DOES INTERNAL CONTROL PROCESS AND FIRM CHARACTERISTICS IMPROVE FIRM VALUE? AN EMPIRICAL ANALYSIS IN THE MANUFACTURING SECTOR

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Abstract

The purpose of this research is to investigate the role of enterprise risk management (ERM), Big4 auditors and firm characteristics on firm value. This population study was conducted in the Indian manufacturing sector. Annual panel data for 11 years (2007–2017) was collected from 60 firms on the National Stock Exchange (NSE). Empirical findings prove that there is variation in *Tobin's Q* but no difference in return on assets (*ROA*) and return on equity (*ROE*) among firms that have implemented ERM and included Big4 audit firms. The study documents that *Q* was influenced by the implementation of ERM, liquidity, firm age and firm size. Findings reveal that ERM, firm size, leverage, firm age, liquidity and firm complexity impacted *ROA*. The study outcome also shows *ROE* was affected by leverage, firm size, liquidity and firm complexity. This study is a valuable addition to the existing studies on the Indian manufacturing sector and has contributed incredible insights to the empirical literature on firm value from the multidimensional outlook of the purchasers, management, and investors. The findings have several implications for investors, managers and researchers.

Keywords: Enterprise Risk Management, Big4 Auditor, Firm Characteristics, Firm Value, India, Manufacturing sector, Tobin's Q, ROA, ROE, Internal Control

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1. INTRODUCTION

Modern businesses operate in a rapidly changing and competitive environment. The risk of falling out of step with this ongoing change is a major threat to all businesses. Empirical evidence shows that firm value is crucial in analysing a company's financial position and long-term sustainability. The foremost aim of every company is to augment the firm value for the welfare of its stakeholders. Internal control processes are designed and maintained by the management of a company to trust the accuracy of financial reporting, promote accountability, and achieve operational effectiveness and efficiency. Organisations disclose information on internal control to gain attention to the authenticity of financial statements to the stakeholders. In many organisations, risk oversight processes are immature, and they must be strengthened to achieve the strategic objectives. Budhathoki, Rai, and Rai (2020) highlighted that the markets respond negatively to internal control weaknesses. Rashid, Kareem, Ali, and Hasan (2021) found that internal

control techniques aid in improving financial performance. Stanton (2012) suggests that internal control helps organisations to identify threats and diversify risks. The New York Stock Exchange and Securities Exchange Commission compelled firms to adopt risk management activities after high-profile corporate scams in the United States of America like Enron, WorldCom, etc. Governments, professional accountants, academics, and other interested parties from different countries have joined hands to prevent the future occurrence of such scandals. This has led to the enactment of laws and the development of internal control mechanisms. In 1992, the Committee of Sponsoring Organisations (COSO) framework broadened it to risk and internal control (Lakis & Giriūnas, 2012). Internal control is a comprehensive action embracing financial, operational, management, strategic and total quality management in an organisation. Mid-21st century was ridden by corporate scandals, which led to the Sarbanes-Oxley (SOX) Act of 2002. Section 404 of the SOX Act on evaluation for internal controls obliges management to install satisfactory internal control mechanisms for reliable monetary transaction reporting. Under Section 302 of the SOX Act on corporate responsibility, financial reports need to incorporate accreditations by the chief risk officers (CRO) that the reports are not distorted, and any defect in the internal control practices are conveyed to the audit committee. According to the COSO, enterprise risk management (ERM) and external audit are vital components of internal control. In this manner, the idea of internal control covers an organisation's boundaries of activities, its objectives and targets; additionally, it accommodates the fundamental objective of effective risk management and external audit. The Companies Act 2013 mandates the presence of risk management and audit committee in all organisations. Zulfikar et al. (2021) and Sterin (2020) showed the presence of an audit committee had a positive effect on internal control disclosures. It will impact the firm value as it involves enormous resource commitment (Anju & Uma, 2017; Janardhanan & R, 2020). Research shows that firm-specific characteristics such as firm size (Kumar & Sujit, 2018), volatility of stock returns (Gatzert & Martin, 2015), ERM (Silva, da Silva, & Chan, 2019), Big4 auditor (Sekerci, 2015), board independence (Baxter, Bedard, Hoitash, & Yezegel, 2013), firm complexity (McShane, Nair, & Rustambekov, 2011), firm age (Ilaboya & Ohiokha, 2016), institutional ownership (Masry, 2016), leverage and liquidity (Mohamad, 2018) influenced firm value. Hence organisations must understand whether the implementation of ERM, inclusion of Big4 auditor and characteristics of the firm creates value. This investigation is an attempt to fill the research gap in the existing body of knowledge by measuring firm value from a three-dimensional perspective: the purchasers, investors and management. The Indian manufacturing sector contributes 16.57% of the Indian gross domestic product (GDP) and represents 20% of the Nifty 500 Index. In this context, this research study aims to answer the following major research question (*RQ*):

Do internal control processes and firm characteristics improve firm value in the Indian manufacturing sector?

The sub-questions are as follows:

RQ1: How many companies have adopted ERM and Big4 auditor during the study period?

RQ2: Is there any change in firm value by adopting ERM?

RQ3: Does firm value differ by the inclusion of Big4 auditor?

RQ4: Does the implementation of ERM, inclusion of Big4 auditor and firm characteristics impact firm value?

