CREATING VALUE THROUGH RELATED AND UNRELATED MERGER AND ACQUISITION: EMPIRICAL EVIDENCE

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Abstract

The main objective of this paper is to examine the impact of related/unrelated merger and acquisition (M&A) on value creation and research and development (R&D) of Indian non-financial sector companies. This study focuses on whether related M&A outperforms unrelated M&A in the context of value creation and R&D. The sample of the study includes 64 companies to evaluate the significance of relatedness and unrelatedness between target and acquiring companies of the Indian non-financial sector using panel data from the period from 2015 to 2020. The study employs a logistic regression model, which is a predictive model employed wherein the response variable is categorical. The idea of logistic regression is to establish a relationship between variables and the probability of a given outcome. The results of our outcome reveal that partner familiarity affects the post-acquisition value creation and R&D. Further, the findings of the study acclaim that related M&A outperform unrelated M&A. The study indicates that related M&A create positive value but influence negatively to R&D. The findings of the study have several implications for the managers and policymakers who need to understand the dynamics of related/unrelated mergers to take a valid judgment before making merger and acquisition decisions.

Keywords: Related/Unrelated Merger and Acquisition, Synergy, Research and Development, Value Creation, Logistic Panel Model

Authors' individual contribution: Conceptualization — I.G. and T.V.R.; Methodology — I.G. and N.T.; Validation — N.T. and T.V.R.; Formal Analysis — I.G.; Investigation — I.G.; Writing — Original Draft — I.G.; Writing — Review & Editing — T.V.R. and N.T.; Visualization — I.G.; Supervision — T.V.R. and N.T.; Project Administration — T.V.R. and N.T.; Funding Acquisition — I.G. and N.T.

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1. INTRODUCTION

M&A is a focus of the discussion that has nourished the financial literature from the last many decades. The performance of companies that are diversifying into related or unrelated M&As has gained the utmost contemplation in research (Hitt et al., 2012). The logical arguments and evidence support that relatedness between target and acquiring firms produce higher performance (Shelton, 1988; Bruton, Oviatt, & White, 1994; Finkelstein & Haleblian, 2002). The literature of M&A defines "relatedness" as the several forms of similarity between the target and the acquirer (Alhenawi & Stilwell, 2019). The companies merge either in a similar industry or in a different industry. Thus, M&A is bifurcated into three categories: horizontal merger, vertical merger, and conglomerate merger (Copeland & Weston, 1988; Ross, Westerfield, Jaffe, & Jordan, 2013; Avinadav, Chernonog, & Perlman, 2017; DePamphilis, 2019). The companies involved in the horizontal and vertical merger operates in the similar industry either with the same products or in a different part of the value chain, whereas in a conglomerate

merger the consolidating companies operate in unrelated industries (Bösecke, 2009; Sherman & Hart, 2005; Copeland & Weston, 1988; Sinkkonen, 2019). The literature supports that relatedness has a fundamental role in value creation post M&A (Alhenawi & Stilwell, 2019). The M&A transactions create value through several measures (Langford & Brown, 2004; Rabier, 2017) and one measure of value creation is synergy (Sinkkonen, 2019). Synergy can be defined when the value of the combined firm is greater than the standalone value of an individual firm (Paven & Tarasconi, 2017). The allocation of resources between the acquiring and acquired firm is commonly linked with relatedness and if firms are capable in different areas, then synergies could be attained by consolidating them (Harrison, Hitt, Hoskisson, & Ireland, 1991). To offer R&D synergies unrelated mergers for acquiring R&D intensive firms may be considered. The study of Ma and Xiao (2017) revealed that companies with a high level of R&D investment before M&A are often seen as desirable targets for a more significant business.

