize external opportunities, helping their firms gain long-term competitive advantage through prospering innovation activities, **Liao,(2023)** .Risk-taking managers not only have a higher level of tolerance to innovation risk and uncertainty, they also have more confidence in successfully completing innovative projects, **Listiani ,et al, (2024)**, and These managers are more likely to actively introduce novel technologies and acquire new knowledge to engage in innovation activities and respond to changes in the external environment Thus, managers' risk-taking contributes to the improvement of firm innovation performance, **Cheng,(2023).**

However, innovation approaches suggest that firms do not operate in a vacuum. Rather, they interact with other organizations (customers, suppliers, competitors, universities, states, and government ministries) and institutions legal, financial, political, and administrative, **Chen, et al., (2024)**. These institutions and organizations participate in the research, development, and commercialization of new products and

processes, Moreover, these factors also shape the behaviors and attitudes of managers, **Gu, & Yuan, (2024)**.

It is noted that green innovation experienced rapid growth after 2015.Thus, it's necessary to explore the link between Managerial overconfidence and green innovation by using alternative approaches, **Cheng, (2023)**. Whereas Managerial overconfidence refers to the tendency of managers to overestimate their abilities and the performance of their firms. Such circumstances can lead to excessive risk taking, resulting in high returns or significant losses, **Wang, (2021).**

On the other hand, corporate innovation refers to developing and introducing new products, services, or processes that enhance the competitiveness and profitability of firms**, Makpotche, et al., (2024).**

The institutional environment can be crucial in shaping the relationship between managerial overconfidence and corporate innovation. Firms operating in different institutional environments may need to adopt different strategies to encourage innovation while mitigating the risks associated with managerial overconfidence, **Wang, et al., (2022).**

Even though, Technological progress and innovations are primarily based on managerial and firm-level expertise, **Wang, et al (2023)**. However, innovative processes comprise interactions between firms, organizations, and institutions**, Liao, (2023).**

Firms operating in developing economies encounter specific challenges in stimulating innovation. These challenges are categorized into two levels, namely, the micro- and macro level**, (Liu, 2024**; **Huang,2024)**. Micro level factors are firm-level challenges affecting innovation, such as resource management and managerial capabilities, these factors are within the control of firms to adjust and increase innovative performance Macro level challenges are country-level factors that impact firm-level innovation and managerial decision-making, for example, the institutional environment in which firms operate**.** These factors are beyond the control of firms. A weak institutional environment sometimes affects a firm's available resources and managerial capabilities.

Because green innovation has environmental externalities, it will be recognized by stakeholders such as the government, investors, suppliers, consumers, etc., and the management will improve their reputation and stimulate the management's enthusiasm for green innovation, **Cheng, (2023)**. Moreover, green innovation has significant financial performance, which can improve the competitive advantage

of the enterprise and realize the long-term sustainable development of the enterprise. This will bring a sense of accomplishment to the executives and stimulate the enthusiasm of management for green innovation, **Makpotche, et al., (2024).**

while top managers pursue the short-term economic benefits of the company. Green innovation has significant environmental performance and financial performance, which can realize the sustainable development of enterprises, **Zhang & Chen, (2023)**. However, compared with traditional innovation, green innovation has the characteristics of large investment, long investment cycle, and high risk, and green innovation has the "dual externality" of technology and environment **Jia, et al, (2023)**. Corporate executives will abandon green innovation in order to avoid risks**, Wang, (2021).**

It is well recognized that innovation is vital for a firm's growth and long-term competitive advantage. Chief Executive Officer (CEO) overconfidence is considered to be highly related to firm innovation since overconfident CEOs are likely to take risks, address challenges, and implement corporate changes such as investing in R&D activities terature reveals internal and external factors influencing firms' green innovation, **Pratiwi, (2024).**

External determinants include governmental regulations, stakeholder pressures market competition and financial resources availability. and institutional investors on the board. Using a sample of US firms, they document that the worse-governed firms generate fewer green patents relative to the well-governed firms, **(Ganie**, **et al., 2023).** Nevertheless, and they do not examine firm investments in green R&D. In addition, the shock used in their framework dates from the late 1980s**, (Lv & Wang, 2024)**.