RQ5: Among ERM, Big4 auditor and firm characteristics, which one has a greater effect on the firm value?

This paper is organised in sections to answer our research questions. Section 2 presents a literature review and formulation of hypotheses. Section 3 describes research methodology and model specification. Section 4 reports findings of the study. Section 5 offers a discussion of the results. Section 6 summarizes the conclusions of our work, discusses the implications underlines its limitations and outlines directions for further research.

2. LITERATURE REVIEW

2.1. Agency, signaling and enterprise risk management theory

The purchasers and investors closely monitor every announcement as it helps them in their investment decision-making (Sudiyatno, Puspitasari, Suwarti, & Asyif, 2020). The financial performance, presence of ERM and audit by Big4 auditor positive signals will add to their confidence and thus improve the firm value. A company with effective risk management policies and an excellent track record of financial performance will be preferred over others by purchasers and investors. The agency theory states that internal control provides security against the actual risks, which may affect the funds invested by the principal (stockholder). The presence of ERM indicates that the agent (management) is informed of the future risk which may obstruct the firm's operations and thus optimise it to increase the firm's value (Agustina & Baroroh, 2016). Following the enterprise risk management theory, the firms with ERM are capable of managing risks more efficiently as they can decrease the delayed consequence of a contingency on the firm value. ERM will prompt the upgrade of a company's firm value (COSO, 2004). Though it is advocated that ERM facilitates value creation; the elements that help in value creation are yet to be identified (Kraus & Lehner, 2012).

2.2. Relationship between ERM and firm value

Ramlee and Ahmad (2015) utilised a sample of Malaysian non-financial firms (with and without a risk management committee (RMC)) to establish that there is no relationship between ERM and firm value (*Q*, return on assets (*ROA*), return on equity (*ROE*)) between 2009 and 2013. Abdullah, Janor, Hamid, and Yatim (2017) performed an empirical study in the Malaysian technology industry during 2004–2012 and regression results revealed that ERM implementation reduces the firm's value (*Q, ROA*).

The research performed on 153 Nordic firms in 2010 by Sekerci (2015) proved that ERM does not support value creation (*Q, ROA*). Whereas, studies conducted by Bohnert, Gatzert, Hoyt, and Lechner (2019), Chen, Chuang, Huang, and Shih (2020), Silva et al. (2019), and Hoyt and Liebenberg (2011) provided evidence that ERM improved firm value (*Q*).

H1: Q varies between ERM and non-ERM companies.

H2: ROA varies between ERM and non-ERM companies.

H3: ROE varies between ERM and non-ERM companies.

2.3. Relationship between Big4 auditor and firm value

Beasley, Clune, and Hermanson (2005) have demonstrated that organisations reviewed by anyone of the Big4 audit firms usually adopt ERM than firms evaluated by non-Big4 audit firms. Desender and Lafuente (2009) studied 97 pharmaceutical firms listed on NYSE, Amex, and Nasdaq from 2004 to 2005. They also found that firms with Big4 auditors had higher ERM scores too. Sekerci (2015) focused on 153 Nordic firms in 2010 and found out that the presence of Big4 auditor improved the firm value (*Q* and *ROA*). They used a survey and secondary data. Eikenhout (2015) identified an adverse relationship between Big4 auditor and firm value (*ROA*) on 39 insurance companies conducted from 2005 to 2008 in the Netherlands.

H4: Q differs among Big4 and non-Big4 companies.

H5: ROA differs among Big4 and non-Big4 companies.

H6: ROE differs among Big4 and non-Big4 companies.

2.4. Relationship between firm characteristics and firm value

2.4.1. Board independence

Ghosh (2013) investigated 100 Indian companies listed on the National Stock Exchange (NSE) based on market capitalisation as of March 31, 2012, and regression results proved that the presence of independent directors did not impact ERM adoption and didn't improve firm value (*Q*). According to Beasley et al. (2005), board independence would bring better risk management and, in this manner, improve the extent of ERM usage and enhance the scope of ERM implementation. They performed an exploratory study on 123 US organisations in 2004 and found out that board independence had impacted ERM implementation positively. Golshan and Rashid (2012) focused on 90 companies listed on Malaysian Bourse and through an independent sample t-test identified that the existence of independent directors on the management board didn't impact the ERM and non-ERM adopters. Baxter et al. (2013) focused on 165 firm-year observations in the US financial services sector from 2006 to 2008 and found that board independence negatively impacts *ROA* but has a positive impact on *Q*. Rosenstein and Wyatt (1990) through the regression method, suggested that independent directors on the board increased firm value (*ROE*). Their study was based on 1251 outside director announcements in the 'Who's News' section on the Wall Street Journal Index from 1981 to 1985.

2.4.2. Firm complexity

Based on 112 firms with ERM, Gordon, Loeb, and Tseng (2009) found that ERM and firm value (*ROA*) are influenced by firm complexity. Firm complexity impacted the firm value positively according to McShane et al. (2011). They supported that companies with more subsidiaries reflect the vision to grow and expand.