This paper focuses on studying the impact of relatedness between acquirer and target company on value creation and R&D in the post-acquisition period, to examine whether related mergers outperform unrelated mergers. In the existing literature, there is a debate going on whether related mergers outperform unrelated mergers. The studies support that related mergers have a higher likelihood to outperform unrelated mergers (Singh & Montgomery, 1987; Datta, Pinches, & Narayanan, 1992; Chatterjee, Lubatkin, Schweiger, & Weber, 1992). The deliberations on the significance of relatedness between target and acquiring firms in connection with value creation are analyzed in many studies (Porter, 1987; Barney, 1988; Hitt et al., 2009). There have been studies that support the strong alliance between R&D and unrelated M&A (Barney, 1988; Swaminathan, Murshed, & Hulland, 2008; Ivarsson & Christensen, 2012). The unrelated merger outperforms related merger in relation to R&D. The basic Standard Industry Classification (SIC) code matching technique that results in a binary relatedness indicator is the most straightforward method of calculating relatedness (Alhenawi & Stilwell, 2019). The value creation is taking place in M&A transactions through a dynamic process driven by multiple firm-specific and transaction-specific factors (Andrade, Mitchell, & Stafford, 2001; Ishii & Xuan, 2014). Thus, various performance factors: Tobin's Q, profitability ratio, liquidity ratio, debt-to-equity ratio, size of the firm, and market capitalization have been included in the model (Appendix).

The inconclusiveness of the findings motivates us to undertake the research study to empirically examine the issues and try to extend prior research and provide new insights about the impact of related/unrelated mergers on value creation and the R&D process. This study focuses on analyses of value creation from a new angle and takes into consideration both strategic and financial rationale. It is inevitable to research from where this value creation comes, and this requires exploring strategic implications from the point of view company and shareholders. Thus, the objective of the study is to examine the impact of related/unrelated M&A on value creation and R&D.

In order to have a healthier understanding of the association between related/unrelated M&A, value creation and R&D this study is conducted. The premeditation of this study is to furnish an intensified thorough understanding and to comprehend how related and unrelated merger contributes to the value creation. The research questions addressed in this study include the following:

RQ1: Is a related merger outperform an unrelated merger?

RQ2: Are related M&A able to achieve value creation, i.e., synergistic effects?

RQ3: Are related M&A able to improve R&D activity?

The paper is structured in five sections. Section 2 provides a review of the literature. The source of data and the econometric model used are discussed in Section 3, whereas Section 4 explains the econometric findings. The final section of the paper highlights the significant findings, implications, and limitations.

2. LITERATURE REVIEW

Theory and anecdote indicate that relatedness causes systematic wealth changes for the merging companies' shareholders (Chuang, 2017). The M&A diversification theory states that related M&A must have greater synergy creation potential as compared to unrelated M&A (Rumelt, 1974; Salter & Weinhold, 1978). Related M&A theoretically supports all three types of synergy whereas only unrelated M&A supports financial synergies and administrative efficiencies. This infers that related M&A will create more value than unrelated M&A (Singh & Montgoery, 1987). Given the framework of value creation opportunities, the researchers have attempted to analyze which type of M&A could create a value for shareholders that exceeds the normal value. Rumelt (1974) was one of the first researchers who differentiated between various types of relatedness, from a single business company to a conglomerate firm A transaction is assumed to be related when the acquirer and the target have the same two-digit or four-digit SIC code[1] (Berger & Ofek, 1995; Nejadmalayeri, Iyer, & Singh, 2017; Adhikari, Nguyen, & Sutton, 2018; Anderson, Stowe, & Xing, 2011).

Kusewitt (1985) concluded a positive effect in related acquisition using a ROA as a dependent variable. Datta et al. (1992) found that related M&A outperforms unrelated M&A with respect to creating value for shareholders. Pennings, Barkema, and Douma (1994) and Miller (2006) found a positive impact using ROCE, ROA, and R&D intensity as a dependent variables. Gugler, Mueller, Yurtoglu, and Zulehner (2003) concluded that related merger outperforms the conglomerate or vertical M&A with relation to profits and sales. Ekkayokkaya and Paudyal (2019) state that gain from synergy increases if the target firm and acquiring firm are vertically related. All studies using event study methodology conclude the superiority of related mergers (Seth, 1990; Chatterjee et al., 1992; Healy, Palepu, & Ruback, 1997; Lubatkin, Srinivasan, & Merchant, 1997; Flanagan & O'Shaugnessy, 2003). However, few studies state the opposite (Chatterjee, 1986; Lubatkin, 1987; Lubatkin & O'Neill, 1988; Matsusaka, 1993; Hoskisson, Hitt, & Hill, 1993; Megginson, Morgan, & Nail, 2004). The value creation should be measured through the acquirers operating performance and in a limited context through