Based on the above analysis, H2 is generated as follows:

H2: There is a significant impact of green innovation efficiency on managerial overconfidence.

2.2.3. Effect of both shareholder activism and green innovation efficiency together on managerial overconfidence:

Shareholders pursue the long-term sustainable development of the company, while top managers pursue the short-term economic benefits of the company. Also, green innovation has significant environmental performance and financial performance, which can realize the sustainable development of enterprises, **Huang, et al., (2024)** However, compared with traditional innovation, green innovation has the characteristics of large investment, long investment cycle, and high

risk, and green innovation has the "dual externality" of technology and environment, **Jia, et al., (2023).**

In addition to that, Corporate green innovation plays an important role in balancing economic development and environmental protection, and promotes the high-quality development economy, Sun**, et al., (2024).**

Furthermore, and according to agency theory, managers who seek steady, short-term increases in performance are less inclined to spend long-term assets on firm innovation efforts than significant shareholders who typically anticipate a rise in future returns from such investments, **Cheng, (2023).** To decrease agency issues and integrate managers' objectives with those of shareholders, this argument claims that firms wanting to improve their innovation efforts should create suitable external or internal governance systems, **Bajzik, (2023).**

In agreement with this, the shareholder activism perspective recommends that to enhance company innovation activities and protect their interests, significant shareholders may utilize their advantage of share ownership to engage in management operations, **Sun, et al., (2024)**. For instance, they may get in touch with managers directly by attending crucial meetings and corporate events, or they could get in touch with managers covertly by using the board of directors hypothesized that R&D inputs are positively correlated with activism. R&D inputs operate as a buffer between activism and its effects on R&D outputs, **Zhou, .et al (2024).**

Previous studies indicate that , Less aggressive interventions may boost managers' confidence when making innovation decisions and encourage them to be more proactive when identifying and seizing potential innovation opportunities, It is simpler for managers and large shareholders to collaborate and work together to obtain the information and resources required for creating and implementing specific innovation projects thanks to the strategic consensus of large owners, **Cheng, (2023).** Given the collaborative character of innovation, the strategic agreement may also be considered advantageous for enhancing a company's success in this area, Barros**, et al (2023).**

Based on the resource-based theory, shareholder activism is conducive to gaining the trust of stakeholders, including investors and consumers, and getting the market and financial resources needed for green innovation**, Zhou, .et al (2024)**. Companies increase their green innovation investment, thus promoting green corporate innovation **Huang,(2024)**, According to signaling theory, on the one hand,

shareholder activism has the "information effect" of alleviating information asymmetry and principal-agent problems, thus providing information to help enterprises make long-term decisions on green innovation activities, which enables them to obtain more green patent outputs, **Jia, et al., (2023).**

On the other hand, higher participation in shareholder activism enhances firms' product market recognition the better the shareholder activism, the higher the performance of corporate green innovation**, Sun, et al, (2024).**

Shareholder activism is defined as engaging with company management and influencing their behavior, advocating policy changes, and impacting their overall conduct. Adopting activist proposed strategies is expected to help shareholders maximize wealth **(Rastogi, et al, 2024)**. Also, defines as formal or informal monitoring of the corporate management, Xie**, et al, (2024).**

Large shareholders' cooperative participation behavior helps align the interests of managers and makes them inclined to invest more time and effort into innovation activities, **Islam, (2024).** This behavior, also termed "strategic consensus," refers to a shared understanding and commitment between large shareholders and managers on the content and implementation of the firm's firm strategies It also can facilitate the occurrence of efficient cooperation and collaboration between large shareholders and managers, **Zhang, et al., (2018).**

