CHAPTER 6

THE NEXUS BETWEEN INTANGIBLE ASSETS AND FIRM PERFORMANCE: EVIDENCE FROM A DEVELOPING ECONOMY

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INTRODUCTION

Firms hold assets in order to generate economic benefits. Firms have two types of assets; tangible and intangible assets. Unlike tangible assets, intangible assets do not have physical form in nature. Trademarks, copyrights, franchises and licenses are common types of intangible assets reported by firms. It is worth mentioning that the type of intangible assets can vary according to the industry in which firms operate, organizational structure, technology and economic development. The accounting treatment of intangible assets is one of the most discussed issues in the business world. Standard setting bodies have issued guidelines on how to reliably and accurately report intangible assets in the recent years.

Intangible assets grab too much attention from policymakers, investors, creditors and firm management. In the current business climate, intangible assets are viewed as a prominent component of balance sheet of firms. Creditors and investors meticulously scrutinize the quality of intangible assets owned by firms. Lev et al. (2009) and Penman (2009) purported that the widening gap between reported book value and market value of firms can be led by the increasing significance of intangible assets in the general economic environment.

Today's economy is dominated by information (Kieso et al., 2016). The information provided by intangible assets significantly boosts earnings of firms such as Microsoft, Coca-Cola and Christian Dior. Having high-quality intangible assets is an essential key to the gaining competitive advantage (Low and Lee, 2014; Roulstone, 2011; Makrominas, 2017). The management of firms should be capable of effectively getting utmost benefit from intangible assets. The effects of intangible assets in financial performance can differ across industries.

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In the last two decades, the importance of intangible assets has tremendously increased. While many studies examined the roles of intangible assets in financial performance, only few studies investigated the relationship between the intangible assets and financial performance in emerging economies. The ultimate objective of the present book chapter is to provide empirical evidence about the impacts of intangible assets on financial performance by utilizing a sample that includes twenty-five non-financial firms quoted in Borsa Istanbul 30 index. The results of this study suggest that intangible assets considerably boost financial performance of sample firms.

This study is structured as follows. First section presents literature review and research hypothesis. Second section discusses research design and data. Third section reveals the results of empirical analysis and discussion. The last section concludes the book chapter and provides suggestions for future studies.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

There have been a large number of studies associated with intangible assets over the last decades. In this section of the study, the studies that investigated the influence of intangible assets on the financial performance of firms are presented.

Seo and Kim (2020) analyzed the association between intangible assets and financial performance of small and medium sized firms operating in South Korea during the period between 2011 and 2016. They concluded that investment in intangible assets positively influences profitability and the value of firms.

Pierre and Audet (2011) tried to analyze the role of intangible assets for firm performance and strategy. They developed a structural equation model to test research hypotheses. The results of empirical analysis reveal that intangible assets prominently contribute to the firm performance.

Bhatia and Aggarwal (2018) used panel data models to evaluate the influence of intangible assets on financial performance of Indian firms over the period 2001-2012. The results of panel data regression model indicate that intangible assets play a vital role in value creation process. They also claimed that investment in intangible assets should be one of the priorities of firm managers.

Salamudin et al. (2010) analyzed the association between intangible assets and firm value by using a sample of firms operating in Malaysia over the period 2000 and 2006. The results of empirical analysis demonstrate that firms that achieved to develop intangible assets are more likely to have high firm value. Additionally, they stated that intangible assets, such as brand name, human capital, which

cannot be reported in the firm's financial statements, are of importance for having competitive advantage.

Chareonsuk and Chansa-ngavej (2008) proposed a framework for the management of intangible assets in the business environment. The proposed framework is based on the approach of balance scorecard. They found that effectively managing of intangible assets is critically important for the survival of firms in the era of knowledge.

Lopes and Carvalho (2021) examined the link between intangible assets and financial performance of firms in Latin America. The research data covered the period between 2011 and 2017 with a sample of 1236 firms. They stated that intangible resources contribute to the boosting firm performance and firm value measured by Tobin's q.

