Intangible Investment and Non-Financial Performance of Egyptian firms: The moderating role of the Covid-19 pandemic

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Abstract

Purpose- We examine the impact of intangible investment on non-financial performance. We also examine the moderating effect of the Covid-19 pandemic on this relationship.

Design/methodology/approach- We extract data from annual reports for a sample of Egyptian firms from 2012 to 2020. We use the generalized method of moment (GMM) for testing research hypotheses.

Findings- We find that (i) intangible investment positively affects non-financial performance, and (ii) the Covid-19 pandemic has weakened this positive effect.

Originality/value- We provide new empirical evidence on the impact of intangible investment on different dimensions of non-financial performance. We offer the first empirical evidence on the moderating role of the Covid-19 pandemic on the relation between intangible investment and non-financial performance.

Implications- Our analysis offers practical and social implications. It would help policymakers, regulators, and shareholders to realize the importance of the intangible investment, and also shed light on the consequences of the Covid-19 pandemic. Our analysis also offers managerial implications. It motivates managers to invest more in intangible investment as an important resource to increase customer satisfaction and loyalty, enhance internal operating performance, and improve learning and growth, which reflect in creating sustainable competitive advantage.

Limitations- A small sample size is one of the limitations of this study. Furthermore, due to the lack of data in Egypt, the analysis does not include other measures of intangible investment. Finally, the sectoral analysis does not include all sectors due to the lack of observations in some sectors.

Keywords: intangible investment; non-financial performance; COVID-19; Egypt.

Introduction

The growth of the knowledge economy puts firms under great pressure to efficiently use soft resources such as knowledge and human capital, which have become crucial factors of economic growth (Qureshi and Siddiqui, 2020). According to the report of the Organization for Economic Cooperation and Development (OECD, 2011), the investment in intangibles has a major effect on productivity and in some cases, the investment matches or surpasses those in the traditional capital such as property, plant and equipment (Qureshi and Siddiqui, 2020). The Egyptian cabinet's centre and decision support system has released Egypt's ranking in the 2020 global knowledge index (GKI), showing that the country has moved from 82nd place to 72nd place in just one year, this index considers a wide range of areas and indicators when calculating the list, including information, communications, technology, research, development, and innovation (IDSC, 2020). So it is essential to measure the implications of intangible investment in the Egyptian context.

Evaluating firm performance is the core focus of stakeholders and researchers. Traditional financial measures do not show the complete performance of firms (e.g., Ishtiaque et al., 2007; Otley, 2003; Kaplan and Norton, 1996, 2001; Hoque and James, 2000; Webb et al., 1997; Lynch and Cross, 1991), because it does not focus on other dimensions of firm success in the long term. Non-financial performance measures concentrate more on a firm‘s success in the long-term, and factors such as innovation and employee satisfaction, internal business process efficiency, customer satisfaction, which improve financial and organizational performance (Chenhall and Langfield-Smith, 2003; Kaplan and Norton, 2001; Banker et al., 2000; Ittner and Larcker, 1998; Ghalayini and Noble, 1996; Lynch and Cross, 1991).

Several papers investigated the implications of intangible investment using samples from countries (e.g., the US, the Uk, Germany, France, Italy, Greek, Taiwan, Korea, Bangladesh, Turkey, India, Egypt, and Tunisia). These papers found that intangible investment positively affects firm financial performance, firm value, future cash flow from operations, and competitive advantage (Wardhani et al., 2021; Seo and Kim, 2020; Qureshi and Siddiqui, 2020; Ferdaous and Rahman, 2019; Ocak and Fındik, 2019; Ismail, 2019; Bhatia and Aggarwal, 2018; Gamayuni, 2015; Boujelben and Fedhila, 2011; Antonelli and Colombelli,

2011; Parcharidis and Varsakelis, 2010; Lin et al., 2006; Hall et al., 2005; Villalonga, 2004; Gleason and Klock, 2006; Klock and Megna, 2000).

Intangible investment can affect nearly all activities and functions in the firm, so it may affect the customer, the learning and growth, and the internal business process. However, none of these previous research, to the best of our knowledge, investigated the effect of intangible investment on non-financial performance.

At present, the crisis of the Covid-19 pandemic has a severe negative effect on all countries of the world as a whole, as this pandemic has resulted in general or partial lockdowns that have led to a global economic downturn and significantly influence the performance of firms in various countries of the world, including Egypt. However, the economic reforms implemented by the Egyptian state has made Egypt one of the few countries in the world that have been able to achieve positive growth indicators despite the repercussions of the Covid-19 pandemic, and therefore the questions about the extent of the Covid-19 pandemic' impact on the non-financial performance of Egyptian firms, and on the association between intangible investment and non-financial performance are worthy of being investigated.

We are motivated to conduct this research by three considerations. First, the literature on the impact of intangible investment on non-financial performance is rare. Second, most of the research that examines non-financial performance takes place in developed countries, while limited research has been conducted in developing countries. Third, recent literature provides evidence that managers handled the Covid-19 global pandemic in Egypt by implementing a number of problems with which employees were extremely unhappy (Salem et al., 2021). Employee satisfaction is one of the key non-financial performance indicators that could affect the sustainability of Egyptian companies. Based on these findings, we are interested to explore whether the Covid-19 crisis moderate the relationship between intangible investment and non-financial performance in the Egyptian context. According to our analysis, intangible investment positively affects non-financial performance; however, the Covid-19 pandemic has weakened this impact.

The rest of the paper is structured as follow. Section 2 review the literature and develops the research hypotheses. Section 3 present the research method. Section 4 discusses the data analysis and the findings. Section 5 concludes the paper.

2. Literature review and hypotheses development

Intangible investment is considered a crucial resource that enables a firm to sustain its competitive advantage. As firms currently become more knowledgeable and information-based, intangible investment is increasing globally. In some cases, this investment equals or surpasses investment in traditional tangible assets such as buildings, equipment and machinery (OECD, 2011).

There are assorted kinds of intangible investment such as capitalized research and development, goodwill, patents, mineral exploration, copyright, trademarks, formula, brand, software, trade secrets, databases, consumer lists, design, and licenses. According to Holloway (2013), intangible assets can be categorized into technology, customer, contract, market, and artistic related intangible assets. The Egyptian Accounting standard No, 23 (which is in line with IAS No 38) stated that the intangible assets often do not include the internally generated intangible assets because they are too difficult to identify as distinct. Also, according to the standard, the research and development expenses are capitalized only if some criteria are met such as to be technically feasible, ability to sell the asset, intention to complete, and the ability to complete the project.

Several prior studies investigated the impact of intangible investment on financial performance and firm value in different countries (Bhatia and Aggarwal,2018; Ferdaous and Rahman, 2019; Ocak and Fındik,2019; Seo and Kim, 2020; Qureshi and Siddiqui, 2020). Bhatia and Aggarwal (2018) studied the effect of intangible assets investment on the Indian firm performance. The authors included a sample of 346 firms from 2001 to 2012 and found that intangible assets affect the performance of companies positively. Ferdaous and Rahman (2019) examined the effect of intangible assets on firm performance in Bangladesh using a sample consisting of 49 listed manufacturing firms. They found that intangible asset's investment positively affects earning per share, while this effect is negative on market performance. Ocak and Fındik (2019) used a sample that included 1353 observations of Turkish firms from 2005 to 2013 to explore the impact of intangible assets on sustainable

growth and firm value, They found that intangible assets positively affect firm value and the sustainable growth rates. Seo and Kim (2020) tested the effect of intangible assets investment on the Korean firm performance for a sample of 173 small and medium-sized firms for the period 2011-2016, They found that intangible asset's investment positively affects the profitability and market value of small and medium-sized Korean firms. Qureshi and Siddiqui (2020) examined the effect of intangible assets on financial performance, market value, and financial policies of the firm, They used a sample of technological firms from different countries from 2015 to 2018, They found that intangible assets have a significant negative impact on return on assets, return on equity, and debt to equity ratio, and positively affect dividend policy.

