Implications of Intangibles Assets on Firm Value and Financial Performance: An Empirical Study on Companies Listed on Egyptian Stock Exchange

Mawaheb Abdel-Aziz Ismail

Accounting Lecturer

Department of Accounting, Alexandria University

E-mail: mawaheb.ismail@gmail.com

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Abstract:

The paper examines the relation between firms' intangible assets and firm's value and financial performance for a sample of firms listed on the Egyptian Stock Exchange during the period from 2000 through 2014. I predict that the level of investment in intangible assets has a positive impact on firm's value, and firm's liquidity and activity levels as measures of financial performance. Results reveal that the level of intangibles has a positive impact on firm's value measured by Tobin's Q. Firm's liquidity is not significantly affected by level of intangibles. Moreover, the level of intangibles has a significant impact on firm's activity, on the aggregate level. However, the intensity of intangible investment has no significant impact on firm's activity level.

Keywords: Intangibles Assets, Tobin's Q, Current Ratio, Total assets turn over, intensity of intangible assets.

I. INTRODUCTION

Over the last two decades, there has been a dramatic growth in intangibles' investments over total firm's investment. Researchers name such growth as shifting towards "knowledge economy". Previous studies, such as Marrano et al. (2009), and Baldwin et al. (2012), attributed productivity growth at macro & firm level to intensive investment in intangibles. The dramatically increase in the share of intellectual asset over the total firm's investment is believed to be the main reason for the evidenced huge difference between companies' book value and market value.

The topic of intellectual capital has been extensively discussed by researchers since the early 1990s. The literature uses the terms "intellectual capital", "intangible assets", "intellectual asset", and "knowledge asset" interchangeably providing a wide range of definitions. The agreed upon features of all intangible assets, as prescribed by IAS 38, are that intangibles are identifiable non-monetary legally protected assets lacking physical substance, providing future economic benefits, and obtained from past activities such as research and development, training, contractual agreement.

Some researchers (e.g., Edvinsson and Malone 1997, Stewart 1997, and Mouritsen el al. 2001) perceive intellectual capital as the difference between the firm's market value and its book value. In accounting terms, this is named as "Goodwill". Thus, intellectual capital is the intangible value of a business. This includes: human capital, structural capital, and relational capital. Human capital represents the value created by employees' skills, know-how, expertise, and competence (Bontis 2001). Structural capital refers to the non-physical infrastructure, processes, and databases of the organization that enable human capital to function. Relational capital denotes such elements as customer relationships, supplier relationships, trademarks, and trade names.

Prior literature highly documented the intense investment in intangible assets over the last twenty years. Kaplan and Norton (2004) compared the book value of total assets to market value of US firms, and found that intangible

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(intellectual) assets increased from about 40% in 1982 to almost 70% of firm's market value. As researchers reported, for high-tech companies, the contribution of intangible assets in output growth was more than 6 times the contribution of tangible assets (Fukao et al. 2009, and Clayton et al. 2009). This is prevalent in both developed as well as developing countries (Hao et al. 2009, and Corrado et al. 2009). Moreover, and according to Corrado and Hulten (2014), the share of intangible investment reached over 14% of US gross domestic product in 2010.

For many reasons discussing the issue of intangible assets remain complex and provide contradictory conclusions. Investments in intangibles are perceived to be more risky compared to tangible and financial assets. This is attributable to the high uncertainty in the value of intangibles, that is, the extent to which newly ideas or technology would contribute to future profits. Also, the issue of property rights adds to the inherent high risk of intangibles, where IAS 38 identifies intangibles as separable assets that can be sold, transferred, licensed, rent, or exchanged either individually or aggregately with a related contract. The high risk and difficulty of defining and enforcing property rights are well documented by research (Lev 2001, Cabral 2000, Cohen et al. 2000). In addition, lack of active and transparent markets for intangible assets makes it more difficult for analysts to assess future earnings for intangibles-intensive firms.

The credibility of financial statements for high-tech firms remains at question. The major aim of any firm is to enhance its company value in order to increase shareholders' wealth and serve the interests of other stakeholders. Firm value, as reflected in company's market price, is highly deviated from book values. It is argued that such deviation indicates that physical and financial assets presented in the company's balance sheet are calculated at less than 20% of its actual value. The increasing gap between firm's book value and its market value prompted researchers to discover whether intangible assets are significant factor in increasing firm's value, and whether such value is reflected in firm's financial statements.

Like many countries, the Egyptian market evidenced major changes over the last twenty years. The early 2000s witnessed a fast growing role of private sector and a shift towards knowledge economy. Many companies have emerged depending mainly on intangible assets, with physical and financial assets being marginal. The investment composition is gradually shifting from tangible to intangible assets. Yet, we are still far behind. Investment in intellectual capital in many countries represents at least 10% of GDP (OECD 2013), whereas in Egypt investment share of intangibles is about 1% of GDP. Investment composition of intangibles, as analyzed by Chen (2018), is also remarkable. Share of Research and Development (R&D) is almost negligible, total investment in intangible is composed mainly of brand equity.

Motivated by the well-established literature documenting the impact on intangibles on corporate value, this research aims to contribute to the understanding of this issue by studying the implication of intangible assets on firms' value and financial performance, mainly liquidity and activity, for a sample of listed Egyptian companies.

The paper further investigates the effect of intangibles intensity on firm value and performance. The results reveal that investment in intangible assets has a significant impact on firm value, measured by Tobin's Q. This result has been proven valid both for the full sample and two sub-samples; high-intangibles firms and low-intangibles firms. Moreover, evidence does not lend credence to the existence of any impact of intangibles on firms' liquidity, measured by current ratio. This rejection is related to both aggregate and partial levels of analysis. Also, findings support the significant impact of intangibles on firms' activity, measured by total assets turn over. This has been proven true only for full sample, but not for sub-samples.