The initiation of an innovation strategy within a firm usually entails support from a wide range of stakeholders and strategic consensus can facilitate the formulation and implementation of innovation strategies and thus enhance innovation performance **Sun ,et al ,(2024)**, strategic consensus not only helps reduce relationship conflicts and any undesirable behaviors of managers, but it also enables the achievement of and commitment to high-quality innovation strategies, as well as securing the legitimacy of strategy formulation by a firm's managers, **Wang, (2021).**

large shareholders' strategic consensus facilitates cooperation and collaboration with managers, as large shareholders and managers are more likely to agree on the priorities of the specific innovation strategies and work together to search for knowledge and resources needed for strategy development and implementation **Zhang, et al (2018)**. Furthermore, given the cooperative nature of innovation, strategic consensus can be seen to be conducive to the improvement of a firm's innovation performance. strategic consensus helps create a

platform for sharing strategic information and knowledge that supports the transformation of innovative ideas into viable processes, products or services, **Makpotche et al, (2024).**

At a high level of strategic consensus, managers may pay more attention to the suggestions and requirements from large shareholders and proactively introduce new technologies as well as deploying resources and capabilities to R&D activities that can promote the development of new products, **Anzilago, et al., (2024).**

On the other hand, strategic consensus can aid the sharing and integration of knowledge and resources of shareholders and managers, contributing to the discovery and adoption of new technologies and knowledge , thus, enhancing the innovation performance of firms, **Lv, & Wang (2024).**This is principally because large shareholders are major investors that are outside of a firm and hence not directly responsible for decisions regarding or the implementation of corporate strategies, **DesJardine, et al, (2024)**. Instead, they can influence managerial attitudes and behaviors toward innovation risks, whether directly, via informal negotiation and consultants with managers, or using indirect approaches such as through the nomination of directors and voting on important strategies, **(Mashayekh, & Morshe, 2020; Pratiwi, 2024).**

Given that managers are the main decision-makers within firms the influence of large shareholder participation behaviors on innovation performance must be realized by changing managers' attitudes or behaviors toward innovation decisions, **Cheng, (2023). .** Therefore, we posit that managers' risk-taking mediates the relationship between large shareholder participation behaviors and firm innovation performance. Specifically, large shareholders' strategic intervention and strategic consensus behaviors may influence firm-level innovation performance by changing managerial risk-taking, Zhang**, et al., (2018).**

Based on the above analysis, H3 is generated as follows:

H3: There is a significant impact of both shareholder activism and green innovation efficiency together on managerial overconfidence.

(3) Data sources, methodologies & Design models used in our research:

3.1. Sample selection and data collection

The study utilizes secondary data from a sample of 16 company listed in Egypt. Five years of data from the financial year (FY) 2018–2019 to (FY) 2022–2023 is collected for analysis in this study. Thus, 5 years of data for 16 company formed 16 × 5 = 80 company year observations for analysis are used:

Table No (1)

NO	Name Company	
1	Ibn Sina Pharm	**(ISPH)**
2	Telecom Egypt	**(ETEL)**
3	Egyptian Pharmaceutical Company (EIPICO)	**)PHAR(**
4	Palm Hills	**)PHDC(**
5	Talaat Moustafa Group Holding	**)TMGH(**
6	Fawry for Banking Technology and Electronic Payments	**)FWRY(**
7	E-Finance for Digital and Financial Investments SAE	**)EFIH(**
8	Misr Company for Fertilizers Production	**)MFPC(**
9	Alexandria Mineral Oils Company	**)AMOC(**
10	Edita Food Industries	**)EFID(**
11	Oriental Weavers Carpets	**)ORWE(**
12	Castle Financial Investments	**)CCAP(**
13	EFG Holding Group	**)HRHO(**
14	Abu Dhabi Islamic Bank	**)ADIB(**
15	Beltone Holding	**)BTFH(**
16	Commercial International Bank	**)COMI(**

3.2. Variable definitions

3.2.1-Measure of Shareholder activism:

Shareholder's activity index is constructed to reflect the involvement of shareholders in corporate governance (CG) activities. This index includes the various facets of CG practices as per the regulatory standards for the listed firms. This index is used as a proxy for shareholder activism. It covers various shareholder activism-related parameters which are considered important in enabling activism, this paper uses various corporate governance activity variables to construct the index. The index sub-categories were chosen so that all the shareholder activism-related issues were roofed, which were highlighted in the literature. The index is constructed using six sub - categories. To explicate Shareholder activism denotes the involvement of the firm's shareholders in corporate governance systems (CG).

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Table No (2)

Items	Measurement indicator
1- Board structure and Compensation :	▪ size of the board. ▪ outside / inside / independent directors. ▪ number of board meetings conducted. ▪ number of independent directors as per regulations. ▪ director with multiple directorships in multiple Companies. ▪ whether the chairman is an independent director
2-Financial Performance:	▪ Retained Earnings ▪ Investments isubsidiaries/group companies. ▪ The market capitalization of the firm. ▪ Dividend paid and Audit details.
3- Ownership type:	▪ Authorized Capital. ▪ Shareholding patterns.
4-Business Focus comprises of:	▪ variables related to strategy ▪ liquidity, and cash management
5-Shareholder Rights includes variables such as:	▪ Proposals placed during the AGM / EGM ز ▪ voting results and whistleblower policy.
6-Related Party Transactions:	▪ Revenue and expenditure from the related parties' transactions. ▪ Dividend income from the related parties' transactions. ▪ Other income from the related parties' transactions.

This index is created by examining various CG activities and shareholders participating in such CG systems. wherein each variable is assigned a binary value following the data in the disclosure report. If disclosure is available, "1" is assigned; else, "0" is assigned. The higher value of the index presents a good shareholders activity in response to CG.

3.2.2 - Measure of Green Innovation Efficiency:

there is a combination effect among the variables that drive the efficiency improvement of green innovation. Because green innovation efficiency is an outcome realized under the conditions of resources – and the resource aspect contains multiple variables.

3.2.2.1. Resource structure:

Given that green innovation demands significant capital investment, its success relies heavily on enterprises possessing deployable, flexible and liquid internal resources. Valuable redundant resources, such as cash assets, play a crucial role in providing resource support for enterprises' green innovation activities, sedimentary redundant

resources are highly liquid resources without a specific purpose, capable of addressing market competition and institutional pressures. In line with the definition of "resource structure" in resource orchestration theory, which underscores that enterprises can maximize the value of resources, enhance resource utilization capabilities and leverage resource opportunities by restructuring their resource portfolio, this paper gauges "resource structure" through the ratio of sedimentary resources to non-sedimentary resources Here, sedimentary resources are defined as (selling expenses þ administrative expenses)/operating income, while non-sedimentary resources are represented by cash/operating.

3.2.2.2. Resource integration:

It uses the return on net assets to indicate the profitability of the enterprise post implementation of integration activities and resource reorganization. Additionally, to reflect the degree of integration of intangible resources, such as knowledge, information and data, the ratio of intangible assets to total assets is considered.

Table No (3)

Resource structure	Resource integration
▪ sedimentary resources are defined as (selling expenses+ administrative expenses)/operating income ▪ while non sedimentary resources are represented by cash/operating income	▪ the return on net assets to indicate the profitability of the enterprise ▪ Additionally, the ratio of intangible assets to total assets

3.2.3. Measure of managerial overconfidence:

The availability of excessive administrative confidence makes the manager take investment decisions that affect both the growth in the company's assets and the growth in the company's sales. If the growth rate in the company's assets is faster than the growth rate in the company's sales, this is an indication of excessive administrative confidence. In light of this, it was indicated Studies have used the surplus investment regression equation to determine the residuals of the model of regression of the company's assets on the growth in its sales. The greater the value of the residuals is than zero, the more this indicates that there is growth in the company's assets greater than the growth in its sales, which expresses the tendency of managers towards excessive investment based on Excessive administrative confidence, and this can be explained by the following mathematical equation:

$$\text{Invest}_{it} = \alpha o + \beta \iota \ \text{Sales Growth}_{it-1} + \varepsilon_{it}$$