2.4.3. Firm age

Majumdar (1997) found with the regression that more established firms are increasingly beneficial and less productive. The study was conducted between 1988 and 1994. Likewise, Dogan (2013) discovered through regression analysis that firm age and firm value (*ROA*) are negatively associated. Coad, Segarra, and Teruel (2013) detailed utilising regression analysis that old firms were less gainful and productive (*ROA*) from an example of 62259 Spanish assembling firms between 1998 and 2006. Capasso, Gallucci, and Rossi (2015) conducted an empirical analysis of 107 Italian firms during 2008–2011 and identified a negative link between firm age and firm value (*ROA*). It was the result of inefficiency in operating costs and huge investments in land and research. Adetunji and Owolabi (2016) concentrated on 114 firms recorded on the Nigerian Stock Exchange from 2010 to 2014 and regression analysis established that firm age does not impact firm value (*ROA*, *ROE* and *Q*). On the contrary, many other studies informed the positive link between age and firm value. Ilaboya and Ohiokha (2016) proved that older companies had higher company value (*ROE*). Thirty Nigerian were involved in the archival data analysis from 2006 to 2012.

2.4.4. Firm size

Bahraini, Endri, Santoso, Hartati, and Pramudena (2021) documented that increase in total assets turnover decreased the firm value. Kumar and Sujit (2018) investigated 646 Gulf Cooperation Council (GCC) firms in 2018 and found that firm size influenced firm value. Mohamad (2018) identified that firm size increases firm value (*Q*). Their study was based on unbalanced panel data of 36 government linked companies (GLC) from 2000 to 2016. Hidayah (2014) revealed that firm size could positively affect firm value (*ROA*). But Susanti and Restiana (2018) supported the structural inertia theory that large-sized firms resisted changes due to high bureaucracy and thus reduced the firm value (*ROE*). They used regression analysis on 108 LQ45 Index companies in Indonesia between 2013 and 2016. Firm size did not impact firm value (*Q*) as per the findings of Sayilir and Farhan (2017) among 130 manufacturing firms in Turkey from 2008–2013. The findings of Amato and Burson (2007) supported that firm size impacted firm value negatively (*ROA*). The data was collected from the Internal Revenue Service (IRS) Corporate Sourcebook

US Financial Services Sector from 2000–2001. Adetunji and Owolabi (2016) proved that *Q* was adversely impacted by firm size while having a positive impact on *ROA*. The structural inertia theory states that the resistance to any change is more in larger organisations due to high bureaucracy, which decreases the firm value (Hannan & Freeman, 1984). But this contradicts with the liability of smallness theory which says that smaller organisations have higher chances of failure due to limited capital, higher operating costs and lack of skilled labourers (Aldrich & Auster, 1986).

2.4.5. Institutional ownership

Enormous outside ownership will put pressure on the executives to reveal all data which will make way to actualise ERM and thus create a positive impact on firm value (Liebenberg & Hoyt, 2003). The positive connection between institutional ownership and corporate governance was demonstrated in the examination led by Wahab, How, and Verhoeven (2008) on 434 firms recorded on Bursa Malaysia during 1999–2002. Research conducted by Cornett, Marcus, Saunders, and Tehranian (2007) on 100 US firms on Standard & Poor's (S&P) as of November 1993 till 2000 established that institutional investors increased firm value (*ROA*). The findings of Masry (2016) supported that institutional ownership increased firm value (*ROE*). His study was on 73 Egyptian companies for eight years. Nashier and Gupta (2016) identified the positive effect of institutional investors on firm value (*Q*). Tsai and Gu (2007) focused on US publicly traded restaurant firms from 1999 to 2003 and ordinary least squares (OLS) and two-stage least squares (2SLS) analysis proved the positive influence of institutional investors on firm value (*Q*). Whereas Bhattacharya and Graham (2007) classified the institutional investors negatively influenced the firm value (*Q*). The study was conducted on 116 firms in Finland in 2004.

2.4.6. Leverage

Mohamad (2018) supported that leverage decreased firm value (*Q*). He used unbalanced panel data and employed regression analysis on 36 GLC Malaysian companies from the year 2000 to 2016. On the other hand, Winarto (2015) stated that leverage positively influenced the firm value (*Q*). Winarto (2015) researched 32 public listed Indonesian companies from 2005 to 2010 and stated that leverage positively influenced the firm value (*Q*). Jin and Jorion (2006) found that leverage positively impacted firm value (*Q*). Sekerci (2015) focused on 153 Nordic firms in 2010 and proved leverage improved the firm value (*Q* and *ROA*). They used a survey and secondary data.

2.4.7. Liquidity

In the study by Mohamad (2018), the firm value was positively impacted by liquidity position. Along these lines, they may have higher inspiring components to place assets into ERM to limit the dangers which can agitate the achievement of organisational goals.

2.4.8. Volatility of stock returns

According to McShane et al. (2011), volatility of stock returns is adversely associated with firm value (*Q*) as investors perceive that risk is more when the volatility is high. The relationship between ERM and the volatility of stock returns was hypothesized by Gatzert and Martin (2015). Fang, Noe, and Tice (2009) analysed 2642 US firms from 1993 to 2004 and predicted that volatility of stock returns improved firm value (*Q*).

H7: ERM, Big4 auditor and firm characteristics impact Q.

H8: ERM, Big4 auditor and firm characteristics impact ROA.

H9: ERM, Big4 auditor and firm characteristics impact ROE.

3. RESEARCH METHODOLOGY

Secondary data like annual reports, company websites and online databases were the sources of information. Due to the unavailability of data, three companies from 63 companies in NSE manufacturing (automobile and energy) were excluded. This is a population study of 60 NSE companies. The frequency of data is annual and comprises 660 firm-year observations. This study was conducted from April 2007 to March 2017. Panel data was used. Details of variables are presented in Table 1.