Some previous studies tested the impact of intangible investment on competitive advantage and future cash flow. For example, Wardhani et al. (2021) used a questionnaire to test the effect of the intangible asset on the competitive advantage of hotels in Semarang City, The results concluded that intangible assets have a positive impact on competitive advantage. Boujelben and Fedhila (2011) examined the relationship between intangible investment and the ability to generate future cash flow from the operation for a sample of 300 Tunisian manufacturing firms from 2001 to 2006, They found that intangible investment has a positive impact on the future cash flow from operations. Regarding the Egyptian context, Ismail (2019) used a sample of 30 firms listed on the Egyptian stock exchange from 2000 to 2014 to examine the impact of intangible assets on firm value and firm performance, He found that intangible assets positively affect Tobin's Q and firm activity.

2.1. The impact of intangible investment on non-financial performance

Performance measurement introduced by Kaplan and Norton (2005) includes financial and non-financial perspectives. The non-financial perspective focuses more on a firm's success in the long term and consists of the customer, internal business process, and learning and growth perspectives.

Prior research showed that intangible investment touches almost all aspects of a firm, covering human capital and product development, line operations such as marketing, research and development, general management, and staff functions such as accounting, legal, finance (Qureshi and Siddiqui, 2020). According to the resources based value theory, every

organization/company is a collection of unique resources and capabilities that become the basis of strategy and the main source of company return (Barney, 1991). Intangible resources are a strategic asset that can create a sustainable competitive advantage and positively affect non-financial performance (Husnah et al., 2013).

Satisfying and maintaining customers is one of the most important objectives for any entity for its survival and to maintain its chances of competition. Therefore, it is expected that the intangible investment will increase customer satisfaction and loyalty by improving the quality of the service or product provided and the effectiveness of the delivery. The internal business process identifies the core processes that the company must master to continue the added value for the customer (Kaplan and Norton, 2005). Intangible investment can improve internal business processes and make it easier by using technology to boost efficiency and reduce waste. Also, intangible investment can improve learning and growth in the firm through increasing the employee skills and knowledge, and the information system quality.

Although several prior studies investigated the effect of intangible investment on firm financial performance, cash flow, and competitive advantage, no study tested this effect on the dimensions of non-financial performance. Based on this discussion and the resources based value theory, we formulate our first hypothesis as follow:

H1: Intangible investment positively affects the non-financial performance of firms listed in the Egyptian stock exchange

2.2. The effect of the COVID-19 pandemic on the relationship between intangible investment and non-financial performance

Covid-19 is one of the world's biggest challenges since the great depression of the 1930s. On January 30, 2020, the World Health Organization announced that the Covid-19 constitutes a health emergency with an international dimension, and on March 11, 2020, with the increase in the severity of the virus and the speed of its spread among many countries of the world, it was declared a pandemic. The international monetary fund expects that all countries will experience a delay in their economic activities. Covid-19 is also delaying Egypt’s recent economic success. (Breisinger et al., 2020). The Egyptian Ministry of Health announced the first case at Cairo international airport related to a Chinese citizen on February 14, 2020, and

on March 4, the first case of infection among Egyptians was announced, which was for an Egyptian returning from abroad (MHE, 2020).

In November 2020, the Egyptian Central Agency for Public Mobilization and Statistics issued a study on the repercussions of the novel coronavirus on the Egyptian economy by tracking changes in some basic macroeconomic indicators during the peak period of the epidemic. The report indicated a decrease in the yearly growth rate of real GDP in the third quarter of 2019. 2020 by 0.6 percentage points from that of 2018/2019, and the Suez Canal revenues decreased as of April 2020 compared to the corresponding levels in the previous two years, 2018 and 2019, due to the impact of the pandemic on global trade, where the monthly rate of change of revenue recorded the lowest level (-7.5%) in May 2020 compared to the same month in the previous two years (4.5% and 6.0%) respectively. Also, the net international reserves decreased by $9.5 billion during the period February-May 2020, and the tourism sector was seriously affected in terms of the number of tourists, as it decreased from 0.9 million tourists in February 2020 to 0.0 million tourists in April 2020, with a decrease of 100%. Furthermore, the Egyptian Stock Exchange index fell sharply in the wake of the pandemic, especially in March and May, as it closed at 9593.9 and 10,220.1 points, respectively, recording the highest monthly decline rate since January 2019 (ECPMS, 2020).

Around mid-March, Egypt responded relatively earlier to control the pandemic outbreak. The government has followed procedures that lead to partial lockdown, including bans on external travel and gatherings, to balance between public health and economic considerations. However, the partial lockdown coupled with unfavourable external conditions decreases economic activity (Breisinger et al., 2020).

The media centre of the council of ministers in Egypt published a report which indicated that the economic reforms implemented by the Egyptian state contributed to enhancing economic resilience and making Egypt one of the few countries in the world that achieved positive growth indicators despite the repercussions of the Covid-19 pandemic. The report indicated that Egypt continued to achieve a positive growth rate despite the Corona crisis, and the gross domestic product continued to increase to 5.5 trillion pounds in 2019/2020, compared to 5.2 trillion pounds in 2018/2019. The report also included that Egypt achieved the highest real return in the world in June 2021 according to Bloomberg (ECPMS, 2020).

Also, International monetary funds indicated that Egypt had controlled well the Covid-19 pandemic and the related disturbance to economic activity by following proactive measures to address social and health needs and bolster the most affected sectors by the crisis (IMF, 2021).

Some prior studies investigated the effect of the Covid-19 pandemic on firms performance and firm value in different contexts (Devi et al., 2020; Shen et al., 2020; Achim et al.,2021; Hu and Zhang, 2021; Bose et al., 2021). Devi et al. (2020) examined the effect of the Covid-19 pandemic on the financial performance of Indonesian firms. They used a sample of 214 firms in the year 2020. They found that Covid-19 positively affect the short-term activity ratio and leverage ratio, but negatively affect the profitability and liquidity ratio. They also showed that, in the consumer goods sector, liquidity, profitability, short-term activity ratios were positively affected, while leverage ratio was negatively affected. They also found that liquidity, profitability ratios were negatively affected in investment, trade, services, finance, and real estate sectors. Shen et al. (2020) investigated the effect of Covid- 19 on the Chinese firms' performance from 2014 to 2020. They found that Covid- 19 negatively affect firm performance.