The paper contributes to the literature on intangible assets through providing evidence from Egypt as one of the emerging economies. It complements previous research on intangibles and its effect on firms' value and performance. Despite the availability of several studies documenting growth and effect of intellectual assets in various contexts, the existing literature

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provides little evidence of the effect of such topic on value and performance of firms operating in Egypt.

The remainder of the paper is organized as follows: Section II presents literature review and hypotheses development. Section III describes the sample and research design. Empirical results are presented in Section IV. A summary of the findings and concluding remarks appears in Section V.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Literature provides many terminologies and definitions for intangible assets. Academic researchers, international organizations, and regulatory bodies define and classify intangibles in different ways. According to FASB, intangible assets incorporate:

1- Marketing-related intangibles; including trademarks; brand names, internet domain, and newspaper mastheads.

2- Customer-related intangibles; including customer lists and contracts, and order or production backlog.

3- Artistic-related intangibles; including plays, literary and musical works, audiovisual production, and television programs.

4- Contract-related intangibles; including licenses, construction permits, and franchise agreements.

5- Technology-related intangibles; including patents and trade secrets.

The European Union's MERITU project perceives intellectual assets entail Human capital, Structural capital, and Relational capital. The OECD (1992) classifies intangibles to include R&D, patents, licenses, and enabling intangible investments (worker training, information structure and organizational structure).

Researchers (e.g., Edvinsson 1997, and Lev 2001) agreed that intangibles are resources that add value to the business, and that exist in addition to working capital and tangible assets, and are contributors to the earnings power of the company. Intangibles are the result of the network effect, and cannot stand by themselves, and therefore benefits derived from the use of intangibles are somehow difficult to be reliably measured.

The measurement and reporting of intangibles have been and still a highly controversial accounting issue. Despite the contribution of intangible asset for productivity at firm level, and economic growth at macro level, measurement and reporting of intangibles are accompanied by some obstacles.

First, different valuation approaches are applied to measure intangibles (Yallwe and Buscemi 2014):

1- Direct intellectual capital method; where firms estimate the monetary value individually or aggregately.

2- Market capitalization method; based on recording the difference between market value and book value of company's total investment.

3- Return on asset method; based on scaling company average earnings by average cost of capital.

4- Scorecard method; based on identifying the various components and determining indicators and indices.

5- Expenditure-based approach; where firms are assumed to invest in intangibles until the discounted present value of the future expected income stream equals to the cost of producing the marginal asset (Corrado et al 2005).

6- Value added intellectual coefficient VAIC; measures how much new value has been created per invested monetary unit of resources. VAIC is composed of human capital, structural capital, and capital employed (Pulic 2000a).

Second, according to accounting standards, most of the investments on intangibles are treated as period expenses regardless of their future benefits. Firms are reluctant to disclose details regarding intangible assets due to the competitive environment.

Most intangible assets are not recognized in financial statements, and accounting standards do not require firms to report separate performance measures for intangibles. Conservative accounting rules require firms to recognize expenses as soon as possible when they are uncertain about the future. Such inclusion of more expense makes companies report less profit than

what they actually earned (Lev 2003). The recognition and reporting of more expenses might bring great difference between the market and book value of the company. Moreover, the inconsistent treatment of externally acquired intangibles versus internally created intangibles adds to the complexity of such issue making it unresolved long lasting accounting topic. Third, investment in intangibles entails financing constraints. Masayuki (2012) used Japanese firm level data to measure the sensitivity of investment to cash flow by the type of asset, and concluded that investment in intangible assets are strongly sensitive than investment in tangible assets.

The issue of intangible assets has been the concern of a bulk of studies addressing different dimensions. One stream of studies focuses on analyzing the impact of intangibles on the accuracy of analysts' forecasts. Barth et al. (2001) argue that the increasing importance of intangible assets and the absence of explicit information about the contribution of intangibles to firm value imply strong market incentives for analysts to incur private search costs to discover the predicted value of intangibles for high-tech firms. It was found that analysts' coverage and effort are greater for firms with more intangible assets. Gu and Wang (2005) explore that intangible assets are associated with more complex information compared to tangible and financial assets due to the high uncertainty in the value of intangibles, along with lack of reliable value estimates for most intangibles. Evidence supports a positive association between analysts' forecast error and firm's investment in intangibles. Therefore, the information complexity of intangibles increases the difficulty of forecasting earnings of intangibles-intensive firms.

Another stream of studies was devoted to evaluate and criticize the accounting treatment for intangibles which has been subject to continuing controversy. Choi et al. (2000) emphasized the idea that financial statements fail to reflect differences in the uncertainty of future economic benefits and costs associated with different types of assets. Assets appearing on the financial position statement are not differentially weighted according to their different

levels of uncertainty.

This paper belongs to a wide domain of studies devoted to explore the impact of intangibles on firm value and financial performance. Chen et al. (2005) employed a large sample of Taiwanese listed companies, and used VAIC as a measure of intangibles in order to assess such relation. Findings underlined the importance of intellectual assets in enhancing firm profitability and revenue growth. Also, investors place more value for companies with better intellectual capital efficiency. Using the same measurement tool and context, Shiu (2006b) reached a positive significant correlation between intangibles and both profitability and market valuation. Another setting, Singapore, was examined by Tan et al. (2007) which used data from 150 companies listed on Singapore Stock Exchange. It concluded that intangibles are correlated with company's current and future performance, and such correlation differs by industry. Ting and Lean (2009) focused on financial institutions in Malaysia and reached a positive relationship between intangibles and profitability. In line with prior findings, Appuhami (2007), Wang (2008 and 2013), Chang (2013), and Pucci et al. (2013), all provide empirical evidence supporting the positive impact of intangibles on firm value and different performance measures.