[1] This concept was operationalized by researchers using the U.S. Federal Trade Commission's Standard Industry Classification at either the two- or four-digit level (Cording, Christmann, & Weigelt, 2010).

the acquirer's financial performance (Ben-David, Bhattacharya, & Jacobsen, 2020).

Lubatkin (1983) found the diversification theory intuitively appealing and noted that the concept of "synergy" has never been studied. Synergy is the value realized from the incremental cash flows generated by combining two businesses (Shaver, 2006; Ross et al., 2013; DePamphilis, 2019). The synergies are classified into *operating synergy* and *financial synergy* (Korhonen, 2020; Paven & Tarasconi, 2017; DePamphilis, 2001). Seth (1990) and Damodaran (2005) state that operating synergies are defined as economies of scale, higher pricing power, synergies arising from a blend of various functional strengths, and higher growth in current or new markets. These synergies allow businesses to raise operating profits, which typically exist as higher cash flows that positively affect the valuation of the acquisition. Operating synergy is traditionally referred to and categorized in two ways: *revenue synergy* and *cost synergy*. These synergies have been usually considered as two different and to a great extent mutually exclusive (Capron, 1999).

Generally, researchers linked synergies with operating synergy gained through economies of scope and economies of scale (Bösecke, 2009; Damodaran, 2005) and the combination of acquirer and target companies' resources resulted in the growth of revenue and savings of cost (Rabier, 2017). In revenue-based synergies, the consolidation of acquirer and target companies' operations leads to increased net sales (Huyghebaert & Luypaert, 2013). Revenue synergy is meant to improve sales growth (Paven & Tarasconi, 2017). Gugler et al. (2003) examined a large sample globally in relation to sales and profit and concluded that related mergers perform better than conglomerate and vertical M&A. Sinkkonen (2019) conducted a survey of company's executives aiming to identify how companies approach synergies in transactions. One of the conclusions is that increasing revenue was the most common motive. Rozen-Bakher (2018) presented a mediation model that explores a potential trade-off between efficiency gains and synergy success. The study concludes probability of the "win synergy-lose efficiency" trade-off increases, which results in higher sales growth but lower profitability. Thus, in this study, the value creation is measured through synergy which uses acquired firms' revenue as a proxy.

The allocation of resources between the acquiring and acquired firm is commonly linked with relatedness and concluded that if firms are capable in different areas, synergies could be attained by consolidating them (Harrison et al., 1991). Few studies conclude that there has been a strong alliance between value creation and R&D in unrelated M&A (Barney, 1988; Swaminathan et al., 2008; Ivarsson & Christensen, 2012) since the issue of post-integration is not generally present and could enhance the transfer of competence and pooling of expertise (Harrison et al., 1991). The study further concluded that high R&D intensity in the target company appears to be a value creation source. This is valid only for merging companies operating in different sectors while a high R&D intensive target company seems to be a value destroyer in the case of a related merger (Ivarsson & Christensen, 2012; Hitt et al., 2009). Cassiman, Colombo, Garrone, and Veugelers (2005) argue that both technological relatedness and market relatedness have a different impact on M&A. If the relatedness between firms is in complementary technological fields, firms are more likely to realize synergies and economies of scope in the R&D process.

Paven and Transconi (2017) focus on conceptual and post-ante value creation based on a matrix with two axes, one is the relatedness of business and the other is the frequency of distribution. They examined value creation using synergies and total shareholder return (TSR) undertaking four case studies and concluded that synergies analysis fits the business relatedness and value creation is more in the case of related firms. Hitt et al. (2012) concluded that selecting target firms carefully and implementing the acquisition process carefully can lead to gain from synergy and creation of value. Ekkayokkaya and Paudyal (2019) examined how value creation differs in the importance of the target's asset to its acquirer and found that acquirers extract greater value as the synergistic gains increase.