Whereas:

Invest it: refers to the volume of investment spending (representing new investments in fixed assets and long-term investments of the company for the year), weighted by the total assets of the previous year of the company: during the period

Sales Growth it: refers to the growth rate of the company's annual sales during the period, and it is the revenues of the previous year - the revenues of the year before the previous year) over the revenues of the previous year.

3.2.4-Control variable:

Regulatory variables relevant to the disclosure tone and stock value encompass several key aspects:

3.2.4.1-Company Size: This is measured by the natural logarithm of total assets at the end of the year

3.2.4.2-Leverage: This variable is measured through the ratio (total liabilities/total assets).

3.2.4.3-Return on Sales: It is measured through the ratio (net profit after tax / total sales).

3.3. Table 1. List of the variables:

Table No (4)

Variable name	Measurement of variables	Literature review
Independent Variables		
Shareholder activism SHA)(	The index is created by examining various CG activities and shareholders participating in such CG systems. Wherein each variable is assigned a binary value following the data in the disclosure report. If disclosure is available, "1" is assigned; else, "0" is assigned. The higher value of the index presents a good shareholders activity in response to CG	**Shingade, et al, (2022) & Islam, (2020, 2024) & Bajzik, (2023).**
Green Innovation Efficiency	**resource structure**: sedimentary resources are defined as (selling expenses + administrative expenses)/operating income, while non-sedimentary resources are represented by cash/operating income **resource integration:** the return on net assets to indicate the profitability of the enterprise.	**Jia, et al. (2023) & Zhou, .et al (2024). Dao,. et al., (2024)**

Variable name	Measurement of variables	Literature review
	Additionally, the ratio of intangible assets to total assets	
Dependent Variable		
managerial overconfidence	Invest it αo + βι Sales Growth it-1 + & it	**Hu, et al. (2024) Pratiwi, (2024), Shelah, & Wang (2024)**
Control Variables		
Size	It is measured by the natural logarithm of total assets at the end of the year.	**Shingade, et al. (2022) &Barros, (2023) Marietza, (2024) Rastogi, et al. (2024)**
Leverage	This variable is measured through the ratio (total liabilities/total assets)	
ROS	It is measured through the ratio (net profit after tax / total sales)	

3.4- Research Design (models):

The multiple regression model was used to test the research hypotheses, and in order to test the first hypothesis H_{01}, which seeks to verify the significance of Shareholders Activism impact on Managerial Overconfidence, the first regression model was formulated as follows:

First regression model:

$$MO = \beta_0 + \beta_1 Sha + \beta_2 Size + \beta_3 Lev + \beta_4 ROS + \varepsilon \qquad H_{01}$$

This Model examines the direct effect of Shareholders Activism on Managerial Overconfidence. And β_0 refers to regression constant, while β_1 to β_4 refers to Coefficients of the independent and control variables.

Whereas:

MO: Managerial Overconfidence,
Sha: Shareholders Activism,
Size: Company Size,
Lev: Company Leverage,
ROS: Return on Sales.

To test the second hypothesis H_{02}, which seeks to verify the significance of the Green Innovation Efficiency impact on Managerial Overconfidence, the second regression model was formulated as follows:

Second regression model:

$$MO = \beta_0 + \beta_1 GIE + \beta_2 Size + \beta_3 Lev + \beta_4 ROS + \varepsilon \qquad H_{02}$$

Whereas:

MO: Managerial Overconfidence,

GIE: Green Innovation Efficiency,
Size: Company Size,
Lev: Company Leverage,
ROS: Return on Sales.