Achim et al. (2021) explored the effect of Covid- 19 on business performance for a sample of 218 Romanian listed firms in the period from 2019 to 2020. Their findings show a decrease in overall market net profits by 37.43%. However, small firms of construction, commerce, agriculture, and transport and storage sectors have a better financial performance. Hu and Zhang (2021) used data from various countries to test the effect of Covid- 19 on firm performance. The results showed that Covid-19 deteriorated firm performance. The negative impact of Covid- 19 is less noticeable in countries with advanced financial systems and better healthcare systems. Bose et al. (2021) used a sample of firms in 47 countries to examine the effect of Covid- 19 on firm value, and the moderating effect of sustainability performance. Their results revealed that Covid-19 negatively affects firm value, especially in countries that are affected much by the pandemic. The negative effect of Covid- 19 is less marked for firms with better sustainability performance.

Based on the above discussion, we noted that there is some prior literature that investigated the effect of the Covid-19 pandemic on firms performance and value in different contexts. However, there is no study – to the best of our knowledge - that either examines the

impact of the pandemic on non-financial performance or its moderating role on the relationship between intangible investment and non-financial performance.

Based on prior research, we expect that intangible investment and non-financial performance could be affected at times of the Covid-19 pandemic. Therefore, we formulate our second hypothesis as follow:

H2: *COVID-19 pandemic moderate the relationship between intangible investment and non-financial performance.*

3. The research method

3.1. Research design and models

Figure (1) shows the model of the paper as follow. Intangible investment is our independent variable, and we use two different measures. **First**, intangible investment is measured as the percentage of intangible assets figure in financial statements divided by total non-current assets and total assets (Qureshi and Siddiqui, 2020; Ocak and Findik, 2019; Bhatia and Aggarwal, 2018; Zhang, 2017). It is worth noting that according to IAS No 38, the internally generated intangible assets are often not recognized as intangible assets because they are too difficult to identify as distinct. So the figure that appeared in financial statements may not include all the intangible investment expenditure. Also, the cost of intangible assets does not represent in all cases the expected future economic benefits of the intangible assets, as a result, the market capitalization method was used as a second measure. **Second**, according to the market capitalization method, the intangible investment is calculated as the difference between the firm market capitalization and the stockholder's equity.

The literature indicated that the increase in the market value of net assets over its book value is mainly due to the presence of intangible assets that were not disclosed in the statement of financial position (Penman, 2009; Krstic and Dordevic, 2010; Mouritsen et al et al., 2005). Also according to (Sveiby, 2001; Ismail, 2019; Madhani, 2012; Edvinsson and Malone, 1997; Mouritsen et al., 2001). The M/B ratio, which represents the increase of a firm's market capitalization over its stockholders' equity, can represent the firm's intangibles. The literature measured intangible investment using the investment expenditures like R&D, advertising, and training expenses (Seo Kim, 2020; Boujelben and Fedhila, 2011). However, this research did not use this measure due to the lack of data in the Egyptian context.

The non-financial performance as a dependent variable was measured using the balanced scorecard (BSC). Non-financial performance includes customer, internal business processes, and learning and growth perspectives.

The customer perspective expresses the firm ability to provide goods and services of high quality, delivery effectiveness, and customer service (Kairu et al., 2013). Some studies measured the customer perspective through many indicators such as the level of customer satisfaction, customer acquisition, customer retention, customer loyalty, and firm market share (Kaplan and Norton, 1996; Iselin et al., 2008; Tuan, 2020). Some studies measure customer satisfaction as a percentage of customers sales growth (Okoye et al., 2017; Ofurum et al., 2019). According to that, customer satisfaction was measured in this paper using the sale growth.

The internal business processes perspective concentrated on the internal business results that result in financial success and customer satisfaction. This perspective includes measures such as quality and cost related to the business processes (Gekonge, 2005). Iselin et al. (2008) measured the Internal business processes perspective through some indicators such as innovation, product and product quality. We used the operating efficiency (operating revenues divided by operating expenses) to measure the internal business process following (Miller and Noulas,1996).

The learning and growth perspective focuses on the quality of information systems (networks, systems, and databases), the ability of employees (knowledge, training, skills, and talents), and the effects of organizational alignment (teamwork, leadership, culture, and alignment and), in bolstering the achievement of firm objectives (Kaplan and Norton, 1992; Gekonge, 2005). The main focus of this perspective is on investing for the future, such as acquiring new PP&E and product research and development (Kaplan and Norton, 1996). Learning and growth perspective is measured through indicators such as employee satisfaction, employee capabilities, employee retention the number of trained employees and employees training cost (Iselin et al., 2008; Tuan, 2020). Other prior studies used the ratio of the total human cost to total revenues to measure the learning and growth performance. (Okoye et al.,2017; Ofurum et al.,2019). The learning and growth perspective was measured in this paper using the employee productivity following (Wang, 2005), which calculated as log of operating income divided by the number of employees.

The Covid-19 pandemic was measured as a dummy variable equals (1) in the year 2020 and (0) otherwise. Following prior research (Wardhani et al., 2021; Seo and Kim, 2020; Qureshi and Siddiqui, 2020; Ferdaous and Rahman, 2019; Ocak and Fındik, 2019; Ismail, 2019), we control for firm size, audit firm size, leverage, firm age, and profitability. We also control for board gender diversity and cash flow adequacy.

We use the following models to test our research hypotheses:

$$NonFP_{it} = \beta_0 + \beta_1 Intinv_{it} + \beta_2 Cov19_{it} + \beta_3 Roa_{it} + \beta_4 Size_{it} + \beta_5 Big4_{it} + \beta_6 Lev_{it} + \beta_7 Age_{it} + \beta_8 Bgd_{it} + \beta_9 Cfa_{it} + \beta_{10} Firm_{it} + \beta_{11} Year_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

$$NonFP_{it} = \beta_0 + \beta_1 Intinv_{it} + \beta_2 Cov19_{it} + \beta_3 Cov19^{*} Intinv_{it} + \beta_4 Roa_{it} + \beta_5 Size_{it} + \beta_6 Big4_{it} + \beta_7 Lev_{it} + \beta_8 Age_{it} + \beta_9 Bgd_{it} + \beta_{10} Cfa_{it} + \beta_{11} Firm_{it} + \beta_{12} Year_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots \quad (2)$$

Where: *NonFP* is the non-financial performance, which is measured through the three dimensions of the customer, internal business process, and learning and growth, *Intinv* is the intangible investment measured by the ratio of intangible assets and the market capitalization method, *Cov19* is the Covid-19 dummy variable, *Roa* is the return on assets, *Size* is firm size, *Big4* is audit firm size, Lev is the leverage, *Age* is firm age, *Bgd* is the board gender diversity, *Cfa* is the cash flow adequacy, *Firm* is the firm fixed effect, *Year* is the year fixed effect, and *Cov19* Intinv* is an interactive variable to test the moderating effect of Covid-19. Table (1) shows the variables and their measurement.

3.3 Sample selection

The population of this study consists of firms listed on the Egyptian Stock Exchange. Data was extracted from the financial reports for a sample of Egyptian firms from 2012 to 2020. The year 2011 was excluded because of the Egyptian revolution. Financial institutions were also excluded from the sample because they comply with different accounting standards and regulations. The final sample consists of 70 listed Egyptian firms with total observations of 630, where the Thomson Reuters Eiko Database was the source for the annual reports of the target sample. The data were processed using the generalized method of moment (GMM) estimator developed for dynamic panel data. Tables 2 and 3 show details of the sample selection.