Multitudinous M&A studies applied varied econometric methods in determining the impact of M&A whereas a small number of studies has used logistic model analysis (Walkling, 1985; Sorensen, 2000; Agrawal & Sensarma, 2007; Brueckner, 2007; Kumar & Rajib, 2007; Basu, Dastidar, & Chawla, 2008; Wang, 2009; Rönnholm, 2010; Branch & Yang, 2010; Pasiouras, Tanna, & Gaganis, 2011). In India, this technique is still at an early stage in the literature of M&A (Ali & Gupta, 1998; Kumar & Rajib, 2007; Vyas, Narayanan, & Ramanathan, 2012; Agnihotri, 2013; Leepsa & Mishra, 2017).

This study contributes to the general literature on M&A. In particular, this study contributes to the literature that deals with target selection in M&As and the role of strategic alliances on M&A success and performance. The mixed results can be explained by a few studies that show non-linear relationships. Further exploration and defining non-linear relationships of diversifying acquisitions represents a future research opportunity. Firstly, to the authors' knowledge, no study has considered the combined effect of related/unrelated M&A on synergy and R&D as these are the two primary motives behind the M&A. Secondly, as an Indian economy is aiming to become a 5 trillion-dollar economy by 2024–2025 that will increase investment flow. Thus, it is vital to study the impact of domestic deals and their relationship with the diversification and value creation theory. Thirdly, the logistic regression methodology has been used that will help to measure the distinctive characteristic of related/unrelated mergers.

3. THE DATA AND METHODOLOGY

The study uses panel data from 2015 to 2020 for the non-financial sector companies. The non-financial sector includes the Manufacturing industry, Mining industry, Electricity industry, Construction & Real Estate industry, and Services industry (as per the classification of CMIE Prowess IQ database). The data has been collected from Capitaline and CMIE Prowess IQ database. The year 2015 is considered as an event year of M&A occurrence[2] and

[2] The M&A markets remained low in the recovery years between 2009 and 2014, as many companies were upgrading their balance sheets, concentrating on their primary business, dissociating non-core assets, and accruing record levels of cash reserves. However, the first signs of an economic recovery started in 2015 in India. This gave companies the confidence to take advantage of favorable financing conditions, sound balance sheets, and a sustained share price performance (Hitchcock, Prakash, Negrete, & Ramdevkrishna, 2018).

the number of M&A deals in the 2015 year is around 603. To make the deals compatible with the requirements, the data has undergone various filtration and 64 companies were considered for the study. The filters used in the study are:

- The deal must be classified as either *merger* or *acquisition*.
- The stake of the acquirer company in the target company should be more than 51%.
- The NIC (National Industrial Classification) code of both the acquirer and target company should be given.
- The target and acquirer both must be listed in the BSE (Bombay Stock Exchange).
- The companies that have announced multiple acquisitions/mergers in one announcement have been excluded.

The study used the econometric logit model, which evaluates the coefficients by a probabilistic method using the maximum likelihood which is free from the basic assumption of normality and equal variance of a population. The logit function uses a particular type of logistic function which is called "sigmoid function". It is non-linear and its value lies between 0 and 1. If the coefficient of the odds ratio is greater than 1, it indicates a unit increase in the variable, whereas if an odds ratio is less than 1, it suggests that the variable probability related to the dependent variable decreases. The logit model expresses the probability p that a dependent variable Y takes the value 1 given X_i.

Mathematically, logit model equation can be written as:

$$\ln\left(\frac{p_i}{1-p_i}\right) = z = a + \beta x + \varepsilon \quad (1)$$

where, $\ln\left(\frac{p_i}{1-p_i}\right)$ represents logit model.