In order to test the third hypothesis H_{03}, which seeks to test the mutual impact of shareholder activism and green innovation efficiency on managerial overconfidence, the third regression model was formulated as follows.

Third regression model:

$$MO = B_0 + B_1\ SHA + B_2\ GIE + B_3\ SIZE + B_4\ LEV + B_5\ ROS + E$$

H_0

(4) Robustness tests between variables &Hypothesis testing:

4.1-Determine the validity of measures and regression models

The variance inflation factor (VIF) was calculated for the purpose of examining the extent of the existence of multicollinearity problems between the independent variables and each other, as the greater the value of this factor than (3), the more this indicates the possibility of a high level of multicollinearity problems.

Table No (5)

Collinearity Statistics results (VIF)

Independent Variables	VIF	Tolerance
Sha	1.406	.711
GIE	1.017	.983
Size	1.147	.872
Lev	1.358	.736
ROS	1.242	.805

Table No (5) above shows that (VIF) values have a maximum value of 1.406, that is, in the case of Shareholder activism, which is less than 3. And Permissible variance test (Tolerance) have a minimum value of 0.711, which is more than 0.1, this signifies the absence of multicollinearity problems between the independent and control variables.

Also, we calculated the correlation relationship between the independent variables, to ensure that the model was free of the problem of autocorrelation. The Pearson correlation coefficient test was conducted to study the degree of autocorrelation between the independent variables. We can also display the correlation coefficients

between the dependent variable and the independent and control variables through table no (5):

Table No (6) Correlation analysis

Variables	MO	She	GIE	Size	Lev	ROS
MO	1					
She	-.575**	1				
GIE	-.513*	.047*	1			
Size	.380**	.145	-.070	1		
Lev	.440**	-.340**	-.054	.326**	1	
ROS	.239*	.366**	-.022	.044*	-.513*	1

*Correlation is significant at the 0.05 level (2-tailed).
**correlation is significant at the 0.01 level (2-tailed).

Table No (6) above shows the following:

- The results show positive and negative correlations between the independent and dependent variables.
- There is a significant negative correlation between Managerial Overconfidence and both Shareholder Activism, Green Innovation Efficiency, were the correlation coefficient reached -0.575, -0.513, at the significance level of 0.01 and 0.05.
- There is a significant positive correlation between a company's Managerial Overconfidence and company size, company leverage, and Return on Sales were the correlation coefficient reached 0.380, 0.440 and 0.239 at the significance level of 0.01 and 0.05.
- In the other situations, the results show that the highest correlation value among the independent and control variables is -0.513 between company Lev and ROS, which is less than 0.70, This indicates that there are no multicollinearity issues in the current study.

4.2- Descriptive statistics.

The results in table no (7) provide descriptive statistics for the study's variables as flow:

Table No (7) Descriptive statistics

Variables	Obs.	Min	Max	Mean	Std. Dev.
MO	75	.000	.446	.215	.0927
She	75	7	18	14.44	3.188
GIE	75	.055	22.401	5.204	2.012
Size	75	8.187	13.988	10.415	1.069
Lev	75	.005	.879	.497	.2222
ROS	75	.067	.427	.2071	.0527

Source: statistical analysis results

Previous table no (7) provide the descriptive statistics as flow:

- The dependent variable (Managerial Overconfidence) ranges between 0.000 and 0.446, with an average of 0.215, with a standard deviation of 0.0927, It is also clear that the standard deviation is low, which indicates the low dispersion among the sample companies in terms of Managerial Overconfidence.
- Concerning Shareholders activism, the results demonstrate that the average (Sha) is 14.44, with a maximum of 18 and a minimum of 7, with a standard deviation of 3.188.
- With regard to Green Innovation Efficiency (GIE), the results demonstrate that the average (GIE) is 5.204, with a standard deviation of 2.012, with a maximum of 22.401 and minimum of 0.055.
- With regard to control variables, it reached the average value of company size 10.415 with stander deviation of 1.069, while the company leverage recorded an average value 49.7%, while return on sales (ROS) recorded an average value 20.71%, with a maximum of 42.7% and a minimum of 6.7%.