. On the other hand, a number of studies fail to support intangibles' impact on corporate valuation and performance. Firer and Williams (2003) used VAIC as a measure of intellectual assets, and data from South Africa business sectors. Empirical evidence did not find any significant association between VAIC and firms' market value, profitability, or productivity. Maditinos et al. (2011) employed data from Greek companies listed in Athens Stock Exchange to investigate the prevalent assumption. Results fail to support the claim that intangibles are positively linked to performance, although it positively affects market value.

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HYPOTHESES DEVELOPMENT

Firm value is the core of corporate finance, and company's main objective is to maximize its value through best utilization of its resources, whether tangible or intangible assets. The impact of intellectual assets on firm's value has been a rich area of research. While intellectual capital is company's assets whose growth should raise firm's value, empirical results show contradictory results concerning this relation. Some studies found positive correlation between intellectual capital and company value, while others did not find any relationship.

Studies supporting the positive relation between intangibles and firm value employ different measures of assessing intellectual capital. Chen et al (2005) suggest that investors place higher value on companies with better intellectual capital efficiency. Wang (2008) use different measures to assess firm's value and reached that it is positively correlated with intangibles. Same results were reached by Pucci et al (2013) and Wang (2013).

Others studies did not find any relationship between intangibles and firm's value. For example, Ferraro and Veltri (2011) used 524 firm-year observations of Italian listed companies and concluded that Italian market does not rely on intellectual capital information in valuing firms. Also, Mehralian et al. (2012) examined the pharmaceutical companies listed in the Iranian Stock Exchange and reached that intellectual components are not correlated to market valuation, only to profitability.

Motivated by the above mixing results, our first hypothesis can be developed as follows:

H1: The level of firm's intangible assets has a positive impact on firm's value.

The rise of intangible asset in size and contribution to firm growth creates an interesting research area for academics. Literature has been concerned with analyzing the effect of investment in intangibles on financial performance. The increasing gap observed between market value and book value of many companies has drawn attention towards investigating the value missing in financial statements. Many researchers, for example Chen et al. (2005), Yang

and Lin (2009), and others, consider intellectual assets the hidden value that is omitted from financial statements and leads firms to gain competitive advantage and earn superior earnings.

As indicated in the literature review, a number of previous studies examined the impact of intangibles on firm's financial performance; however, empirical evidence is inconclusive and far from reaching consensus.

On the one hand, Riahi-Belkaoui (2003), using data from US multinational firms, and Bontis et al. (2000), using data from Malaysian firms, support a positive relationship between intellectual assets and financial performance indicators. Same was reached by Chen et al. (2005) which indicate a positive impact of intellectual capital, measured by value added intellectual coefficient VAIC, on firm's profitability. Moreover, they proved that this coefficient can be used to assess future financial performance.

On the other hand, Firer and Williams (2003) used intangibles-intensive firms from South Africa and showed that corporate performance is not correlated with intangibles. Also, Maditinos et al. (2011) examined this relationship in the context of Greek companies and reached that intellectual capital is hardly linked to financial performance.

The researcher believes that the reason for inconclusive results regarding the impact of intangibles on financial performance is the difference in contexts, measurement tools, and study periods.

Since financial performance has many dimensions and indicators, I specify liquidity and activity levels to denote firm's financial performance. In order to test the impact of intangibles on financial performance, my second and third hypotheses can be illustrated as follows:

H2: The level of firm's intangible assets is positively related to firm's financial performance measured by liquidity level.

H3: The level of firm's intangible assets is positively related to firm's financial performance measured by activity level.

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III. RESEARCH DESIGN

This section presents sample selection, along with the empirical models employed.

Data and Sample Selection

The initial study sample consists of the most active firms continuously listed on the Egyptian Stock Exchange included in EGX 100 during the period of 2000-2014. The following companies were excluded:

1. Companies in the financial industry and utility industry are excluded since they face different regulatory environments than those of other companies.

2. Companies with missing data in at least one variable.

The exclusion criteria ended up with a final sample of 30 firms distributed over six manufacturing sectors: Food and Beverage, Chemicals, Construction and materials, Healthcare and Pharmaceuticals, Industrial goods and services, and Technology. Our final sample represents 450 firm-year observations. Study Period, extending from 2000 through 2014, is most appropriate to fulfill our research objective. This is because the Egyptian stock market during that period has witnessed major differences between book value and market value of firms' equity. Moreover, this period, and the coming period indeed, can be perceived an era of intangibles where investing in innovative and technology-based projects is highly targeted (Ismail 2011).

Empirical Models:

Firm Value:

The first research hypothesis examines the correlation between firm's value and the level of firm's intangible assets.

The following model illustrates the predicted relation as follows:

$$ \text{Tobin's } Q = \beta_0 + \beta_1 IA_{it} + \beta_2 Size_{it} + \beta_3 Growth_{it} + \beta_4 Lev_{it} + \beta_5 Pers_{it} + e_1 \quad -(1) $$

Dependent Variable:

Firm value, is measured using Tobin's Q = MV of equity / BV of equity (Lang and Stulz 1994, and Gamayuni 2015).

Independent Variable:

IA_{it} is the level of firm's intangibles measured using market capitalization method as the difference between market value of equity MVE and the book value of equity BVE for each firm-year (Edvinsson and Malone 1997, and Mouritsen el al. 2001):

As mentioned before, there are a number of alternative approaches that have been developed in the literature to assess intangibles assets. Some studies, for example Barron et al. (2002), measure intangibles as the summation of advertising expenses, R&D, and intangible assets figure in the balance sheet. Other papers (Corrado et al. 2005, 2009, and Fukao et al. 2009) assess intangibles through R&D. expenses, organizational capital (% of manager's labor compensation), and brand equity (% of advertising expenses). Moreover, Value Added Intellectual Coefficient (VAIC) has been used by many researchers to estimate intangibles through its three components: human, structural, and capital employed (Pulic 2000a, Firer and Williams 2003, Wang 2008, and Chen et al. 2005).