The model is as follows:

Model 1

$$Related\ M\&A = \beta_0 + \beta_1 Synergy_{it} + \beta_2 RD_{it} + \beta_3 DE_{it} + \beta_4 PROF_{it} + \beta_5 LIQ_{it} + \beta_6 TQ_{it} + \beta_7 SIZE_{it} + \beta_8 MCAP_{it} + u_{it} \quad (2)$$

where, *RD* means research and development; *PROF* denotes profitability ratio; *LIQ* means liquidity ratio; *TQ* is Tobin's Q; *SIZE* is the size of the firm and *MCAP* is market capitalization which remains the same. The term u_{it} denotes a random disturbance term.

The various post estimation tests have been used in the study to test the validity of the model. Multicollinearity occurs when two or more independent variables are approximately calculated in the model by a linear combination of other independent variables. Variance inflation factor (VIF) has been used to measure multicollinearity between the independent variables. According to Chatterjee and Price (1991), VIF should be less than 10.

The unit root test is used to determine whether the time series variable is non-stationary and has a root factor. The null hypothesis is that the series contains a unit root, and the alternative is that the series is stationary. McFadden (1973) states that the R^2 is a more familiar concept, but the rho-squared is used to measure maximum likelihood estimation only. The rho-squared represent an excellent fit if the value is between 0.2 to 0.4.

The idea behind the Link test is that a regression equation is appropriately specified, and no other independent variable is required. It looks for link error that tests whether a dependent variable linked accurately with an independent variable. The model squared independent variable needs to be insignificant, whereas the non-squared variable needs to be significant to satisfy the Link test.

The goodness of fit test (Hosmer-Lemonshow) has a null hypothesis that there is a significant difference between observed and expected proportions.

4. EMPIRICAL ANALYSIS AND DISCUSSION

This section will present the analysis of the data and discuss the results obtained from the data.

Table 1. Descriptive statistics

Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
Related M&A	0.639	0.482	0	1
Synergy	2624.728	5125.831	6.06	40627.54
RD	5.916	27.307	0	223.98
DE	1.116	2.132	0	16.97
PROF	14.25	15.1	-15.59	82.78
LIQ	1.14	0.416	0.16	2.54
TQ	2.015	3.75	0.009	41.628
SIZE	3027.38	7557.118	17.1	51613.63
MCAP	7470.345	38801.75	0	341000

Source: Authors' estimation (STATA, 14).

It is evident from the table that there is more variation in synergy, firm size, and market capitalization, as shown by their high standard deviations of 5125.831, 7557.118, and 38801.75, respectively relative to their means of 2624.728, 3027.38, and 7470.345, respectively. Due to outliers in market capitalization, synergy, and firm size, a natural logarithm is used to transform them. Low variation is exhibited in all other independent variables as shown by the relatively low standard deviations and relatively low mean.

Table 2. Hadri Lagrange multiplier (LM) test

Variables	*Synergy*	*RD*	*DE*	*PROF*	*LIQ*	*TQ*	*SIZE*	*MCAP*
z	4.1229	1.6719	2.0930	1.5476	4.7805	2.8948	4.2777	4.4774
p-value	0.0000	0.0473	0.0012	0.0409	0.0000	0.0019	0.0000	0.0000

Source: Authors' estimation (STATA, 14).

The unit root test Hadri LM rejects the null hypothesis of a unit root as the p-value of each variable is less than 0.05, thus, the series is stationary.

Table 3. Correlation matrix and VIF

Variables	*Related M&A*	*Synergy*	*RD*	*DE*	*PROF*	*LIQ*	*TQ*	*SIZE*	*MCAP*	*VIF*
Related M&A	1.000									–
Synergy	0.078	1.000								3.968
RD	-0.010	0.272	1.000							1.532
DE	-0.083	-0.096	-0.056	1.000						1.511
PROF	0.007	0.333	0.149	-0.202	1.000					1.398
LIQ	-0.035	-0.268	-0.039	0.037	0.117	1.000				1.244
TQ	0.056	0.096	0.017	-0.110	0.204	-0.076	1.000	1.000		1.196
SIZE	0.159	0.767	0.310	-0.069	0.078	-0.199	-0.125	0.342		1.13
MCAP	0.189	0.357	0.108	-0.180	0.284	0.066	0.251	1.000	1.000	1.076

Source: Authors' estimation (STATA, 14).