4. The data analysis and discussion of results

4.1 Descriptive analysis

Table (4) shows the descriptive analysis. It shows that the intangible assets represent on average 5.2 % and 2.7% from the non-current assets and total assets respectively. These percentages are relatively small because the internally generated intangible assets according to IAS 38 are difficult to be recognized as they are not distinct. The means of sales growth and size are 20% and 6.05 consequently. The operating revenues to operating expenses have a maximum of 5.34. The average operating income per employee is .035. The descriptive analysis also reveals that 40% of the financial reports included in the sample are audited by Big 4 audit firms. The mean of ROA is 2 % which is very weak. The firms' liabilities represent on average 43% from the total assets, this indicates that Egyptian firms in the sample depend on equity as a source of financing more than debt. The minimum firm's age is 4 years and the maximum is 114 years. The woman representation on the board has a mean of 7.6 % which is a relatively small percentage and indicates that the Egyptian firms do not depend more on women in the board of directors. Finally, operating cash flow represents 14% from the current liabilities which is relatively weak.

4.2 Correlation

Table (5) shows the correlation analysis. It shows that sales growth is positively correlated with intangible assets and negatively correlated with the Covid-19. The relationship between operating efficiency and each intangible investment (market measure), and ROA is positive, while this relationship is negative with Covid-19. Furthermore, employee productivity has a positive relationship with intangible investment and a negative relationship with firm size, board gender diversity, and Big 4. There is no evidence of the multicollinearity problem between the independent variables.

4.3 Regression results

Using panel data methodology, the ordinary least square (OLS) was used to test the hypotheses in this paper. However, the results of OLS show some problems. These include a heteroscedasticity problem (Prob > chi2 = 0.000); an autocorrelation problem according to the Wooldridge test (Prob > F = 0.000) and an endogeneity problem as shown by the Hausman – Durbinwaston test. To resolve these problems, the current paper uses the generalized method of moment (GMM) estimator developed for dynamic panel data, which was first introduced by Hansen (1982).

The consistency of GMM estimators depended on the validity of the assumption that the error terms do not show serial correlation and on the validity (exogeneity) of its instruments (VanderPal,2019). The dynamic GMM panel-data estimation has several advantages. First, it can reduce endogeneity problems due to the potential correlation between regressors and error terms. Second, it includes lagged of the dependent variable as covariates and includes unobserved panel-level effects, fixed. Third, it is an appropriate method for a data structure (Hansen, 1982; Arellano and Bond, 1991). The Arellano and Bonds two-step difference GMM estimator is used in this paper. Arellano and Bond (1991) derived a consistent generalized method of moments (GMM) estimator for this model. The Arellano and Bond estimator can perform poorly if the autoregressive parameters are too large or the ratio of the variance of the panel-level effect to the variance of the idiosyncratic error is too large.

To test for serial correlation in dynamic panel-data models, Arellano–Bond test was used in this study. The result of the Arellano–Bond test show that there is no autocorrelation in all models. Also, this study uses the Sargan test of overidentifying restrictions to know the presence of heteroskedasticity. The result indicates that the overidentifying restrictions are not valid in all models (P- value is insignificant). This means that there is no heteroskedasticity in all models.

4.3.1 The effect of intangible investment on non-financial performance

Table (6) shows different regression models formulated to test the effect of intangible investment on the dimensions of non-financial performance. Models 1 to 3 examined the effect of intangible investment on customer satisfaction. The results in models 1 and 2 indicate that the percentage of intangible assets positively affect customer satisfaction. Models 4 to 6 test the impact of intangible investment on the internal business process. These models reveal that intangible investment positively affects the operating efficiency at a level of a significant 1%. The effect of intangible investment on learning and growth is demonstrated in models 7 to 9. These models show a positive effect on employee productivity at a 1% significant level. The results in Table (6) show that the Covid-19 pandemic negatively affects both customer satisfaction and internal business processes, while it positively affects learning and growth.

Regarding the control variables, the analysis shows that customer satisfaction is affected positively by ROA, Big 4 and the percentage of operating cash flow. it also shows a negative effect of firm size on the internal business process. The findings of control variables on learning

and growth show a negative effect for ROA and Big 4, and a positive effect for each of leverage, firm age, and operating cash flow.

4.3.2 The effect of covid 19 on the relationship between intangible investment and non-financial performance

Table (7) shows the findings related to the moderating effect of the Covid-19 pandemic on different measures of non-financial performance. Models 1 and 2 show at a 1% significant level that the Covid-19 pandemic negatively affects the positive effect of intangible investment on customer satisfaction. Also, this pandemic weakens the positive effect of intangible investment on learning and growth, while this moderating effect is insignificant regarding the internal business processes.

Robust analysis

We use different measures of firm non-financial performance. We use the customer share (total firm sales divided by total sector sales) as a proxy for customer satisfaction. We use operating margin (firm operating margin divided by total revenues) as a proxy for the internal business processes. We also use the return on investment (firm capital expenditure divided by total assets) as a proxy for learning and growth. The results of all models in Table (8) confirm the positive effect of intangible investment on customer satisfaction, internal business processes, and learning and growth. Also, the results support the negative effect of Covid-19 on both customer satisfaction and internal business processes. Regarding the moderating effect of Covid19, the robustness analysis in Table (9) confirm that Covid-19 increase the negative effect of intangible investment (measured by the market capitalization method) on customer satisfaction and internal business processes.

Sectoral analysis

A further sectoral analysis is conducted on real estate, foods, and building materials industries, sectors where these sectors include more observations compared to the other sectors in the sample. Regarding the real estate sector, table (10) revealed that intangible investment has a positive effect on employee productivity, also the intangible investment (market measure) has a positive effect on operating efficiency. The Covid-19 has a negative effect on sales growth and operating efficiency, but this effect is positive on employee productivity. Table (11) shows that the Covid-19 decreases the positive effect of intangible investment on operating efficiency and employee productivity also decreases the positive effect of the intangible asset on sales growth, Regarding the food sector Table

(12) shows the effect of intangible investment on non-financial performance in the food sector. It shows that intangible investment positively affects employee productivity, also, intangible assets have a positive effect on sales growth and operating efficiency. Table (13) reveals that Covid-19 has a positive effect on sales growth and employee productivity, but it does not have any moderating effect. Regarding the building material industries sector. Table (14) shows that intangible investment has a positive effect on dimensions of non-financial in the building material industries, and Covid-19 has a negative effect on sales growth, but this effect is positive regarding employee productivity. Table (15) indicates that Covid-19 decreases the positive effect of the intangible asset on sales growth in the building material industries, and increase this positive effect on operating efficiency, also, the Covid-19 increases the positive effect of intangible investment on employee productivity.

4.4 Discussion of Results

Our analysis shows that intangible investment positively affects the different dimensions of non-financial performance of the firms listed on the Egyptian stock exchange. Specifically, it shows that customer satisfaction, internal business process, and learning and growth are positively affected by the increase in intangible investment. This indicates that this investment positively affects all aspects of the firm, especially it can increase customer loyalty by increasing the quality of the service or product provided, improve internal business processes and make it easier by using technology to boost efficiency, and increase the employee skills and knowledge. These results are in line with the resources based value theory where intangible investment is strategic resources that enhance the non-financial performance of the firm and create sustainable competitive advantage. Although there is no paper investigating the effect of intangible investment on non-financial performance, our findings, in general, are consistent with studies focusing on financial performance and competitive advantage. These include Wardhani et al. (2021), Seo and Kim (2020), Qureshi and Siddiqui (2020), Ferdaous and Rahman (2019), Ocak and Fındik (2019), Ismail (2019) and Bhatia and Aggarwal (2018).