The reason for choosing market capitalization method is the applicability and data availability, where R&D expenses were totally missed in most of our sample firms' financial statements.

Control Variables:

In order to consider endogeneity effects and firm-specific characteristics, I include some control variables, widely used in literature, as follows: (Barron et al. 2002, Chalmers et al. 2012, and Alves and Martins 2014)

Size; measured as natural logarithm of firm's total assets.

Growth; measured as change in firm's sales revenue.

Leverage; measured as firm's total liability scaled by book value of equity.

Persistence; measured as change in firm's earnings figure.

Financial Performance:

My second and third hypotheses illustrate the impact of intangibles on firm's financial performance. Proxies for financial performance are:

1- Liquidity indicator; current ratio CR, current assets deflated by current liabilities (Kaoru et al. 2017, Aggelopoulos 2017).

2- Activity indicator; total assets turn over TATO, sales revenue scaled by total assets (Pucci et al. 2013, Gamayuni 2015).

The following are the models expressing such relations:

$$CR_{it} = \lambda_0 + \lambda_1 IA_{it} + \lambda_2 Size_{it} + \lambda_3 Growth_{it} + \lambda_4 Lev_{it} + \lambda_5 Pers_{it} + e_2 \text{----(2)}$$

$$TATO_{it} = \gamma_0 + \gamma_1 IA_{it} + \gamma_2 Size_{it} + \gamma_3 Growth_{it} + \gamma_4 Lev_{it} + \gamma_5 Pers_{it} + e_3 \text{----(3)}$$
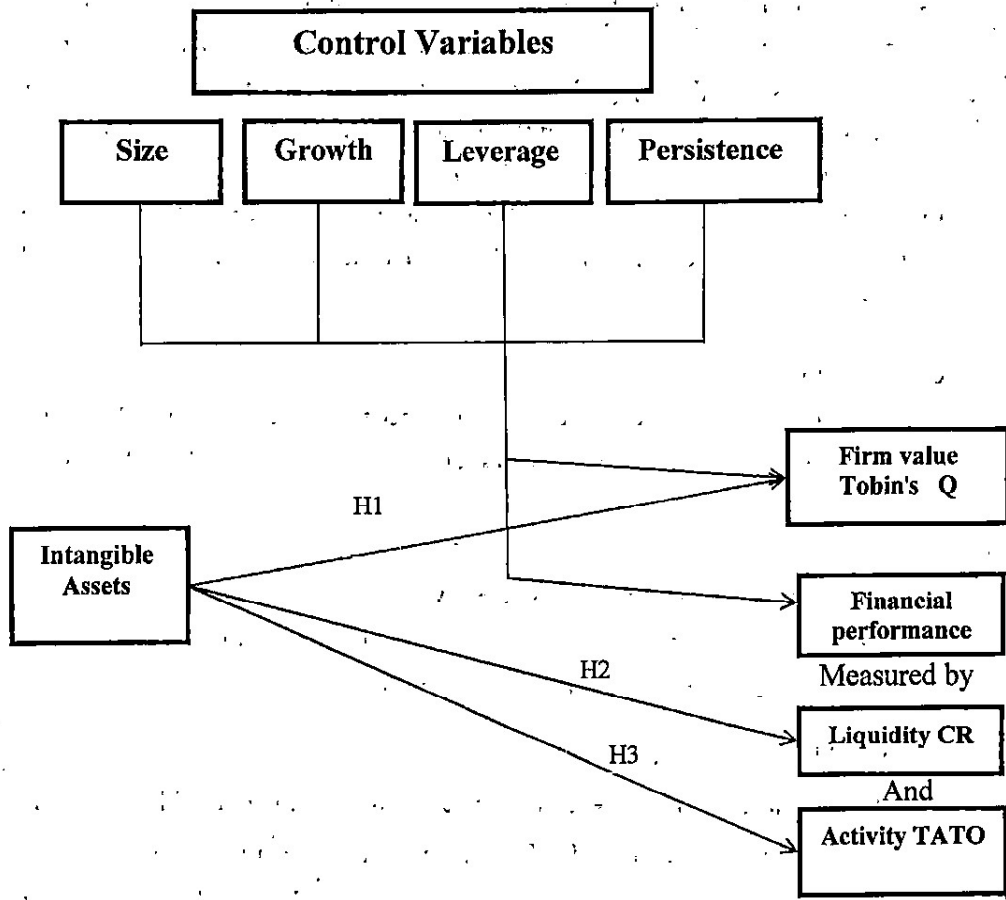
*prepared by the researcher

IV. RESULTS

This section discusses descriptive statistics and outcomes of the fundamental and sensitivity analyses

Table (1)
Summary of Descriptive Statistics for Research Variables

Variables	Mean	Median	Std. Dev	Minimum	Maximum	1st Quart	3rd Quart
IA	15.0083	0.5872	57.3907	-0.80002	693.082	0.1367	1.4838
CR	2.60833	1.62019	3.31092	0.099748	32.07881	1.26942	2.390573
TATO	0.77077	0.61732	0.69606	0.013285	5.524053	0.36979	0.92548
Tobin'sQ	68.9717	3.15800	404.9418	0.056333	6732.8000	1.31724	7.828000
Size	19.6913	19.9239	1.501792	16.32262	22.65552	18.33135	20.68986
Growth	-0.0091	0.0000	0.23647	-4.94425	0.836337	0.000000	0.000000
Lev	0.476529	0.08046	1.01182	0.00000	10.52439	0.004642	0.416922
Pers	-0.29193	0.03872	9.51686	-193.096	40.92296	-0.29633	0.272952