The correlation matrix provides evidence of a negative correlation of related M&A with R&D, liquidity ratio, and debt-to-equity ratio which implies related M&A has a negative relationship with them while having a positive relationship with other independent variables. There is no multicollinearity problem in variables as the VIF index is less than 10, thus, all independent variables can be used.

Table 4. Effect of related M&A on synergy and R&D

Related M&A	*Odds ratio*	*Std. Err.*	*z*	*P > |z|*	*[95% Conf.*	*Interval]*	*Sig.*
Synergy	4.273381	1.560935	3.98	0.000	2.088593	8.743581	***
RD	0.006609	0.007515	0.88	0.378	0.991987	1.021448	
DE	1.065195	0.154566	0.44	0.663	0.801521	1.415608	
PROF	0.9490519	0.021984	-2.26	0.024	0.906928	0.993133	**
LIQ	1.73451	0.923458	1.03	0.301	0.610935	4.924463	
TQ	1.462514	0.334912	1.66	0.097	0.933635	2.290988	*
SIZE	1.2858225	0.093949	-3.81	0.000	0.150076	0.544356	***
MCAP	0.7738658	0.070743	-2.8	0.005	0.646924	0.925717	***
Pseudo R^2		0.355		Log-Lik. full model		-68.542	
McFadden's R^2		0.357		McFadden's Adj. R^2		0.212	
Goodness of fit test Hosmer-Lemenshow Chi^2 (8)		18.23		Prob. > Chi^2		0.0196	

Source: Authors' estimation (STATA, 14).
*Note: ***, **, and * signify 1%, 5%, and 10 %m respectively.*

The impact of related M&A on synergy, profitability ratio, Tobin's Q, size of the firm, and market capitalization is positive and significant. The synergy odds ratio is 4.273381, which indicates that if it is a related M&A then the level of the synergy will increase by 4 times. The findings are in line with studies of Lubatkin (1987), Barney (1988), Datta et al. (1992). These studies argue that a successful merger is one, which increases the combined value of the firm (Michel & Shaked, 1985; Weidenbaum & Vogt, 1987) and results are conclusive to prove the statement as the odds ratio is 4 and statistically significant, this effect indicates the presence of synergies. However, the odds ratio of R&D is not statistically significant, which conforms to studies (Ornaghi, 2009; Blonigen & Taylor, 2000; Desyllas & Hughes, 2005). The findings conclude that the relation between R&D and related M&A is negative, and it corresponds with the idea that firms when heading M&A, might reduce their R&D expenses. The odd ratio of R&D is 0.006609, which is less than 1, and also not statistically significant which infers that the level of R&D will decrease if it is a related firm merger. Thus, it can be concluded that related M&A impacts R&D negatively.

Profitability is also statistically significant while the odds ratio is less than 1, which indicates that less profitable companies seek to boost their efficiency by acquiring other productive companies (Dickerson, Gibson, & Tsakalotos, 1997; Geroski & Jacquemin, 1988). The purchasing firms are likely to produce higher operating profits. The odds ratio of Tobin's Q is more than 1 and also statistically significant, highlighting the validation of optimistic growth for the future of acquiring a firm (Kammler & Alves, 2009) and Tobin's Q affects a firm's decision to acquire (Adams & Mehran, 2008; Bris, Brisley, & Cabolis, 2008; Delcoure & Hunsader, 2006). The firm size odds ratio is more than 1 and statistically significant, indicating that the firm size will increase in related M&A. However, large firms generally acquire resources with the related firm and gain synergies in economies of scale and scope (Lubatkin, 1987; Mishra & Chandra, 2010; Desyllas & Hughes, 2005; Singh & Mogla, 2008). Their findings conclude that firms' acquisition is relatively larger and the size of M&A is considered an important determining factor. Market capitalization is statistically significant and the odds ratio is less than 1, which indicates that the company with more market capitalization has more chances to participate in related M&A activity.