Table 1. Variables

Measurement	*Name*
(Total assets + Market capitalisation - Net worth) / Total assets	Tobin's Q (Q_{it})
Net income divided by average total assets	Return on asset (ROA_{it})
Net income divided by shareholder's equity	Return on equity (ROE_{it})
ERM/RMC/CRO = 1, otherwise 0	The existence of ERM/RMC/CRO (ERM_{it})
Big4 auditor = 1, otherwise 0	The existence of Big4 auditor (AC_{it})
Natural log (Total assets)	Firm size($SIZE_{it}$)
% of shares with institutional investors	Institutional ownership ($INSOWN_{it}$)
Net cash flow from operating activities divided by total assets	Liquidity (LIQ_{it})
% of independent directors divided by total number of board of directors	Board independence (BOD_{it})
Number of years since inception	Firm age (AGE_{it})
Total assets divided by net worth	Leverage (LEV_{it})
Number of subsidiaries	Firm complexity (FC_{it})
(Standard deviation of daily returns) × √365	Volatility in daily stock returns (VOL_{it})

Source: Authors' elaboration.

The relationships explored in the existing literature (Janardhanan, 2020) were used to formulate the following regression models to investigate the role of implementation of ERM, the inclusion of Big4 auditor and firm characteristics on firm value. As in Adetunji and Owolabi (2016), *Tobin's Q*, *ROA*, and *ROE* are used to measure firm value in this study.

Model 1:

$$Q_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 AC_{it} + \beta_3 SIZE_{it} + \beta_4 AGE_{it} + \beta_5 LIQ_{it} + \beta_6 BOD_{it} + \beta_7 INSOWN_{it} + \beta_8 LEV_{it} + \beta_9 FC_{it} + \beta_{10} VOL_{it} + \varepsilon_{it} \quad (1)$$

Model 2:

$$ROA_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 AC_{it} + \beta_3 SIZE_{it} + \beta_4 AGE_{it} + \beta_5 LIQ_{it} + \beta_6 BOD_{it} + \beta_7 INSOWN_{it} + \beta_8 LEV_{it} + \beta_9 FC_{it} + \beta_{10} VOL_{it} + \varepsilon_{it} \quad (2)$$

Model 3:

$$ROE_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 AC_{it} + \beta_3 SIZE_{it} + \beta_4 AGE_{it} + \beta_5 LIQ_{it} + \beta_6 BOD_{it} + \beta_7 INSOWN_{it} + \beta_8 LEV_{it} + \beta_9 FC_{it} + \beta_{10} VOL_{it} + \varepsilon_{it} \quad (3)$$

4. RESEARCH RESULTS

The summary statistics of all the 13 variables, i.e., independent, dependent and firm-specific variables, has been shown in Table 2. It consists of 660 firm-year observations of 60 companies across 11 years. For each variable, the mean, standard deviation, minimum and maximum are reported along with the variation over time and firms for the dependent variable and regressors.

Table 2. Variable statistics

Variable	*Mean*	*Std. dev.*	*Min*	*Max*
Dependent variables				
Q	1.39	3.37	-41.19	19.73
ROA	7.89	7.42	-25.3	42.7
ROE	16.79	17.11	-114.8	112.19
Independent variables				
ERM	0.36	0.48	0	1
AC	0.31	0.46	0	1
Firm characteristics (control variables)				
SIZE	4.69	1.15	0	6.74
AGE	34.07	21.84	0	98
BOD	41.16	18.9	0	87.5
FC	8.87	19.69	0	164
LIQ	0.1	0.09	-0.22	0.55
INSOWN	17.9	16.71	0	68.72
LEV	2.47	1.32	0	9.71
VOL	2.28	1.17	0	6.31

Source: Authors' elaboration.

4.1. Findings for *RQ1*

To identify the presence of ERM and Big4 auditor, content analysis was conducted on 660 annual reports and 60 company websites. Risk management committee, RMC, COSO, enterprise risk management, ERM, chief risk officer, CRO, KPMG, Deloitte, PwC and Ernst & Young were the keywords.