Table (1) illustrates some important points. Intangible assets (IA) constitute a large proportion of firm value. The differences between mean (15.008) and median (0.587) of IA suggest the existence of highly intangible asset intensive firms alongside firms with low level of intangible asset intensity in our sample. Intangible asset shows high dispersion sited in a large standard deviation figure (57.39). For current ratio, the variable shows a low difference between mean (2.6) and median (1.6), and a low standard deviation (3.3), denoting a minor dispersion in current assets and current liabilities among sample firms. This is more obvious in analyzing total assets turn over (TATO). Tobin's Q shows the greatest standard deviation (404.9) and the largest differences between mean and median, and between minimum and maximum values. And so, firm value is the most dispersed variable among all. The four control variables show relatively low dispersion sited in low standard deviation values and small ranges.

In order to qualify my regression tests, I conduct the basic tests for normality (Skewness and Kurtosis values). Results indicate that the sample is normally distributed. For multicollinearity, I examine the variance inflation factors (VIFs) for predictors, and ensure a low values (less than 10) for all variables included in our regression models. Thus, I isolate the effects of both normality and multicollinearity

in interpretation of regression outcomes. These tests were employed for the full sample in conducting the fundamental analysis, and each sub-sample in implementing the sensitivity analysis.

Table (2)
Correlation Matrix for Study Variables

Variables	IA	CR	TATO	Tobin's Q	Size	Growth	Lev	Pers
IA	1	-0.067	0.084	0.903**	0.022	0.001	0.083	0.008
CR	0.184**	1	0.082	0.027	-0.24**	0.03	-0.054	-0.59
TATO	0.17**	0.247**	1	0.005	-0.38**	0.018	-0.072	-0.014
Tobin'sQ	0.94**	0.106*	0.15**	1	0.037	0.002	0.099**	0.007
Size	0.105*	0.25**	-0.49**	0.146**	1	-0.04	0.126**	0.068
Growth	0.31	0.061	0.42**	0.013	-0.255**	1	0.017	0.005
Lev	0.116*	-0.27**	-0.16**	0.2**	0.367**	0.00	1	0.023
Pers	-0.006	-0.103*	0.014	0.020	0.063	-0.109*	0.115*	1
** Correlation Significant at 1% level (2-tailed) . * Correlation Significant at 5% level (2-tailed)								

Table (2) reports Pearson (above the diagonal) and Spearman (below the diagonal) correlation coefficients. Spearman correlation shows more significant coefficients, where it is based on ranked, rather than numerical values. The highest significant positive correlation is that between IA and Tobin's Q (0.903 Pearson and 0.94 Spearman, both significant at 1% level), most probably because the two indicators are calculated using the same variables, market value and book value of firms' equity. According to Pearson coefficients, IA is not significantly correlated to any other of study variables. Whereas, Spearman coefficients show significant correlations between IA and total assets turn over, size, and leverage.

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Fundamental Analysis:

(1) Firm Value Hypothesis

Table (3)

**Outcomes of Regression Analysis for the effect of
Intangible Assets (IA) on Firm Value (Tobin's Q)
For the Full Sample**

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	-78.612	111.115	-0.707	0.48	
IA	6.465	0.145	44.515	0.000	1.008
Size	2.457	5.633	0.436	0.663	1.019
Growth	-0.00001	0.000	-0.092	0.926	1.003
Lev	8.179	8.199	0.998	0.319	1.024
Pers	-.051	0.862	-0.59	0.953	1.005
R-Sq = 82.3% 0.000		F= 401.6	N=439	P-value =	

Results of regression indicate that the model is statistically significant in elaborating the relationship between intangible assets and firm value, where P-value turns out to be zero ($\leq 5\%$). The variance inflation factors (VIFs) for independent and control variables (all less than 10) free our model from multicollinearity problem. Coefficient determination value (R-Sq) implies that 82% of the variations in firm value can be explained through changes in variables contained in the model. Moreover, the intangibles coefficient value **(6.465)** and significance **(0.000)** indicate a positive significant impact of intangibles on firm value, implying the **Acceptance of my first hypothesis.**

The above result supports evidence provided by previous studies such as Gamayuni (2015) which reached a positive impact for intangibles on firms' value in Indonesia. Also, Maditinos et al (2011) used empirical data from Greek companies listed in the Athens Stock Exchange, and reached the same findings. This was also supported by evidence from Baltic Stock Exchange examined by Berzkalne and Zelgalve (2014).

The researcher believes that the dramatic increase in market capitalization of Egyptian listed companies would not have been explained by any mean other than the massive growth in intellectual capital, even if such growth is almost centered in one item of intangibles which is brand equity, as argued by Chen (2018).

(2)Firm Liquidity Hypothesis:

Table (4)
Outcomes of Regression Analysis for the effect of
Intangible Assets (IA) on Firms' Current Ratio (CR)
For the Full Sample

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	13.811	2.077	6.651	0.000	1.008
IA	0.005	0.003	1.744	0.082	1.019
Size	-0.567	0.105	-5.388	0.000	1.003
Growth	0.0000	0.000	0.379	0.705	1.024
Lev	-0.110	0.153	-0.719	0.473	1.005
Pers	-0.014	0.016	-0.876	0.381	1.008
R-Sq = 7.5% 0.000	F= 6.993		N=439	P-value =	

Table (3) explores the statistical significance of the model in shaping the relation between intangibles and firms' liquidity; this seems obvious in P-value. However, the model explains only minor variations in current ratio, as indicated by R-Sq (7.5%). In addition, the coefficient of IA **(0.005)** is very low indicating a weak impact of IA on CR, yet insignificant **(0.082)**. This leads to the **Rejection of the second hypothesis concerning liquidity.**

This result corresponds that in Gamayuni (2015), which discards the influence of intangibles on current ratio, where correlation coefficient turned out to be negative and insignificant. A recent study by Demmou et al. (2019) employs intangible assets data of firms operating in developed countries, and suggests that investment in intangibles creates a financial friction which places a load on liquidity indicators.