4.3. Testing hypothesis:

4.3.1-Test hypothesis No. 1

H_{01}: "**There is a significant effect of shareholder activism on Managerial overconfidence"**

For testing the first hypothesis of the study, the direct effect of shareholder activism on Managerial Overconfidence, are estimated using the multiple regression model.

Table No (8) Regression analysis for H_{01a}

Dependent variable	Predicators	Coefficients β	T-value
Managerial Overconfidence	Constant	-.050	-.503
	Sha	-.012**	-4.051
	Size	.022**	2.696
	Lev	.095*	2.278
	ROS	.108*	2.325
R	**.681**	F	15.133
R^2	**.464**	Sig.	.000
Adj. R^2	**.433**	Std. Error	.069836

Source: statistical analysis results

From the previous table the following conclusions can be drawn:

1-Correlation coefficient R is equal to 0.681, which means that there is a strong correlation between Managerial Overconfidence and independent and control variable.

2-R Square value is 0.464, which means that 46.4% of the change in Managerial Overconfidence is due to changes in shareholders activism, and the rest of the changes in Managerial Overconfidence are due to other factors outside the model.

3-The results show that shareholders activism has a statistically significant (þ-Value <0.05) negative (-β) influence on Managerial Overconfidence, which means that managerial overconfidence decreases with increasing shareholder activism

Based on the above, F value 15.133, and (Sig=.000) for model, then we can accept first hypothesis of the study which mean that "**There is a significant effect of shareholder activism on Managerial overconfidence**".

4.3.2-Test hypothesis No. 2

H02: "There is a significant effect of green innovation efficiency on Managerial overconfidence"

For testing the second hypothesis of the study, the direct effect of Green Innovation Efficiency on Managerial Overconfidence, are estimated using the multiple regression model.

Table No (9) Regression analysis for H_{02}

Dependent variable	Predicators	Coefficients β	T-value
Managerial Overconfidence	Constant	-.273**	-3.563
	GIE	-.020*	-2.563
	Size	.023**	2.565
	Lev	.156**	3.687
	ROS	.255**	2.947
R	**.600**	F	12.857
R^2	**.360**	Sig.	.000
Adj. R^2	**.324**	Std. Error	.076272

Source: statistical analysis results

From the previous table the following conclusions can be drawn:

1-Correlation coefficient R is equal to 0.600, which means that there is a strong correlation between Managerial Overconfidence and independent and control variable.

2-R Square value is 0.360, which means that 36% of the change in Managerial Overconfidence is due to changes in Green Innovation Efficiency, and the rest of the changes in Managerial Overconfidence are due to other factors outside the model.

3-The results show that Green Innovation Efficiency have a statistically significant (þ-Value <0.05) negative (-β) influence on Managerial Overconfidence, which means that managerial overconfidence decreases due to the green innovation efficiency.

Based on the above, F value 12.857, and (Sig=.000) for model, which means that there is a significant negative effect of Green Innovation Efficiency on Managerial Overconfidence. Then we can accept second hypothesis of the study which mean that "**There is a significant effect of green innovation efficiency on Managerial overconfidence**".

4.3.3-Test hypothesis No. 3

H03: "**There is a significant effect of both shareholder activism and green innovation efficiency together on managerial overconfidence"**

For testing the third hypothesis of the study, the direct effect of Shareholder activism and Green Innovation Efficiency on Managerial Overconfidence, are estimated using the multiple regression model.

Table No (10) Regression analysis for H_{02b}

Dependent variable	Predicators	Coefficients β	T-value
Managerial Overconfidence	Constant	-.278**	-3.041
	Sha	-.044**	-3.506
	GIE	-0.052**	-3.644
	Size	.022**	2.502
	Lev	.163**	3.751
	ROS	.253**	2.870
R	**.785**	F	17.104
R^2	**.562**	Sig.	.000
Adj. R^2	**.385**	Std. Error	.077345

Source: statistical analysis results

From the previous table the following conclusions can be drawn:

1-Correlation coefficient R is equal to 0.785, which means that there is a strong correlation between Managerial Overconfidence and independent and control variable.