Figure 1. Companies with ERM

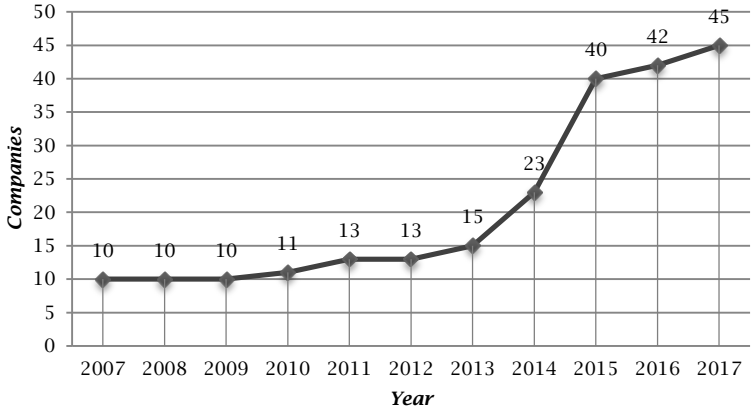

Figure 2. Companies with Big4 auditor

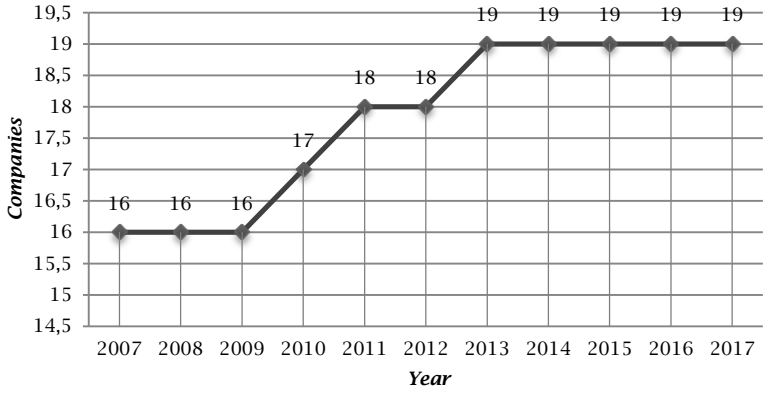

Figure 1 shows that there has been an increasing trend in the existence of ERM. In 2013 after the enforcement of the Companies Act, there has been a three-fold increase. It can be inferred that companies understand the importance of having ERM for sustainable growth. Figure 2 depicts that

the number of Big4 auditor also showed an increase. Research suggests that though the quality of the audit provided by the Big4 is no different from others, the customers perceive it to be better. So, manufacturing companies give more importance to external audits by Big4 as it helps them to maintain product quality and retain customers.

4.2. Findings for *RQ2*

Results in Table 3 support that firm value (*Q*) showed a difference between ERM and non-ERM companies. This explains the purchasers' belief that ERM helps in the early assessment of the risks associated with changes in the inside and outside environment which helps to capitalise on the risky events before the contenders respond to the environmental changes. On the other hand, findings proved that ERM and non-ERM companies do not differ in firm value (*ROA*, *ROE*). It is observed that only 10 to 13 companies have implemented ERM during the 2007–2012 period. ERM involves huge resource commitment, which reduces the net income of the firm. From management and investor's perspective, ERM will make any variation in firm value only in the long run.

Table 3. Comparison of firm value among ERM and non-ERM observations

Firm value	Type	N	Mean	Std. deviation	Std. error	95% confidence		Minimum	Maximum	ANOVA	Sum of squares	df	Mean square	F	Sig.
						Lower bound	Upper bound								
Q	0	423	1.1459	2.9354	0.1427	0.8653	1.4264	-28.87	9.83	Between groups	72.463	1	72.463	6.433	0.01*
	1	237	1.8366	4	0.2598	1.3247	2.3485	-41.19	19.73	Within groups	7412.403	658	11.265		
	Total	660	1.3939	3.3701	0.1311	1.1363	1.6515	-41.19	19.73	Total	7484.867	659			
ROA	0	423	7.9176	7.7977	0.3791	7.1724	8.6629	-25.3	42.7	Between groups	0.61	1	0.61	0.011	0.92
	1	237	7.8542	6.7158	0.4362	6.9948	8.7136	-5.85	41.29	Within groups	36303.842	658	55.173		
	Total	660	7.8948	7.4222	0.2889	7.3275	8.4621	-25.3	42.7	Total	36304.452	659			
ROE	0	423	17.2407	18.3839	0.8938	15.4837	18.9977	-114.8	112.19	Between groups	237.469	1	237.469	0.811	0.37
	1	237	15.9903	14.5708	0.9464	14.1257	17.855	-44.47	83	Within groups	192728.654	658	292.901		
	Total	660	16.7917	17.1118	0.666	15.4838	18.0996	-114.8	112.19	Total	192966.123	659			

*Notes: 0 denotes non-ERM companies; 1 denotes ERM companies, * significant at 10%.*
Source: Authors' elaboration.

4.3. Findings for *RQ3*

In Table 4 the results show that *Q* differs among Big4 and non-Big4 companies. The presence of Big4 audit firms gives a secure feel to the purchasers regarding the audit quality when they analyse the annual reports and company websites before investing. The results demonstrated that the Big4 auditor does not alter *ROA* and *ROE*. It implies that the presence of Big4 auditor does not decide the management efficiency in generating profits from assets and income from investments. The inclusion of Big4 auditor will reduce the net income and thus affect the firm value.

Table 4. Comparison of firm value among ERM and non-ERM observations

Firm value	Type	N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Minimum	Maximum	ANOVA	Sum of squares	df	Mean square	F	Sig.
						Lower bound	Upper bound								
Q	0	453	1.1527	3.0473	0.14317	0.8713	1.434	-28.87	9.83	Between groups	84.055	1	84.055	7.473	0.006*
	1	207	1.9218	3.94349	0.27409	1.3815	2.4622	-41.19	19.73	Within groups	7400.812	658	11.247		
	Total	660	1.3939	3.37015	0.13118	1.1363	1.6515	-41.19	19.73	Total	7484.867	659			
ROA	0	453	7.833	7.7538	0.36431	7.117	8.5489	-25.3	42.7	Between groups	5.532	1	5.532	0.1	0.752
	1	207	8.0303	6.65518	0.46257	7.1183	8.9423	-5.32	38.7	Within groups	36298.92	658	55.166		
	Total	660	7.8948	7.42228	0.28891	7.3275	8.4621	-25.3	42.7	Total	36304.452	659			
ROE	0	453	17.3369	18.60809	0.87428	15.6187	19.0551	-114.8	112.19	Between groups	429.342	1	429.342	1.467	0.226
	1	207	15.5986	13.2245	0.91917	13.7864	17.4107	-36.57	73.3	Within groups	192536.781	658	292.609		
	Total	660	16.7917	17.11188	0.66608	15.4838	18.0996	-114.8	112.19	Total	192966.123	659			

*Notes: 0 denotes non-Big4 companies; 1 denotes Big4 companies, * significant at 10%.*
Source: Authors' elaboration.