It is worth mentioning that empirical evidence of other studies supports the opposing direction. For example, Aggelopoulos et al. (2017) reached a positive impact of intangible assets on firm's liquidity, measured by current ratio, for small- and medium size enterprises in Greece. Also, Kaoru et al. (2017) found a correlation between firms' liquidity and levels of intangible assets held by a sample of Japanese firms.

The researcher believes that investment in intangible assets forces firms to employ more cash to finance such investment. This decreases firms' ability to meet its current obligations through current assets.

(3) Firm Activity Hypothesis:

Table (5)
Outcomes of Regression Analysis for the effect of
Intangible Assets (IA) on Firms' Total Asset Turn Over (TATO)
For the Full Sample

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	4.235	0.417	10.163	0.000	1.008
IA	0.001	0.001	2.099	0.036	1.019
Size	-0.176	0.021	-8.349	0.000	1.003
Growth	0.000	0.000	0.296	0.767	1.024
Lev	-0.021	0.031	-0.667	0.505	1.005
Pers	0.001	0.003	0.265	0.791	1.008
R-Sq = 15% 0.000		F= 15.162	N=439	P-value =	

Table (4) indicates the significance of the model (P-value=0) in illustrating the relation between intangibles and firms' activity level measured by total assets turnover TATO. R-Sq implies that 15% of variations in firms' activity level can be justified by independent variables. The sign and significance of IA coefficient (0.001, 0.036) suggest a (weak) positive and significant correlation between IA and TATO. Thus, the third hypothesis is Accepted at 5% significance level.

Same results ire reached by Chen et al. (2005) and Bontis et al (2000). While opposite reached by Gamayuni (2015). The latter found a negative insignificant correlation between IA and TATO. Also, Puntillo (2009) failed to show any positive significant association between IA measures and financial performance indicators for Italian firms listed in Milano Stock Exchange.

The researcher believes that since activity level indicators measures the effectiveness of companies in utilizing its resources in generating revenues, therefore, it bears mixed results across firms, industries, and countries. Moreover, the differential selection of study sample and period participates in producing contradictory findings.

Sensitivity Analysis:

In order to check for the robustness of my results, I perform a sensitivity analysis to investigate the effect of intensity of intangibles on firms' value and financial performance. For this purpose, I split our sample into two sub-samples around the median of IA which turned out to be 0.587 (table (1)):

High-intangibles firms; whose median is greater than or equal 0.587, and

Low-intangibles firms; whose median is less than 0.587, and re-conduct the regression analyses to test for the three hypotheses as follows:

(1) Firm Value Hypothesis -

Effect of Differential levels of Intangibles on Firm Value

Table (6)

Outcomes of Regression Analysis for the effect of
Intangible Assets (IA) on Firm Value (Tobin's Q)
For High-Intangibles Firms

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	-249.194	235.934	-1.056	0.292	
IA	6.603	0.210	31.47	0.000	1.005
Size	9.139	11.847	0.771	0.441	1.035
Growth	-0.00002	0.000	-0.184	0.854	1.003
Lev	13.84	13.027	1.062	0.289	1.021
Pers	10.115	12.793	0.791	0.430	1.024
R-Sq = 82.4% 0.000	F= 200.087		N=219	P-value =	

The outputs show the significance of the model (P-value = 0) in predicting the relation between IA and firm value for high-intangibles firms. R-Sq indicates the ability of IA and control variables in explaining variations in firm value. The coefficient of IA (6.6 significant) is slightly higher than that for full sample (6.465) appearing in table (3).

The significance of IA coefficient implies the Acceptance of our first hypothesis expecting a positive significant impact of IA on Tobin's Q for high-intangibles firms.

Table (7)
Outcomes of Regression Analysis for the effect of Intangible Assets (IA) on Firm Value (Tobin's Q) For Low-Intangibles Firms

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	-1.012	0.918	-1.102	0.272	
IA	3.916	0.258	15.189	0.000	1.062
Size	0.121	0.047	2.591	0.010	1.076
Growth	-0.86	0.071	-1.213	0.227	1.011
Lev	-0.067	0.106	-0.632	0.528	1.017
Pers	-0.002	0.005	-0.311	0.756	1.015
R-Sq = 52.2% 0.000	F= 46.683		N=220	P-value =	

The low P-value indicates the significance of the model. The explanatory power of the model decreases from 82% for full sample and high-IA firms to 52% for low-IA firms, implying that decreasing the intensity of intangibles makes the variable IA less capable of explaining variation in firm value. Additionally, the IA coefficient decreases from above 6 in full sample and high-IA firms to 3.916 in low-IA firms. Yet, the coefficient is still positive and significant so that I **Accept** the hypothesis of positive impact of IA on firm value for low-intangibles firms.

It is worth noting that same results have been reached by many studies, such as, Chen et al. (2005), Wang (2008 and 2013), Pucci et al. (2013), and Maditinos et al. (2011).

Therefore, in absolute terms, and regardless of the intensity of investment in intangible assets, the **level of intangibles** has a **positive significant impact** on **firm value** measured by Tobin's Q. This conclusion has been proven true from analyzing full sample and the two sub-samples; high-IA firms and low-IA firms.