The debt-to-equity ratio and liquidity ratio odd ratio is more than 1 but they are statistically insignificant. However, these findings are in synchronize with studies of Desyllas and Hughes (2005), Dickerson et al. (1997), and Bertrand and Betschinger (2012), respectively.

The pseudo R-squared is used to compare models. If pseudo-R-squared higher, it indicates a better prediction outcome. The likelihood-ratio test indicates the model explanatory power, the smaller the value, the better the model. Log-likelihood value is -68.542, and the Chi-square value is 0.000, which is statistically significant, concluding that related M&A outperforms unrelated M&A and related mergers impact synergies positively and R&D negatively.

The McFadden's R-squared is 0.357, which represents that model is fit. Since the p-value is 0.0196, which is less than 0.05, hence, the model is correct. In the goodness of fit test (Hosmer-Lemonshow) the p-value is 0.0196 which is less than 0.05, it rejects the null hypothesis, and the model is correct.

Hence, in a nutshell, the study concludes that partner familiarity has a positive impact on the post-acquisition synergy but not in the case of R&D. The findings of the study conclude that there is a stronger association between value creation and related mergers; however, the opposite is with related mergers and R&D. Because of the relatedness, the acquiring company management has a strong understanding of the target firm's resources and is able to effectively combine them to generate value creation for the company. The rationale for higher performance in related mergers is based on higher potential synergies from combining complementary capabilities. The acquired firms in related acquisitions fully benefit from the relatedness, implying that the share of resources with a related firm is more valuable than the simple combination of resources from two unrelated firms (Singh, 1987). The companies generally have two options either to develop in-house R&D or acquire R&D through M&As. Value creation occurs when merging firms possess strengths in different areas. The transfer of skills and sharing know-how between the executives would have a greater impact on unrelated M&As. This notion also supports that post-integration activities will be a very little or rare issue in unrelated merger.

Table 5. Link test

Related M&A	*Coef.*	*Std. Err.*	*z*	*P > z*	*[95% Conf.*	*Interval]*
hat	0.986	0.200	4.920	0.000	0.593	1.378
hatsq	0.125	0.060	2.080	0.380	0.007	0.243
cons	-0.132	0.233	-0.570	0.571	-0.588	0.325

Source: Authors' estimation (STATA, 14).

It can be concluded that the variable *hat* is significant, and the variable *hatsq* is insignificant. Therefore, the model satisfies the Link test, and the model is considered the best fit.

Table 6. Confusion matrix

		Predicted condition		
		Positive (D)	*Negative(~D)*	*Total*
True condition	Positive (+)	77	29	106
	Negative (-)	15	23	38
	Total	92	52	144

Classified + if predicted Pr (D) ≥ 0.5;
True D defined as vhc! = 0.

Sensitivity	Pr (+/D)	83.70%
Specificity	Pr (-/~D)	44.23%
Positive predictive value	Pr (D/+)	72.64%
Negative predictive value	Pr (~D/-)	60.53%
False + rate for turn ~D	Pr (+/~D)	55.77%
False – rate for true D	Pr (-/D)	16.30%
False + rate for classified +	Pr (~D/+)	27.36%
False – rate for classified -	Pr (D/-)	39.47%
Correctly classified		69.44%

Source: Authors' estimation (STATA, 14).

It estimates the model's general predicted accuracy, and from above Table 6, we can say that model is 69.44% correctly classified. The rules of this are higher the value, the better the model.

This study makes a valuable contribution to the existing literature in the form of examining the merger and acquisition from a new angle. In earlier studies, the merger and acquisition has been focused on post merger improvement using accounting and event study methodology whereas prediction has been made about characteristics related to acquirer and target companies using the logistic regression. This study examines the impact of related/unrelated M&A on firm performance using an advanced research design to find the answer to the questions: *Which merger outperform the related or unrelated?* and *Which merger creates more value based on synergy and R&D?*

It can be inferred that merging with unrelated firms can lead acquiring firms to distant themselves from its core business and unlikely to create value. M&As are likely to create value only when the managers are intended on avoiding common problems (psychological basis, hubris, etc.) and developing acquisition competencies to identify target that have complementary resources and capabilities and leads to synergy gains.