4.4. Findings for *RQ4* and *RQ5*

As per the correlation results shown in Table 5, the presence of *ERM* is positively correlated with *Q*. Firm size (*SIZE*), firm age (*AGE*), institutional ownership (*INSOWN*), leverage (*LEV*), board independence (*BOD*), liquidity (*LIQ*) and volatility (*VOL*) are positively correlated with *Q*. Presence of *ERM*, and the presence of Big4 auditor are not correlated with *ROA* and *ROE*. Firm size (*SIZE*), firm age (*AGE*), firm complexity (*FC*), leverage (*LEV*), and volatility (*VOL*) are negatively correlated with *ROA* and *ROE*.

Table 5. Correlation

	Q	*ROA*	*ROE*	*ERM*	*AC*	*SIZE*	*AGE*	*BOD*	*FC*	*LIQ*	*INSOWN*	*LEV*	*VOL*
Q	1												
ROA	0.25*	1.00											
ROE	0.21*	0.89*	1.00										
ERM	0.10*	0.00	-0.04	1.00									
AC	0.11	0.01	-0.05	0.12*	1.00								
SIZE	0.06	-0.01	-0.02	0.29*	0.05	1.00							
AGE	0.01	-0.06*	-0.04	0.11*	0.11*	0.40*	1.00						
BOD	0.09*	0.04	0.01	0.06	0.16*	0.34*	0.32*	1.00					
FC	0.05	-0.10*	-0.14*	0.11**	0.25*	0.18*	0.13*	0.18*	1.00				
LIQ	0.25*	0.64*	0.58*	0.01	0.01	0.04	-0.05	0.04	-0.13*	1.00			
INSOWN	0.04	0.07*	0.05	0.09*	0.24*	0.28*	0.46*	0.30*	0.13*	0.03	1.00		
LEV	0.03	-0.31*	-0.14*	-0.07*	-0.08*	0.31*	0.18*	0.14*	-0.11*	-0.06*	-0.04	1.00	
VOL	0.09*	-0.11*	-0.02	-0.06	0.00	0.19*	0.21*	0.47*	0.03	-0.05	0.22*	0.31*	1.00

*Note: * significant at 10%.*
Source: Authors' elaboration.

Table 6. Test results

Co-linearity statistics			
Variable	***Variance inflation factor***	***Tolerance***	
SIZE	1.57	0.638151	
BOD	1.51	0.661141	
AGE	1.46	0.683895	
VOL	1.44	0.693414	
INSOWN	1.44	0.695292	
LEV	1.34	0.748101	
FC	1.17	0.851648	
AC	1.15	0.868764	
ERM	1.15	0.872122	
LIQ	1.05	0.953342	
Mean	1.33		
Hausman test			
Variable	***Chi-square statistics***	***df***	***p-value***
Q	9.58	10	0.4778
ROA	101.15	10	0.0000*
ROE	86.42	10	0.0000*
Likelihood-ratio test			
Variable	***Chi-square statistics***	***df***	***p-value***
Q	293.356	59	0.0000*
ROA	427.935	59	0.0000*
ROE	305.074	59	0.0000*
Wooldridge test			
Variable	***F-statistics***	***df***	***p-value***
Q	122.837	59	0.0000*
ROA	4.44	59	0.0394*
ROE	2.367	59	0.1293

*Note: * significant at 10%.*
Source: Authors' elaboration.

Based on Hausman test results random effects model (REM) is appropriate for Model 1 and fixed effects model (FEM) is suitable for Model 2 and Model 3. There is an absence of multicollinearity. But as per the likelihood-ratio test, there is heteroskedasticity. Wooldridge test shows that Model 1 and Model 2 do not have first-order autocorrelation, but Model 3 has first-order autocorrelation.

In light of the outcomes received by the regression analysis, the models are tested.