Our findings show that the Covid-19 pandemic diminishes the positive effect of intangible investment on customer satisfaction and learning and growth. These findings in general, are in line with prior research focusing on financial performance and the Covid crisis (Devi et al., 2020; Achim et al., 2021; Shen et al., 2020; Bose et al., 2021).

Our analysis shows that the impact of intangible investment on non-financial performance is driven by industry sectors. It shows that intangible investment in the building material industries sector has a positive effect on the perspectives of non-financial performance. It also shows that, in the food sector, intangible investment positively affects learning and growth, while it has a positive effect on customer satisfaction and internal business processes. In the real state, we noted that intangible investment has a positive effect on learning and growth, and intangible investment (market measure) has a positive effect on the internal business processes.

Regarding the effect of Covid-19 on non-financial performance, the results reveal that Covid-19 negatively affects the sales growth in real state and building material industries sectors, while its impact is positive in the food sector. Covid-19 also positively affects the learning and growth in real state, building material industries, and food sectors

Respecting the moderating effect of Covid-19, the results in the real state reveal that the Covid-19 decreases the positive effect of intangible investment on internal business processes and learning and growth, also it decreases the positive effect of the intangible asset on customer satisfaction. while in the building material industries sector, the Covid-19 decreases the positive effect of the intangible asset on customer satisfaction, and increase this positive effect on the internal business process, also, the Covid-19 increases the positive effect of intangible investment on learning and growth.

5. Conclusions

The prior literature focused on investigating the effect of intangible investment on firm financial performance, the future cash flow from operations, and competitive advantage. Our paper examined the effect of intangible investment on firm non-financial performance. We also investigated the moderating effect of Covid-19 on the relationship between intangible investment and non-financial performance. We collected data for 70 firms listed on the Egyptian stock exchange with total observations of 630 from 2012 to 2020. The results indicate that the non-financial performance of Egyptian firms is positively affected by intangible investment. Specifically, the increase in intangible investment leads to more customer satisfaction, improvement in the internal business processes, and an improvement in the learning and growth indicators. The results also indicated that the Covid-19 negatively affect the relationships between intangible investment and both customer satisfaction and learning and growth. Furthermore, the

results show how the non-financial performance of different sectors was affected by the intangible investment and the Covid-19 pandemic.

This paper provides several contributions as it is considered the first empirical evidence on the effect of intangible investment on the different dimensions of non-financial performance. It contributes to the literature on non-financial performance as it provides evidence that non-financial performance is affected positively by intangible investment. Furthermore, this paper is among the first papers that explore the impact of the Covid-19 pandemic, especially in emerging countries like Egypt by investigating its effect on the link between intangible investment and non-financial performance.

Our findings provide some practical and social implications. Our evidence would help policymakers, regulators, and shareholders to realize the non-economic consequences of the intangible investment in general, and at the time of Covid-19 in particular. Our findings also offer managerial implications. Our evidence suggests that managers need to increase their intangible investment as this lead to desirable consequences. These include: increasing customer satisfaction and loyalty, enhancing internal operating performance, and improving learning and growth, which reflect in creating sustainable competitive advantage.

This paper has some limitations, First, it was conducted on a small sample size. Second, the analysis does not include other measures of intangible investment due to the lack of data in the Egyptian context. Third, the sectoral analysis does not include all sectors due to the lack of observations in some sectors. Future research may focus on examing the effect of intangible investment on competitive advantage and non-financial performance of Egyptian banks and Egyptian small and medium-sized firms. It could also investigate the moderating effect of financial constraints and corporate governance mechanisms on the relationship between intangible investment and non-financial performance. In addition, future research can use other proxies to test the non-financial performance perspective.

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Table 1. Variables and Measures

Type of Variables	Variable Name	Measures	Symbol
Independent variable	Intangible investment		
	The ratio of intangible assets	The intangible assets divided by total non-current assets	Intncr
		The intangible assets divided by total assets	Intast
	market capitalization method	The difference between the market value of equity and book value	Intmark
Dependent variables	Non- Financial Performance		
	customer satisfaction	Sales growth: (total sales in current year- total sales in previous year)/ total sales in the previous year	Salgrow
	internal business process	Operating efficiency: operating revenues divided by operating expenses	Opreffic
	learning and growth	employee productivity: log of operating income divided by the number of employees	Emplpro
Moderating variable	COVID 19	A dummy variable equals (1) in the year 2020 and (0) otherwise.	Cov19
Control variables	Firm Size	Log of total assets	Size
	Profitability	Net profit divided by total assets	Roa
	Firm age	The number of years in operation from an enterprises' inception	Age
	Audit Firm size	A dummy variable is assigned a value	Big4

		of (1) if the firm is audited by BIG 4 and (0) otherwise.	
	Leverage	Total liabilities/ Total assets	Lev
	Board gender diversity	The percentage of female directors is divided by the total number of directors.	Bgd
	Cash flow adequacy	Operating cash flow divided by total current liabilities	Cfa

Table 2. Sample Selection

	No. of firms	No. of observations
Initial sample	218	1526
Less: financial firms and banks	45	315
Less: firms with missed data	103	581
Final sample	70	630

Table3. sample selection in sectors

Sector	Number of firms	Observations
Real estate	19	171
Foods	17	153
Bulding materials	7	63
Basic Resources	6	54
Industrial Goods , Services and Automobiles	3	27
Shipping andTrasportation	3	27
Trade & Distributors	3	27
Paper & Packaging	3	27
Telecommunication and information technology	2	18
Energy	2	18
Textile	2	18

Tourist	1	9
Health Care & Pharmaceuticals	1	9
Utilities	1	9
Total	70	630

Table (4): descriptive statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Salgrow	630	-0.84	1.61	0.20	0.291
Opreffic	630	0.001	5.34	1.07	0.717
Emplpro	630	0	0.65	0.035	0.072
Intncr	630	0	0.73	0.052	0.120
Intast	630	0	0.58	0.027	0.069
Intmark	630	0	957	67.87	162.89
Cov19	630	0	1	0.111	0.314
Roa	630	-1.44	0.528	0.023	0.148
Size	630	4.30	7.98	6.05	0.8
Big4	630	0	1	0.40	0.491
Lev	630	0.0005	0.95	0.43	0.214
Age	630	4	114	32	18.23
Bgd	630	0	0.38	0.076	0.102
Cfa	630	-2.80	5.03	0.143	0.570