Theoretically, this study supports the diversification theory and synergy theory. It holds true that the combination of resources of two companies builds the basis of value creation in the context of mergers.

5. CONCLUSION

The present study investigates new areas of value creation and relatedness of firms through merger and acquisition deals. The study aims to analyze whether mergers and acquisitions create value for the acquiring firm post-merger and whether related merger outperforms unrelated mergers. The impact of related/unrelated M&A on R&D has also been examined. The relatedness of the firm has been analyzed using two-/four-digit NIC code. Due to the distinctive characteristic of the dependent variable, i.e., related/unrelated M&A, the logistic regression model has been used in the study. The study concludes that related M&A impacts value creation positively and is statistically significant indicating sound governance of companies. If a firm merge in a related industry then the synergy of acquiring a firm will increase by 4 times whereas the odd ratio of R&D is positive but not statistically significant which means that if a firm merge in a related industry then the R&D of acquiring firm may decrease. The various post estimation tests have been employed to the model to analyze the validity of the model. The Link test and goodness of fit test support that model fits well whereas the overall accuracy of the model is 69.44%.

The value creation is expected to be highest in related firm M&A and to forecast synergies the degree of similarity between the firms is often used (Healy et al., 1997; Lubatkin et al., 1997). The theory of value creation is based on the premise that value is the key factor and fundamental indicator of companies' performance, understanding value as the one that all stakeholders receive and not only the shareholders. This premise of theory is supported by this study. The diversification will reduce the shareholders' risk and help gain opportunities of high growth potential sectors in a market other than an existing market. The aftermath of this would be that it will increase investors and financial institutions confidence, which leads to a reduction in the cost of capital.

This study has various managerial implications. Firstly, the managers before any deal should plan the synergies they expect to gain and define them as planned, measurable, and challenging. This categorization would practically simplify the chances of obtaining each of the predicted synergies as seeking synergies that diversification will bring is challenging. Secondly, the managers need to realign themselves to adapt to technological advancement strategically. This will help merging firms to gain opportunities or advantages to their competitors by diversifying their markets or introducing new products into their existing markets. Thirdly, this study indicates that firms related mergers are associated with superior post acquisition performance for the acquiring firms. Thus, this research suggests that a manager needs to strike a balance between achieving synergy success and increasing R&D activities in related mergers. M&As primary concern is business relatedness; choosing partners will affect M&As success or failures. In good understanding, once the partner is chosen it will help managers to focus on post-integration activities.

The current paper has some limitations. The lack of financial data about the deal, acquiring and target firm resulted in a small sample size. The dataset includes only domestic M&As. The firms interested in the global market for enhancing competitiveness and international M&As are becoming increasingly prevalent. This paper focuses only on transactions funded with capital, common equity, or a combination of both, other ways of financing such as asset deals or other hybrid structures can be included. A landmark for future work will be to further divide relatedness into business, cultural, technological and size relatedness. The synergy items that contribute most to the buyer valuation of the company across different industries to provide valuable insights to industrial buyers and private equity companies can be taken into consideration. However, the study gave us a good perspective of the drivers that will steer the firm to approach M&A in the developing economy.

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APPENDIX

Table A.1. Definition of variables

Variables	*Description*
Synergy	It is measured by a change in sales. It is a proxy of value creation.
R&D Expense (RD)	The R&D expenditure given in financial statement of company has been used.
Debt-to-equity ratio (DE)	It is a proxy of financial leverage calculated as total liabilities (sum of noncurrent liabilities and loans)/shareholders' equity.
Market capitalization (MCAP)	Market capitalization refers to the total market value of outstanding shares of publicly traded companies.
Liquidity ratio (LIQ)	It is calculated by dividing current assets with current liabilities.
Tobin's Q (TQ)	It is calculated by dividing equity share (market value) plus preference share and total debt with total assets (book value).
Firm size (SIZE)	It is measured by the total assets of the firm.
Profitability ratio (PROF)	It is measured by return on capital employed (ROCE).