(2)Firm Liquidity Hypothesis

Effect of Differential levels of intangibles on Firms' Liquidity:

Table (8)

**Outcomes of Regression Analysis for the effect of
Intangible Assets (IA) on Current Ratio (CR)
For High-Intangibles Firms**

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	11.557	2.680	4.312	0.000	
IA	0.122	0.002	1.848	0.066	1.005
Size	-0.224	0.135	-3.341	0.001	1.035
Growth	0.031	0.000	0.466	0.642	1.003
Lev	-0.055	0.148	-0.826	0.410	1.021
Pers	-0.036	0.145	-0.534	0.594	1.024
R-Sq = 7.6% 0.005	F= 3.485		N=219	P-value =	

Table (8) reports the significance of the model, where P-value < 5%. Almost the same conclusions can be drawn from regression outcomes as that in fundamental analysis in table (4) related to the full sample. The insignificant coefficient of IA (0.066 > 5%) implies the Rejection of the second hypothesis concerning the impact of IA on high-intangibles-firms' liquidity measured by CR.,

Table (9)

**Outcomes of Regression Analysis for the effect of
Intangible Assets (IA) on Current Ratio (CR)
For Low-Intangibles Firms**

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	16.135	3.317	4.865	0.000	
IA	-0.035	0.931	-0.517	0.606	1.062
Size	-0.277	0.169	-4.070	0.000	1.076
Growth	-0.10	0.258	-0.153	0.878	1.011
Lev	-0.019	0.383	-0.295	0.768	1.017
Pers	-0.044	0.019	-0.668	0.505	1.015
R-Sq = 8% 0.003	F= 3.722		N=220	P-value =	

The low P-value points at the model significance. However, the value and insignificance of IA coefficient implies the **Rejection** of the hypothesis predicting a positive impact of IA on CR, same was concluded in fundamental analysis presented in table (4).

Therefore, in absolute terms, and regardless of the intensity of investment in intangible assets, the **level of intangibles** has **no significant impact** on firm **liquidity** measured by current ratio. This conclusion is supported by results of fundamental analysis of full sample and sensitivity analyses of the two sub-samples; high-IA firms and low-IA firms.

This result is supported by empirical evidence provided by Gamayuni (2015) and Demmou et al. (2019).

The researcher agrees with the idea that financing intangibles through external funds is somehow constrained, and hence firms rely mainly on internal sources to finance the investment in intangibles; pushing down liquidity indicators.

(3)Firm Activity Hypothesis

Effect of Differential levels of intangibles on Firms' Activity:

Table (10)
Outcomes of Regression Analysis for the effect of Intangible Assets (IA) on Total Assets Turn Over (TATO) For High-Intangibles Firms

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	3.025	0.668	4.525	0.000	
IA	0.084	0.001	1.264	0.208	1.005
Size	-0.222	0.034	-3.291	0.001	1.035
Growth	0.026	0.000	0.395	0.693	1.003
Lev	-0.057	0.037	-0.852	0.395	1.021
Pers	-0.023	0.036	-0.338	0.736	1.024
R-Sq = 6.5% F= 2.968 N=219 P-value = 0.013					

Results show the significance of the model (P-value = 0.013) in predicting the relation between IA and high-IA firms' activity level. Whereas, the insignificance of IA coefficient (0.208>5%) **Rejects** the hypothesis of a positive impact of IA on TATO for high-IA firms. This result **differs** from that

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in fundamental analysis of full sample presented in table (5). The fundamental analysis accepts the hypothesis of such positive impact.

Table (11)
Outcomes of Regression Analysis for the effect of
Intangible Assets (IA) on Total Assets Turn Over (TATO)
For Low-Intangibles Firms

Variables	β	Std. Error	t	Sig.	VIF (collinearity)
Constant	5.545	0.517	10.715	0.000	
IA	**0.026**	0.145	0.449	**0.654**	1.062
Size	-0.549	0.026	-9.46	0.000	1.076
Growth	0.195	-0.04	3.473	0.001	1.011
Lev	-0.045	0.060	-0.794	0.428	1.017
Pers	0.027	0.003	0.487	0.626	1.015
R-Sq = 30% 0.000		F= 21.135		N=220	P-value =

Table (11) points at the significance of the model, where P-value equals 0. The insignificance of IA coefficient (0.654>5%) implies no impact of IA on low-IA firms'

activity level. Thus, I **Reject** the hypothesis predicting a positive impact of IA on TATO for low-IA firms. Again, this result contradicts fundamental analysis of full sample which supports such positive impact.

Therefore, on the aggregate level, and according to our fundamental analysis, the hypothesis of **positive impact of IA on firms' activity** level is supported. However, this conclusion is not valid at high and low-IA firm levels.

Empirical results of Bontis et al. (2000), and Puntillo (2009) support my results.

The researcher believes the justification is that firms' activity indicators assess how much pounds invested in total assets is translated into revenues. Undeniable is the fact that investment in intangibles is long term investment which takes time period to show its fruits, reflected in higher revenues and more profits.

Testing for Mean Differences:

As a further robustness analysis, I conduct a T-Test for mean differences between the two sub-samples: high-IA firms and low-IA firms. The results are presented in the following table:

Table (12) Independent Samples Test.