Table (5): the correlation matrix

	Sal grow	Opr effic	Empl pro	Int mark	Int ncr	Int ast	Cov 19	Roa	Size	Big4	Lev	Age	Bgd	Cfa	VIF
Salgrow	1														-
Opreffic	-	1													-
Emplpro	-	-	1												-
Intmark	.02	.27***	.49***	1											1.2
Intncr	.19***	.00	.15***	.37***	1										4
Intast	.20***	-.06	.11***	.24***	.84***	1									3.7
Cov19	-.28***	-.15***	.00	-.04	-.07**	-.08**	1								1
Roa	-.01	.16***	-.03	-.06**	-.00	-.01	-.07**	1							1.1
Size	.04	.00	-.11***	.05	.24***	.21***	-.00	.10***	1						1.6
Big4	.05	-.00	-.06*	.04	.09**	.08**	.01	.04	.43***	1					1.4
Lev	.05	-.08**	.00	.10***	.07**	.02	.01	-.04	.43***	.27***	1				1.4
Age	.05	.04	.05	.07**	.02	.01	.07**	-.03	-.09**	-.26***	.09***	1			1.1
Bgd	.03	-.04	-.11***	-.04	.08*	.14***	.00	.08**	.08**	.07**	-.03	-.12***	1		1.1
Cfa	-.02	.07**	-.03	-.03	.01	.05	-.073*	.19***	.06	-.05	-.16***	-.06**	.02	1	1.1

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (6) The effect of intangible investment on the non-financial performance of Egyptian firms

	Salgrow			Opreffic			Emplpro		
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	-1.13	-1.22	-0.82	-1.68*	-.95	-1.44	1.55	2**	2.56**
L.Salgrow	0.97	1.30	1.03	-	-	-	-	-	-
L.Opreffic	-	-	-	2.22**	3.11***	2.96***	-	-	-
L. Emplpr	-	-	-	-	-	-	17.27***	22.43***	22.89***
Intncr	1.92*	-	-	8.69***	-	-	16.70***	-	-
Intast	-	1.89*	-	-	2.50**	-	-	8.10***	-
Intmark	-	-	1.26	-	-	18.31***	-	-	21.74***
Cov19	-12.69***	-12.66***	-13.11***	-8.31***	-8.43***	-8.22***	3.79***	4.88***	4.33***
Roa	3.67***	3.69***	4.05***	1.10	1.19	0.74	-5.04***	-5.49***	-7.97***
Size	-0.63	-0.66	-1.03	-5.39***	-4.55***	-3.90***	-8.52***	-8.92***	-9.06***
Big4	2.32**	2.33**	2.32**	-0.64	-0.84	0.32	-0.49	-1.01	-0.93
Lev	0.47	0.88	0.57	1.11	1.47	1.94*	8.99***	9.08***	7.31***
Age	0.31	0.17	0.65	0.41	0.99	-0.42	3.47***	2.89***	3.48***
Bgd	-0.82	-0.67	-0.81	0.79	0.53	-0.72	-1.58	-1.13	-1.47
Cfa	1.72*	1.95**	1.44	1.21	1.64	0.28	1.59	2.80***	-0.10
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	560	560	560	560	560	560	560	560	560

Table (7) The effect of covid 19 on the relationship between intangible investment and non-financial performance

	Salgrow			Opreffic			Emplpro		
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	--1.01	-1.02	-0.85	-1.83*	-1.08	-1.58	0.44	0.73	1.17
L. Salgrow	2.14**	1.90*	1.14	-	-	-	-	-	-
L. Opreffic	-	-	-	2.51**	3.32***	3.36***	-	-	-
L. Emplpro	-	-	-	-	-	-	17.02***	18.77***	23.91***
Intncr	2.54**	-	-	7.75***	-	-	17.34***	-	-
Intast	-	2.03**	-	-	2.18**	-	-	5.61***	-
Intmark	-	-	1.29	-	-	19.41***	-	-	19.95***
Cov19	-7.90***	-7.34***	-8.64***	-7.91***	-7.74***	-7.28***	6.05***	6.11***	4.93***
Cov19* Intncr	-5.96***	-	-	-0.97	-	-	-9.67***	-	-
Cov19* Intast	-	-3.92***	-	-	-1.63	-	-	-8.06***	-
Cov19* Intmark	-	-	-1.35	-	-	-0.33	-	-	-8.42***
Roa	2.79***	2.39**	3.59***	1.16	1.26	0.76	-6.93***	-7.67***	-9.30***
Size	-1.07	-0.95	-1.11	-5.28***	-4.54***	-3.94***	-7.84***	-8.71***	-7.28***
Big4	2.96***	2.82***	2.24**	-0.53	-0.84	0.32	-1.08	-1.03	-1.18
Lev	0.12	0.37	0.49	1.03	1.07	1.66*	6.05***	6.57***	5.32***
Age	0.29	0.36	0.61	0.38	0.96	-0.62	1.92*	1.26	1.93*
Bgd	-0.16	-0.19	-0.66	0.73	0.60	-0.73	-1.42	-1.15	-1.29
Cfa	2.80***	2.58**	1.60	1.28	1.72*	0.42	3.16***	3.24***	-0.15
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	560	560	560	560	560	560	560	560	560

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (8): **The effect of intangible investment on non-financial performance (robust analysis)**

	Custshar			Oprmarg			Rninvest		
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	-11.21***	-9.89***	-7.88***	-3.96***	-4.11***	-3.64***	3.75***	4.13***	3.93***
L. Custshar	-85.81***	-104.93***	-40.85***	-	-	-	-	-	-
L. Oprmarg	-	-	-	12.24***	17.43***	11.81***	-	-	-
L. Rninvest	-	-	-	-	-	-	5.36***	6.08***	6.58***
Intncr	24.29***	-	-	4.90***	-	-	8.73***	-	-
Intast	-	15.55***	-	-	4.67***	-	-	4.07***	-
Intmark	-	-	79.83***	-	-	5.87***	-	-	11.31***
Cov19	-14.06***	-12.75***	-9.74***	-2.52**	-2.78***	-2.95***	0.92	1.45	1.15
Roa	-6.08***	-5.42***	-5.99***	0.02	0.08	0.04	-0.10	0.33	0.60
Size	12.64***	11.52***	9.73***	-0.76	-0.84	-0.34	2.26**	2.13**	1.62
Big4	-1.92*	-1.98**	-2.08**	-0.11	-0.25	-0.44	2.98***	3.21***	2.99***
Lev	-0.04	1.63	-1.99**	3.14***	2.49**	3.05***	-0.32	0.02	-1.02
Age	0.53	0.79	1.82*	-3.10***	-3.71***	-2.74***	1.03	1.36	1.61
Bgd	7.89***	8.83***	7.43***	0.17	0.40	-0.18	1.48	1.76*	2.30**
Cfa	5.70***	11.77***	4.53***	2.34**	2.55**	3.05***	2.69***	2092***	2.54**
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	560	560	560	560	560	560	560	560	560

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (9): The effect of covid 19 on the relationship between intangible investment and non-financial performance (robust analysis)