Table 7. Regression results

Variables	*Model 1*			*Model 2*			*Model 3*		
	OLS	*FEM*	*REM*	*OLS*	*FEM*	*REM*	*OLS*	*FEM*	*REM*
Enterprise risk management (*ERM*)	2.41	1.81	2.37	-1.47	1.69	-0.61	-1.13	1.07	-1.03
	(0.016)*	(0.071)*	(0.018)*	(0.143)	(0.091)*	(0.539)	(0.258)	(0.284)	(0.301)
Big4 auditor (*AC*)	2.11	0.18	0.97	-0.38	-0.63	-0.55	-1.46	-0.69	-1.07
	(0.035)*	(0.861)	(0.333)	(0.703)	(0.531)	(0.586)	(0.144)	(0.493)	(0.286)
Firm size (*SIZE*)	-0.33	2.61	1.70	1.82	5.77	3.35	0.27	5.27	2.09
	(0.740)	(0.009)*	(0.089)*	(0.070)*	(0.000)*	(0.001)*	(0.791)	(0.000)*	(0.037)*
Firm age (*AGE*)	-0.67	0.00	-0.44	-0.54	-4.08	-1.62	-0.12	-3.62	-0.76
	(0.503)	(0.998)	(0.662)	(0.589)	(0.000)*	(0.105)*	(0.902)	(0.000)*	(0.448)
Liquidity (*LIQ*)	6.83	4.06	5.13	21.36	11.12	14.39	17.53	8.45	12.31
	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*
Board independence (*BOD*)	0.24	-0.52	-0.22	1.63	1.06	0.88	-0.07	-0.74	-0.78
	(0.810)	(0.602)	(0.827)	(0.103)	(0.290)	(0.376)	(0.942)	(0.459)	(0.435)
Institutional ownership (*INSOWN*)	-0.17	-0.97	-0.74	1.01	0.62	1.06	1.13	0.21	0.80
	(0.865)	(0.335)	(0.457)	(0.312)	(0.536)	(0.290)	(0.260)	(0.830)	(0.421)
Leverage (*LEV*)	1.02	-1.28	-0.54	-9.32	-8.28	-8.12	-3.73	-6.27	-4.69
	(0.309)	(0.201)	(0.587)	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*
Firm complexity (*FC*)	1.56	1.79	1.83	-2.45	-2.43	-3.13	-2.15	-2.83	-3.19
	(0.119)	(0.073)*	(0.068)*	(0.015)*	(0.015)*	(0.002)*	(0.032)*	(0.005)*	(0.001)*
Volatility (*VOL*)	2.19	2.99	3.12	-0.70	-1.26	-0.40	-1.17	-0.62	1.59
	(0.029)*	(0.003)*	(0.002)	(0484)	(0.208)	(0.686)	(0.242)	(0.534)	(0.112)
R-squared	0.0958	0.4203	0.8893	0.4994	0.7382	0.3315	0.3614	0.5978	0.2417
Hausman test			9.58		54.136			86.42	
			(0.0078)*		(0.0000)*			(0.0000)*	
F-test			63.347		24.115			12.70	
			(0.000)*		(0.000)*			(0.000)*	

*Notes: p-value is shown in parenthesis and * significant at 10%. OLS — ordinary least squares, FEM — fixed effects model, REM — random effects model.*
Source: Authors' elaboration.

Table 8. Model relationships

Variable	*Model 1: REM OLS using Q*			*Model 2: FEM (within) using ROA*			*Model 3: FEM (within) using ROE*		
	Coef.	*Robust std. err.*	*p-value*	*Coef.*	*Robust std. err.*	*p-value*	*Coef.*	*Std. err.*	*p-value*
ERM	0.73	0.31	0.02*	0.97	0.57	0.09*	1.75	1.63	0.28
AC	0.48	0.5	0.33	-0.79	1.27	0.53	-2.49	3.62	0.49
SIZE	0.34	0.2	0.09*	2.3	0.4	0.00*	6	1.14	0.00*
AGE	-0.01	0.01	0.66	-0.32	0.08	0.00*	-0.82	0.23	0.00*
BOD	0	0.01	0.83	0.02	0.01	0.29	-0.03	0.04	0.46
FC	0.01	0.01	0.07*	-0.03	0.01	0.02*	-0.1	0.04	0.01**
LIQ	7.89	1.54	0.00*	27.05	2.43	0.00*	58.76	6.95	0.00*
INSOWN	-0.01	0.01	0.46	0.02	0.04	0.54	0.02	0.1	0.83
LEV	-0.07	0.13	0.59	-1.82	0.22	0.00*	-3.95	0.63	0.00*
VOL	0.4	0.13	0.00*	-0.26	0.21	0.21	0.37	0.6	0.53
Constant	-1.79	0.83	0.03	9.57	2.35	0	21.47	6.73	0

*Note: * significant at 10%.*
Source: Authors' elaboration.

REM Model 1 shows a significant relationship as 89% of variances in *Q* can be predicted by the independent variables (*H7* supported). FEM Model 2 shows a significant relationship as 73% of variances in *ROA* can be predicted by the independent variables (*H8* supported). FEM Model 3 shows a significant relationship as 60% of variances in *ROE* can be predicted by the independent variables (*H9* supported). Thus, it is evident that there is a difference in *Q* for companies based on ERM and Big4 (*H1* and *H4* supported). But on the other side, there is no difference in *ROA* and *ROE* (*H2*, *H3*, *H5*, and *H6* not supported).

5. DISCUSSION OF THE RESULTS

5.1. Purchasers' perspective

Liquidity increments *Q* indicating to the purchasers that the company has generated more cash from its business. The purchasers favour companies that have ERM in place as they believe it will help the firm to anticipate the risks in the business environment, which in turn helps them to minimize losses. Implementation of ERM helps to increase *Q*. The presence of Big4 auditor positively impacts *Q* as it ensures audit quality to the purchasers. The presence of 358 large-size firms helps to increase value for the company as it gives purchasers more confidence. The volatility of stock returns increases *Q*. It indicates to the purchasers that stock is in high demand in the market. The company's vision for future developments is represented through the number of subsidiaries. 159 firm-year observations are indicating no subsidiaries and 107 with subsidiaries more than the industry average of 5. It is observed that the purchasers consider firm complexity in the long run as it increases *Q*. An older company has a better impression on the purchasers. 393 firm-year observations with less than the industry average of 34 years have decreased *Q*. There are 63 firm-year observations without an independent director on the board and 182 firm-year observations without any institutional ownership. So, this creates ambiguity in the minds of the purchasers regarding the effectiveness of the internal control. Thus, it has a negative effect on *Q*. Purchasers prefer firms with less debt financing. Hence it has a negative impact on *Q*.