	High-Intangibles Firms	Low-Intangibles Firms	Differences (Sig)
IA	29.827	0.1233	29.7037 (0.000)*
Tobin's Q	136.1559	1.7876	134.3682 (0.000)*
CR	2.6117	2.6049	0.0068 (0.983)
TATO	0.8356	0.7059	0.1297 (0.048)*
Size	19.8749	19.5068	0.3681 (0.009)*
Growth	-0.02197	0.00371	-0.02569 (0.250)
Lev	0.6196	0.33344	0.2861 (0.003)*
Pers	0.06932	-0.6531	0.72252 (0.421)

*Significant at 5% significance level

Results of T-Test imply that the two sub-samples have significantly different means with respect to IA (by definition, since the sample was split originally around IA median), Tobin's Q, TATO as main variables. Also, the means are significantly different with respect to size and leverage as control variables. The means are not significantly different with respect to CR as a main variable, and growth and persistence as control variables.

This further supports study's evidence of accepting the first and third hypotheses predicting a significant impact of intangibles on both firm value and firm activity levels, and rejecting the second hypothesis predicting an impact of IA on firm liquidity levels.

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V. SUMMARY AND CONCLUSION

This study attempted to evaluate the role of intangible assets in financial markets. I investigate the impact of intangible assets on firm value and firm performance for a sample of Egyptian firms continuously listed on the Egyptian stock exchange during the period from 2000-2014. Based on the reasoning that intangibles have been perceived by literature as the value driver of firms' competitive advantage, research hypotheses predict that investment in intangible assets has a positive significant impact on firm value and performance. I assess firm value through Tobin's Q, whereas for performance, two measures were selected; current ratio denoting firm's liquidity and total assets turn over denoting firm's activity.

Two levels of analyses were conducted: fundamental and sensitivity analysis. First, I regresses intangible assets on measures of firm value and financial performance for the full sample (aggregate level). Second, the full sample was divided according to intangibles intensity into two sub-samples: high-intangibles firms and low-intangibles firms, and regression analysis was re-conducted (partial level).

Conclusions:

The first hypothesis predicts a positive impact of intangibles on firm's value. This hypothesis has been supported by empirical evidence; both at the aggregate and partial levels. That is, investment in intangible assets shows a significant impact on Tobin's Q for the full sample and the two sub-samples: high and low-intangibles firms. Evidence is consistent with the premise that the higher the intangible assets owned by the company, the more appreciation investors will assign to that company, where they link such investment to profitability and sustainability. The same findings were reached by a number of studies. Chen et al. (2005), Shui (2006), Wang (2008), and Pucci et al. (2013), while employing different measures and using different contexts; they all reached a positive direct relationship between intangibles measures and firm value. It is worth mentioning that other studies discard any impact of

intangibles on corporate value, for example, Ferraro and Veltri (2011), and Mehralian et al. (2012).

The second hypothesis predicts a positive impact of intangibles on firm's liquidity level as an indicator of financial performance. For liquidity, measured by current ratio, the hypothesis has been rejected, both at the aggregate and partial levels. Results failed to support any significant impact of intangibles on firm's liquidity, neither for the full sample nor for the two sub-samples. The researcher believes that the reason is that investment in intangible assets at all levels represents a financial burden on firms' availability of cash, where resources are devoted for financing these investments. This finding is supported by some studies and contradicted by others. Gamayuni (2015) and Demmou et al. (2019) provide evidence of insignificant impact of intangibles on firm's liquidity, whereas, Aggelopoulos et al. (2017) and Kaoru et al. (2017) provide opposing evidence.

The third hypothesis predicts a positive impact of intangibles on firm's activity level as another indicator of financial performance. With respect to firm's activity, measured by total assets turn over; study's results differ on the aggregate level and partial levels. For the full sample, results support the positive significant impact of intangibles on total assets turn over. For high- and low-intangibles firms, results fail to support such hypothesis. Similarly, Bontis et al. (2000), and Bollen et al. (2005) suggest a positive relationship between intangibles and firm performance. While Firer and Williams (2003), and Maditinos et al. (2011) provided evidence rejecting such relation.

This paper contributes to the body of literature addressing the impact on intangibles assets on firms' different dimensions. Examining the Egyptian setting which is socially, economically, and politically different from other countries, I analyze how would investment in intangible assets impact firm's value and financial performance. Results support the national trend towards enhancing investment in knowledge- based and technology-based projects. Increasing investments in innovative creational schemes would push up firms' value and performance.

Recommendations:

The evidence provided by this paper has important insights. **First, for companies**, investing in intellectual assets is worthwhile since it paves the way for gaining competitive advantages and market appreciation. The most successful corporations nowadays are the ones that insensitively invest in knowledge-based assets. We can see the outstanding success and superior profits of international companies like Google, Microsoft, Facebook, and Twitter are mainly based on intangibles, while traditional assets play only a marginal role. **Second, for standard setters**, accounting treatment for intangible assets should be reformulated in a way that it considers the special nature and characteristics of these assets. Assets with different levels of uncertainty should be weighted differentially in the financial statements. **Third, for researchers,** advanced proxies should be developed for assessing firm's performance especially in case of intangibles-intensive companies. Existing evidence on intangibles' impact on firms' financial performance is mostly circumstantial and often contradictory. This supports the argument that traditional measures of a company's performance may be unsuitable in the knowledge-based economy driven by intellectual capital. **Fourth, for policymakers**, in a rapid-growing technology world, sound economic development would not be enhanced without intensive investment in knowledge-based projects. Supportive mechanisms should be directed towards innovations and creativity. Projects based on knowledge and technology should be incubated and supported financially and structurally on the national level.

Future Research:

The researcher believes that the topic of this paper remains interesting and open. Further research could be conducted using different proxies for independent and dependent variables. For example, intangible assets can be assessed through incorporating R&D expenses and advertising expenses, or through calculating the value added intellectual coefficient VAIC. Also, firm value and financial performance can be measured through other metrics. A promising area for future research is to develop new performance indicators capable of emphasizing the nature of intangibles. Moreover, researchers would propose how intangible assets be better presented in financial statements in a way that considers its uncertain nature.

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