Uddin et al. (2022) analyzed whether intangible assets succeed to decrease the adverse effects of pandemic shocks on firm performance by using a sample of firms operating in the United States of America over the period 1985-2020. They found that intangible assets are useful in safeguarding sample firms from macroeconomic shocks caused by pandemics.

Bollen et al. (2005) investigated the link between firm performance and intellectual capital by using a survey data. They stated that intellectual capital considerably affects economic wealth of firms and should be taken into consideration when designing the firm's strategy. The result of the study indicated that firm managers should focus on relation capital, human capital and structural capital, components of intellectual capital, to report strong financial performance.

Zanni et al. (2015) proposed a framework to evaluate the impacts of different marketing assets on financial performance, through their influence on the level of intellectual capital owned by firms operating in Italy. The results of empirical analysis suggest that intellectual capital positively influences sample firms' performance and the interaction of marketing assets such as exclusive stores and brands has positively related with the value of intellectual capital.

Duho (2022) examined the effects on intangible resources on the financial performance of sample firms in West Africa. The results of empirical analysis reveal that firm size positively affects, while financial leverage negatively affects financial performance and intellectual capital has positive influences on firms' cost efficiencies.

Subaida (2021) analyzed the impacts of intangible assets on firm value and performance by using a sample consisting of firms listed on Indonesia Stock

Exchange. They stated that firm value and financial performance are not influenced by intangible assets.

Sayed et al. (2022) investigated the impacts of intangible investments on Egyptian firms' non-financial performance over the period 2012-2020. They concluded that the increase in intangible investment positively influences the customer satisfaction and internal business processes and thereby enhances financial performance.

Nagaraja and Vinay (2016) empirically test the relationship between intangible assets and financial performance by using a sample of Indian firms. They claimed that intangible asset positively influenced financial performance measured by return on assets but did not influence financial policies.

High-level of globalization and high fluctuations in the markets exert pressure on firms to get competitive advantage (Schnorrenberger, 2005). Barney (1991) stated that a firm strongly depends on intangible assets to have sustainable advantage and should effectively employ intangible assets in maximizing financial performance. In the new economy, intangible assets have been considered prominent in designing of firms' strategic objectives. Previous studies yield important evidence on the contributions of intangible assets to firms' financial performance. Based on these arguments, the following hypothesis is developed.

Hypothesis 1: Intangible assets positively impact the firm performance.

RESEARCH DESIGN AND DATA

In this section of the study, research design and data are discussed. The sample used in this study consists of 25 non-financial firms listed on BIST-30 Index in the period between 2016 and 2022. It is worth stating that financial firms are excluded from the sample due to different financial reporting regulations they should comply. Table 1 reveals the industry classifications of sample firms. This table indicates a high representation of the whole economy. Sample firms operate in six different industries. According to Table 1, 44% of sample firms operate in the manufacturing industry, firms operating in chemicals and petroleum account for 16% of sample firms.

Table 1. Industry Classification of Sample Firms		
Industry	**Number of Firms**	**Percentage**
Manufacturing	11	0.44
Chemicals and Petroleum	4	0.16
Technology	3	0.12
Transportation	3	0.12
Mining	2	0.08
Construction	2	0.08
Total	25	100

The empirical model employed in the present book chapter is constructed as follows. Return on equity is used as a dependent variable, size and leverage are included into empirical model as control variables.

$$ROE_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 LEV_{it} + \beta_3 IA_{it} + \varepsilon_{it}$$

Firm size is measured by natural logarithm of total assets of sample firms. LEV stands for financial leverage measured by the ratio of total debts to total assets. IA represents natural logarithm of sample firms' intangible assets.

DESCRIPTIVE STATISTICS

Table II presents the descriptive statistics for research variables. According to Table II, the average profitability measured by return on equity is 0.186. Return on equity for sample firms ranges from -0.36 to 0.87. Table II indicates that the mean of size measured by natural logarithm of sample firms' total assets is 10.338. In addition, leverage measured by the ratio of total debts to total assets has a mean of 0.559, ranging from 0.00 to 0.88. The logarithm of intangible assets varies significantly, ranging from 5.92 to 10.58, with a mean of 8.603.