5.2. Management's perspective

Liquidity has the highest impact on *ROA*. The presence of 358 large-size firms shows that management can productively use its assets and generate profits. It increases *ROA*. ERM helps management to be proactive in their specific environment, health, safety and sustainability (EHSS) opportunities and issues. The existence of ERM has a positive impact as it will increase *ROA*. Independent directors on the board (above 0.41 for 202 firm-year observations) and institutional investors (312 firm-year observations with more than 0.18) promote better monitoring and governance. It will improve management efficiency leading to an increase in *ROA*. As the company grows old, it will be able to manage its assets more efficiently as per the dynamic environment. But 393 firm-year observations with less than the industry average of 34 years negatively impacted *ROA*. 159 firm-year observations with no subsidiaries and 107 with subsidiaries more than the industry average of 5 have reduced the *ROA*. Big4 auditor help to examine the credibility of internal control measures to the management. But it reduces net income, as it requires huge resource commitment, thus negatively affecting *ROA*. Highly leveraged 247 firm-year observations decreased *ROA* because there is more debt than equity denoting its effect on the net assets of the firm. *ROA* has decreased due to the high volatility of stock returns from 323 firm-year observations. It implies that any variation in the security's value will affect the profits generated from the management of assets.

5.3. Investors' perspective

The investor perceives that the company has sufficient liquid assets to meet its operating activities. As per the results, liquidity has the highest impact on *ROE*. Firm size represents total assets. The presence of 358 large-size firms shows the investors that the company generates better income for their investments and thus has a positive impact on *ROE*. ERM and internal control grab the attention of stakeholders towards investment in the organisation. This investment encourages a solid establishment for the organisation's development and sustainability. So, the existence of ERM has a positive impact on *ROE* in the long run. Volatility increases *ROE*. 329 firm-year observations are having low volatility in daily stock returns. Independent directors and institutional ownership give a strong signal to the investors regarding good corporate governance mechanisms. Independent directors on the board are below 0.41 for 458 firm-year observations which decreases *ROE*. But 312 firm-year observations with more than 0.18 of institutional investors increase *ROE*. Firm complexity decreases *ROE* as 159 firm-year observations don't have subsidiaries. 393 firm-year observations with less than the industry average of 34 years have negatively impacted *ROE*. In the manufacturing sector, investors do not give much importance to the presence of Big4 auditor as it involves huge resource commitment that reduces net income and negatively affects *ROE*. Higher leverage triggers greater deficit risk in organisations leading to financial distress. Hence it negatively impacts *ROE*.

6. CONCLUSION

This study is a valuable addition to the existing studies on the Indian manufacturing sector and has contributed incredible insights to the empirical literature on firm value from the multidimensional outlook of the purchasers, management, and investors. *Q* showed that ERM, firm age, liquidity, and firm size matter to purchasers. The results of *ROE* proved that investors are interested in liquidity, firm size, leverage, and firm complexity. *ROA* indicated that the management has to give importance to ERM, firm size, firm age, firm complexity, liquidity and leverage.

The findings have several implications for investors, managers, and researchers. As this study covers the Indian manufacturing sector, the results are more authentic, precise and speak for all firms in the above sector. This study documents that the adoption of ERM and Big4 auditors has increased from 2007–2017. Manufacturing companies give more importance to external audits by Big4 as it helps them to maintain product quality and retain customers. This study helps to understand that *Q* differs among ERM and non-ERM companies. The purchasers of the organisation accept that the presence of ERM helps in the early evaluation of the risks related to changes in the interior and outside environment and capitalise on the risky events before the contenders respond to the environmental changes. Though ERM involves huge resource commitment, it increases firm value. The study proved that there is variation in *Q* but not in *ROA* and *ROE* between Big4 and non-Big4 observations. Big4 auditor give a secure feel to the purchasers regarding the audit quality when they analyse the annual reports and company websites before investing whereas it does not decide the management efficiency in generating profits from assets and income from investments. This study supports the enterprise risk management theory which mentions that the firms with ERM can reduce the aftereffect of an event on the firm's value as they can manage risks more efficiently through internal control. So, firms can confidently implement ERM even if it incurs huge investment. The outcome of this study denoted that the adoption of ERM, firm size, firm age and leverage influenced *Q*. Data from this study indicated that ERM, firm size, firm age, liquidity, leverage, and volatility affected *ROA*. Results proved that firm size, age, liquidity, leverage, and volatility impacted *ROE*. From this study, it can be understood that liquidity has the greatest impact on firm value. So, to increase the firm value, companies should increase their liquid assets to meet their operating activities. Firms with huge asset bases are preferred by the purchasers, management, and investors. Consequently, firm size improves firm value.

There are some limitations to this study. It is based on companies listed in the Indian Manufacturing sector and the period covered by the dataset is 2007–2017. With this regard, research in the future could be conducted in different countries or focused on other sectors as well as consider periods other than 2007–2017. Future research could include data from organisation surveys and spotlight on developing an ERM index to measure the level of ERM implementations in organisations.

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