2-R Square value is 0.562, which means that 56.2% of the change in Managerial Overconfidence is due to changes in both Shareholder activism and Green Innovation Efficiency, and the rest of the changes in Managerial Overconfidence are due to other factors outside the model.

3-The results show that Shareholder activism and Green Innovation Efficiency have a statistically significant (þ-Value <0.05) negative (-β) influence on Managerial Overconfidence.

Based on the above, F value 17.104, and (Sig=.000) for model, which means that there is a significant negative effect of both Shareholder activism and Green Innovation Efficiency on Managerial Overconfidence.

Then we can accept the third hypothesis of the study which mean that "**There is a significant effect of both shareholder activism and green innovation efficiency together on managerial overconfidence**".

(5) Conclusion & future research and research prospect:

A. Conclusion:

Based on the results of the statistical analysis of the study data and testing the hypotheses, the researcher concluded that shareholder activity leads to reducing managerial overconfidence, as the value of the beta coefficient reached -0.012 the interpretation coefficient reached 46.4%. In the same context, the efficiency of green innovation also works to reduce managerial overconfidence. The beta coefficient reached -0.020 and the interpretation coefficient reached 36%, while when both shareholder activity and green innovation efficiency were entered together in the regression model, this led to a greater impact on reducing managerial overconfidence, as the interpretation coefficient reached 56.2%, which is greater than the explanatory coefficient in the case of entering each variable separately.

The following table no (11) presents a summary of the results of hypothesis testing:

Table No (11) Summary of hypothesis testing results

Hypothesis	Variables	Coefficients (β)	Testing results
H_{01}	**Dependent**: Managerial Overconfidence **Independent**: Shareholders activism	-0.012*	Accept
H_{02}	**Dependent**: Managerial Overconfidence **Independent**: Green Innovation Efficiency	-0.020*	Accept
H_{03}	**Dependent**: Managerial Overconfidence **Independent**: Shareholders activism & Green Innovation Efficiency	-0.044** & 0.052**	Accept

The findings of the study have implications for various stakeholders of listed companies, specifically investors, including minority shareholders, majority shareholders, management, regulators and policymakers. For investors, it can act as a tool for assistance in investment decisions, as companies where activist shareholders and

green innovation efficiency are present are more likely to avoid fraudulent practices for managerial overconfidence in investment decisions.

There is scope to empirically test and understand the correlation between the financial performance and green innovation efficiency in firms. There is also scope to empirically test and understand the correlation between managerial overconfidence and tax evasion, and finally, it would be interesting to understand empirically how shareholder activism can affect dividend policies, in highly regulated sectors such as banking.

B. Limitations and research prospects:

green innovation activities necessitate the utilization and integration of diverse physical and intangible resources. Consequently, enterprises are urged to systematically advance the development of their own digital platforms or actively engage in innovation ecosystems. This proactive approach can facilitate the effective integration of disparate resources across industrial and supply chain partners, thereby curbing the need to channel more funds toward R&D investments in green innovation. This, in turn, will facilitate the enhancement of innovation efficiency Finally, enterprises are advised to focus on optimizing resource allocation within their own organizations to bolster more efficient internal resource utilization and minimize resource wastage in operational processes.

The current study was conducted using data for the2019-2023 period, it can be tested for different periods. We can also add more sectors to the setup and understand the relationship between activism and green innovation and Managerial overconfidence in other sectors as well Despite the strengths of this study, there are several limitations that should be considered when interpreting its findings. One limitation is the relatively small sample siz, In future research. Additionally, further studies could extend the research to other areas of corporate finance to assess the generalizability of the findings across different countries.

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