	Custshar			Oprmarg			Rninvest		
	1	2	3	4	5	6	7	8	9
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	-10.24***	-7.94***	-8.89***	-4.23***	-3.80***	-4***	3.52***	3.90***	3.46***
L. Custshar	-23.4***	-126.89***	-34.06***	-	-	-	-	-	-
L. Oprmarg	-	-	-	12.18***	16***	10.86***	-	-	-
L. Rninvest	-	-	-	-	-	-	5.36***	6.06***	6.68***
Intncr	20.68***	-	-	4.83***	-	-	8.26***	-	-
Intast	-	14.06***	-	-	4.81***	-	-	4.05***	-
Intmark	-	-	71.72***	-	-	5.86***	-	-	10.37***
Cov19	-13.39***	-14.85***	-6.74***	-2.46**	-2.31**	-2.70***	1.85*	1.67*	1.10
Cov19* Intncr	8.41***	-	-	-0.88	-	-	-1.11	-	-
Cov19* Intast	-	21.76***	-	-	-1.49	-	-	0.03	-
Cov19* Intmark	-	-	-5.57***	-	-	-3.59***	-	-	0.19
Roa	-3.65***	-2.35**	-6.14***	-0.11	-0.29	-0.53	-0.14	0.035	0.70
Size	13.31***	11.78***	9.01***	-0.80	-0.62	-0.28	2.52**	2.21**	1.75*
Big4	-1.67*	-2.07**	-2.22**	-0.22	-0.25	-0.43	3***	3.27***	2.96***
Lev	-0.01	3.72***	-2.28**	2.75***	2.52**	2.59***	-0.55	-0.04	-1.06
Age	0.64	1.74	1	-3.47***	-3.61***	-3.46***	1.09	1.34	1.53
Bgd	7.86***	10.09***	6.67***	0.20	0.39	-0.34	1.63	1.72*	2.18**
Cfa	4.75***	7.22***	4.35***	2.37**	2.26**	2.20**	2.78***	3***	2.41**
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Obs	560	560	560	560	560	560	560	560	560

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (10): the effect of intangible investment and non-financial performance in the real estate sector

	Salgrow			**Opreffic**			**Emplpro**		
	Intncr	Intast	Intmark	Intncr	Intast	Intmark	Intncr	Intast	Intmark
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	-2.28**	.	.	-	.	.	-1.47	-0.38	-0.53
L. Salgrow	0.37	2.44**	2.53**	-	-	-	-	-	-
L. Opreffic	-	-	-	1.27	2.36**	1.02	-	-	-
L. Emplpro	-	-	-	-	-	-	31***	28.67***	14.70***
Intncr	-0.68	-	-	1.51	-	-	3.99**	-	-
Intast	-	-0.48	-	-	1.33	-	-	2.25**	-
Intmark	-	-	0.08	-	-	4.98***	-	-	10.61***
Cov19	-7.81***	-10.09***	-9.30***	-6.82***	-5.95***	-3.80***	2.07**	1.80*	-1.05
Roa	2.02**	0.93	0.15	1.75*	2.25**	1.71*	0.52	-0.20	-0.97
Size	-2.38**	-1.43	0.23	0.40	0.65	1.04	-1.15	0.10	0.66
Big4	-2.08**	1.78*	.	.	.	0.01	0.54	-1.20	-1.84*
Lev	1.75*	0.82	-1.09	-2.05**	-1.16	-1.14	-1.37	-2.42**	-1.26
Age	-2.25**	1.46	1.58	-0.12	-1.21	-0.53	-1.48	-0.78	-0.65
Bgd	-0.04	-1.28	-1.72*	0.12	1.02	0.05	-1.50	-1.42	-1.71*
Cfa	2.48**	1.88**	1.41	0.02	-0.97	-0.72	1.89*	1.26	0.18
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	152	152	152	152	152	152	152	152	152

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (11) The effect of covid 19 on the relationship between intangible investment and non-financial performance in the real estate sector

	Salgrow			Opreffic			Emplpro		
	1	2	3	4	5	6	7	8	9
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	0.09	-2.28**	-2.06**	.	.	-0.29	-1.71*	-1.10	-0.17
L. Salgrow	0.88	-0.16	0.75	-			-	-	-
L. Opreffic	-	-	-	1.24	2.02**	0.71	-	-	-
L. Emplpro	-	-	-	-		-	35.38***	38.29***	5.60***
Intncr	0.38	-	-	1.26		-	3.34***	-	-
Intast	-	-0.93	-	-	2.09**	-	-	2.18**	
Intmark	-	-	1.62	-		4.39***	-	-	5.86***
Cov19	-3.16***	-3.91***	-5.11***	-3.38***	-3.58***	-4.10***	2.16**	2.16**	1.59
Cov19* Intncr	-0.13	-	-	-1.43		-	-1.40	-	-
Cov19* Intast	-	-0.02	-4.72***	-	-1.89*	-	-	-1.99**	-
Cov19* Intmark	-	-	-	-		-3.75***	-	-	-10.37***
Roa	-0.04	1.65*	1.71*	1.48	2.13**	3.33***	0.37	0.19	-0.03
Size	0.21	-2.55**	-2.53**	0.76	-0.67	-0.83	-0.95	0.37	0.49
Big4	0.60	-2.18**	-1.98**	.	.	-0.95	0.56	0.50	-0.68
Lev	-1.48	1.85*	1.60	-1.68**	-0.65	0.84	-1.15	-0.68	-1.36
Age	0.54	-2.30**	-2.09**	-0.09	-1.40	-0.48	-1.70*	-1.23	-0.36
Bgd	-0.46	-1.07	0.10	-0.15	1.14	1.09	-1.51	-1.49	-1.61
Cfa	1.40	2.56***	2.34**	-0.17	-0.49	-0.04	1.99**	1.26	0.46
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes

Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	152	152	152	152	152	152	152	152	152

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (12): the effect of intangible investment and non-financial performance in the food sector

	Salgrow			**Opreffic**			**Emplpro**		
	Intncr	Intast	Intmark	Intncr	Intast	Intmark	Intncr	Intast	Intmark
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	-1.05	-1	1.86*	1.23	1.31	1.85*	-1.35	-0.83	0.76
L. Salgrow	-0.56	-0.06	-2.37**	-	-	-	-	-	-
L. Opreffic	-	-	-	1.92*	1.93*	2.83***	-	-	-
L. Emplpro	-	-	-	-	-	-	-1.48	-0.99	-2.83***
Intncr	1.82*	-	-	2.14**	-	-	4.96***	-	-
Intast	-	0.76	-	-	-0.71	-	-	3.59***	-
Intmark	-	-	-1.49	-	-	-1.16	-	-	3.64***
Cov19	2.83***	2.06**	1.31	1.12	0.62	-0.47	2.08**	2.04**	0.84
Roa	1.20	0.57	-0.68	1.13	0.48	-1.06	-1.90*	-2.16**	-2.61***
Size	-0.47	-1.17	1.31	-0.95	-0.34	1.60	-0.45	-1.18	-1.34
Big4	-2.08**	-1.17	1.37	0.33	-0.19	2.03**	-1.43	-1.18	0.22
Lev	2.41**	0.71	-0.12	1.71*	0.60	-1.52	0.87	0.85	0.61
Age	-0.94	-0.80	1.87*	1.56	0.75	1.77*	-0.73	-0.52	1.33
Bgd	1.54	1.10	-1.07	-1.03	0.14	-1.79*	-0.61	-0.68	0.19
Cfa	2.51**	1.19	0.34	-0.46	0.03	-1.95*	1.42	1.24	-0.56
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	136	136	136	136	136	136	136	136	136

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (13) The effect of covid 19 on the relationship between intangible investment and non-financial performance in the food sector