Table 2. Descriptive Statistics					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
ROE	175	0.186	0.185	-0.36	0.87
SIZE	175	10.338	0.681	8.31	12.2
LEV	175	0.559	0.218	0.00	0.88
IA_LOG	175	8.603	1.091	5.92	10.58

CORRELATION MATRIX

Table 3 shows the correlation coefficients among the research variables used in the empirical analysis. According to Table 3, there is no multicollinearity problem among variables as the highest correlation coefficients is below the cut-off point of 0.80. Return on equity has the highest positive correlation coefficient with the intangible assets, 0.386, followed by leverage. As shown in Table 3, the correlation between size and leverage, size and intangible assets is statistically significant at 0.01.

Table 3. Pearson Correlation Coefficients				
	ROE	**SIZE**	**LEV**	**IA_LOG**
ROE	1.000			
SIZE	0.014	1.000		
LEV	0.027	0.228***	1.000	
IA_LOG	0.386***	0.538***	0.316***	1.000

Notes: *** indicates indicate significance level at 0.01.

THE RESULTS OF REGRESSION RESULTS

The regression results are reported in this part of the study. The regression results of pooled OLS, fixed-effects model and random effects model are presented in Table 4. The result of Hausman test indicates that fixed effects estimator is much more efficient compared to random effects for the research hypothesis. The present study focuses on the estimators of fixed-effects model to discuss the empirical results.

According to Table 4, size measured by the natural logarithm of sample firms's total assets positively influences the return on equity. This finding supports Yang and Chen (2009) and Gligor et al. (2014). On the other hand, leverage measured by the ratio of total debts to total assets negatively and significantly related to financial performance. This finding implies that low-leveraged sample firms are more likely to report higher profitability.

Table 4. Regression Results

	Pooled OLS		**Fixed-Effects Regression**		**Random Effects Regression**	
	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.
Constant	0.161	0.401	-1.002	0.000	-0.652	0.004
SIZE	-0.072	0.001	0.022	0.429	-0.009	0.702
LEV	-0.074	0.221	-0.236	0.005	-0.189	0.010
IA_LOG	0.094	0.000	0.126	0.000	0.121	0.000
Adjusted R-squared	0.190		0.430		0.420	
F-Statistic	15.100		37.490		99.850	
Prob. (F-Statistic	0.000		0.000		0.000	
Hausman Test	15.41 (0.001)					

The results of pooled OLS, fixed-effects and random effects regression reveal significant positive relationship between financial performance and intangible assets. According to the fixed effects regression model, the coefficient on IA-LOG is 0.126 implying that an increase of one percent intangible assets brings about the increase of financial performance by 12.6 percent. The findings suggest that intangible assets contribute to financial performance of sample firms. This conclusion allows us to accept research hypothesis and is in line with the results of Seo and Kim (2020), Pierre and Audet (2011), Lopes and Carvalho (2021) and Sayed et al. (2022). It is worth mentioning that the explanatory power of fixed-effects regression model is 43%.

CONCLUDING REMARKS

As the world economy is becoming much more globalized, intangible assets play a prominent role in enhancing organizational effectiveness. Firms operating in

emerging markets are expected to effectively employ their intangible assets in enhancing financial performance. Intangible assets in the new economy have been considered important in the composition of firms' assets and strategic objectives. The proper management of intangible assets becomes essential for increasing shareholders' wealth.

The objective of this book chapter is to empirically investigate the association between financial performance of 25 non-financial firms listed on BIST 30 Index and intangible assets from 2016 to 2022. The results of empirical analysis reveal that there is significant and positive association between intangible assets and financial performance measured by return on equity. It is also worth stating that the results of fixed effects regression indicate that low-leverage firms are more likely to report high financial performance. The present study provides important implications for the policymakers, investors and firm management. Future studies can use cross-country data to obtain further evidence.

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