	Salgrow			Opreffic			Emplpro		
	1	2	3	4	5	6	7	8	9
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	-0.38	-0.03	0.18	-0.31	1.48	2.12	-0.72	-0.37	0.04
L. Salgrow	-0.17	-0.61	-0.26	-	-	-	-	-	-
L. Opreffic	-	-	-	1.27	2.31**	1.97**	-	-	-
L. Emplpro	-	-	-	-	-	-	-1.26	-2.17**	-0.99
Intncr	0.69	-	-	0.29	-	-	5.18***	-	-
Intast	-	1.54	-	-	-0.09	-	-	5.7***	-
Intmark	-	-	-0.15	-	-	-0.77	-	-	3.38***
Cov19	2.83***	2.32**	1.51	0.48	0.87	0.51	1.91*	1.08	2.39**
Cov19* Intncr	-0.18	-	-	-0.66	-	-	-0.71	-	-
Cov19* Intast	-	-0.80	-	-	-1.40	-	-	-0.53	-
Cov19* Intmark	-	-	-0.63	-	-	-1.41	-	-	-1.14
Roa	0.66	-0.43	-0.17	-0.11	0.20	-0.68	-1.89*	-2.34**	-2.36**
Size	-1.11	0.21	-0.42	0.09	-0.20	0.98	-0.57	-1.84*	-1.20
Big4	-0.46	-0.31	-0.01	0.58	0.07	1.33	-1.02	0.01	-0.46
Lev	1.10	-0.22	0.45	1.27	0.48	-0.76	0.95	1.83*	0.93
Age	-0.38	0.17	0.21	0.35	1.58	2.09	-0.41	0.63	0.22
Bgd	0.39	0.23	-0.04	-0.27	-0.19	-1.50	-0.45	-0.02	-0.32
Cfa	1.23	1.35	0.61	0.00	0.36	-1.48	1.34	-0.50	1.19
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes

Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	136	136	136	136	136	136	136	136	136

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (14) The effect of intangible investment on non-financial performance in the building materials industries sector

	Salgrow			**Opreffic**			**Emplpro**		
	Intncr	Intast	Intmark	Intncr	Intast	Intmark	Intncr	Intast	Intmark
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	0.18	-0.45		-0.55	0.35	0.71	-1.18	-0.79	-0.65
L. Salgrow	-0.39	-1.03	-0.25	-	-	-	-	-	-
L. Opreffic	-	-	-	0.587	0.46	2.38**	-	-	-
L. Emplpro	-	-	-	-	-	-	-1.72*	-1.61	0.04
Intncr	-0.27	-	-	1.68*	-	-	1.73*	-	-
Intast	-	2.01**	-	-	-0.87	-	-	-0.30	-
Intmark	-	-	-0.75	-	-	7.63***	-	-	8.45***
Cov19	-3.84	-3.60***	-3.75***	-0.22	-0.25	-0.59	1.19	0.91	1.84*
Roa	0.31	0.90	0.34	1.28	0.79	1.90*	-0.75	-0.63	0.26
Size	-1.40	-1.57	-1.55	-0.78	-0.03	0.21	0.63	0.65	0.87
Big4	-0.04	0.32	0.18	1	0.13	-0.02	0.01	-0.59	-0.27
Lev	-1.07	0.08	-0.74	0.81	-0.04	0.93	-0.43	-0.79	-0.59
Age	0.63	0.01	0.33	-0.48	0.34	0.56	-1.31	-0.86	-0.87
Bgd	-0.88	-1.37	-1.10	-1.02	-0.79	-0.26	1.52	1.80*	1.41
Cfa	0.21	0.17	0.10	0.55	0.55	0.55	1.17	0.50	0.63
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	56	56	56	56	56	56	56	56	56

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

Table (15) The effect of covid 19 on the relationship between intangible investment and non-financial performance in the Building Materials industries sector

	Salgrow			Opreffic			Emplpro		
	1	2	3	4	5	6	7	8	9
	Z	Z	Z	Z	Z	Z	Z	Z	Z
Cons	-0.17	-0.62	-0.03	-0.59	0.57	0.74	-1.20	-0.47	-0.74
L. Salgrow	-0.88	-1.13	-0.46	-	-	-	-	-	-
L. Opreffic	-	-	-	0.36	0.31	2.20**	-	-	-
L. Emplpro	-	-	-	-	-	-	-1.81*	-2.29**	-0.76
Intncr	-0.15	-	-	1.76	-	-	1.81*	-	-
Intast	-	2.18**	-	-	-1.03	-	-	-0.71	-
Intmark	-	-	-0.58	-	-	7.12***	-	-	8.40***
Cov19	-2.08**	-2.58***	-3.17***	-1.19	-1.02	-0.85	0.37	-0.42	0.89
Cov19* Intncr	-1.96**	-	-	2.02**	-	-	1.40	-	-
Cov19* Intast	-	-1.17	-	-	1.61	-	-	3.20***	-
Cov19* Intmark	-	-	-0.82	-	-	0.75	-	-	2.94***
Roa	0.95	1.08	0.45	0.96	0.67	1.87*	-0.84	-0.63	0.32
Size	-1.37	-1.62	-1.51	-0.90	0	0.13	0.53	0.70	0.63
Big4	0.38	0.47	0.28	1.05	0.01	0.02	0	-0.43	0.17
Lev	-0.68	0.17	-0.64	0.76	-0.14	0.85	0.39	-1.11	-1.02

Age	0.25	-0.14	0.26	-0.54	0.55	0.61	-1.33	-0.55	-0.94
Bgd	-1.18	-1.49	-1.14	-0.91	-0.94	-0.40	1.51	0.71	0.23
Cfa	0.58	0.28	0.17	0.32	0.43	0.49	0.01	0.57	0.70
Firm- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year- effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs	56	56	56	56	56	56	56	56	56

Note: *** significant at 1%, ** significant at 5%; * significant at 10%

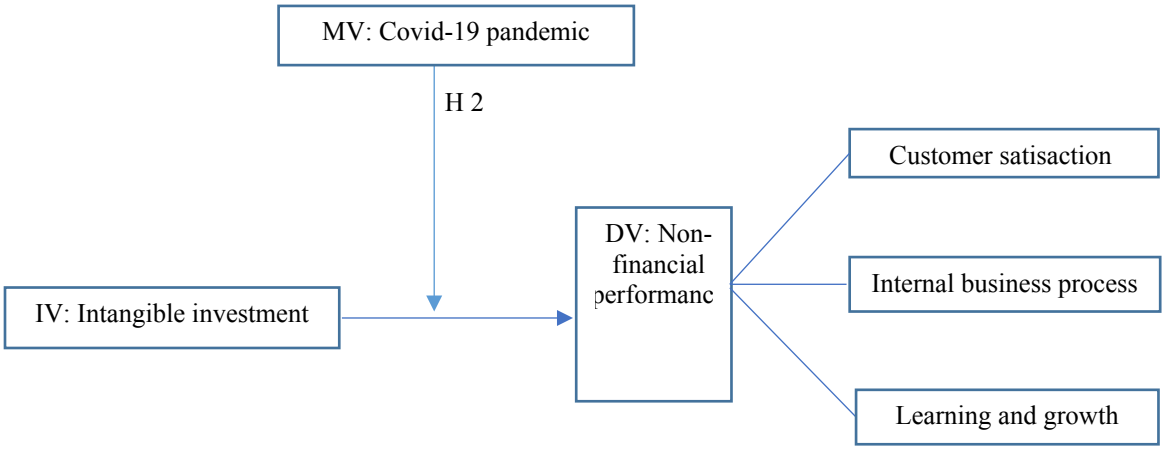

Figure 1. the relationships between variables
(IV=independent variable, DV=dependent variable, MV= moderator variable)