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Skill Resources Similarity and Post-acquisition Performance of the Acquiring Firms: Role of the Acquiring firms Size

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Abstract:
The primary objective of this study is to investigate the effects of the similarity in the skill resources of the merging firms on the post-acquisition performance of the acquiring firms. The study investigates the post-acquisition performance of 313 samples of merger and acquisition transactions completed from 2003 to 2015 by American firms operating in pharmaceutical and biotechnology industry. The study find out that the similarity between the merging firms in the degree of emphasis they give to the marketing activities can lead to a positive post-acquisition performance for the acquiring firms. On the contrary, the similarity between the merging firms in the degree of emphasis given to R&D activities is found to negatively affect the post-acquisition performance of the acquiring firms. In addition, the study find out that the acquirers size positively moderates the relationship between the similarity in the degree of emphasis given to marketing activities by the merging firms and the post-acquisition performance of the acquiring firms. It indicates that larger acquirers have extra resources which they can invest to facilitate the integration and the learning process for the marketing teams of the merging firms to share ideas and knowledge which may positively influence the post-acquisition performance of the acquiring firms.

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1.1 Introduction

The resource-based-view (RBV) states that the acquiring firms can realize economies of scope through skill transfer which imply that the similarity of the intangible resources of the merging firms are the source of knowledge which can be used for value creation (Farjoun, 1998). Makri, Hitt, & Lane (2010) also indicate that the theoretical arguments for diversification such as economies of scope usually state that firms can benefit using a particular resource for example, their know-how in several lines of business through sharing of related resources and activities among similar businesses. In the same fashion, the acquiring firms can diversify into new business context by using the similarity in their skill resources like R&D and marketing resources with the preferred target to generate corporate synergy (Harrison et al., 1991) transfering these resources to the target firm's business. The finding by Capron & Pistre (2002) also support this line of argument by finding out that the acquiring firms can realize a positive post-acquisition performance through the transfer of their R&D and marketing resources to the target's business context. Because the familarity of the acquirer with the industry of the target firm can eliminate or significantly diminish the need for the acquiring firms' managers to learn the business of the target firm and facilitate learning from the acquisition process which can positively affect the post-acquisition performance of the acquiring firms (King et al., 2004). In addition, the similarity in the skill resources between the merging firms can increase the absorptive capacity of the acquirer which enable it to identify, acquire, assimilate and integrate the acquired skill resources of the target with its existing knowledge resources (King et al., 2008). In addition, the prior literature states that acquiring firms with extra resources as a result of their size have the capacity to invest on R&D activities which has the ability to increase the potential of the acquirers to cope up with the business dynamism by involving into continuous innovations (e.g., Dutta, Narasimhan, & Rajiv, 1999; Markides & Williamson, 1994). The acquirers can also invest these extra resources on marketing capabilities which can increase the acquiring firms' ability to convert and commercialize their innovations into the kind of products that can capture the customers' needs and preferences using the feedback and customer information provided by their marketing activities to improve the efficiency of their manufacturing process (Dutta, Narasimhan, & Rajiv, 1999). Furthermore, the acquiring firms with larger size have resources to organize acquisition programs and task forces (Laamanen & Keil, 2008) which can coordinate and create organizational learning environment facilitating an open communication between the personnel of the merging firms increasing the possibility for free interaction and sharing of R&D and marketing skills (King et al., 2008; Farjoun, 1998) among the merging firms' teams of experts. The acquiring firms' size can also be considered as the attribute for the successful realization of the acquisition strategies which can help the acquirers to emphasize on innovation through consistent and continuous investments on R&D activities. Because the literature indicates that significant R&D investments show a strong managerial commitment to innovation as one of a characteristic that is increasingly important to overall firm competitiveness. It is further considered as a critical success factor for the acquiring firm's post-acquisition performance (Hitt, Ireland, & Hoskisson, 2007).

In general, the merger and acquisition literature indicates that the post-acquisition resource transfer between the merging firms which engage into related acquisitions can enhance the post-acquisition performance of the acquiring firms (e.g., Capron and Pistre, 2002**;** Capron, Dussauge and Mitchell, 1998). For example, the evidence from the study by Capron and Pistre (2002) with a special focus to horizontal acquisitions show that the acquirers can earn abnormal returns when they transfer their own R&D and marketing resources to the targets.

Whereas, Capron, Dussauge and Mitchell (1998) state that the resources redeployment among the merging firms depends on the strength of the resource positions in either of the merging partners. Here, both of these studies focused on the horizontal acquisition strategy and did not specifically check the similarity in the skill resources between the merging firms. Therefore, this study fills the research gap by investigating the effects of the similarity between the merging firms from R&D and marketing skill resources on the post-acquisition performance of the acquiring firms. Because the acquisition literature states that the similarity in the skill resources between the acquirer and the target has a great potential to determine the absorptive capacity of the acquiring firms which can increase their ability to evaluate, acquire, assimilate and integrate a new technology or skill resources obtained from their preferred target firms (e.g., King et al., 2008; Harrison et al., 1991).

The prior acquisition researchers investigate the effects of the corporate/skill resources relatedness between the merging firms on the post-acquisition performance of the acquiring firms defining their similarity by using; the strategic similarity of the two firms (e.g., Zeng & Schoenecker, 2015; Swaminathan, Murshed, & Hulland, 2008; Ramaswamy, 1997), the similarity of the knowledge bases of the two merging firms (e.g., Makri, Hitt, & Lane, 2010; Robins & Wiersema, 2003; Ahuja & Katila, 2001), the marketing resources similarity of the merging firms (Capron and Hulland, 1999) and human resources similarity of the merging firms (Farjoun, 1994). But, this study tries to fill the acquisition literature gaps by investigating the effects of the similarity between the merging firms in both R&D resources and marketing resources which have been investigated independently from the similarity of the knowledge bases of the merging firms and the marketing resources similarity perspectives in the prior acquisition researches. In addition, to the best of our knolwledge, the literature review indictaes that there is no a research study which has investigated the impact of the similarity of the merging firms in R&D resources and marketing resources on the post-acquisition performanc of the acquiring firms by using the acquirers size as a moderating variable. Thus, this study fills this research gap by investgating the effects of the skill resources similarity between the merging firms on the post-acquisition performance of the acquiring firms with a special emphasis to R&D and marketing skill resources' similarity by introducing the acquirers size as a moderating variable.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 *The Effects of Corporate/Skill Resources Similarity on the Acquiring Firms Post-acquisition Performance*

According to the resource-based view, heterogeneity among firms in owning and controlling key resources is a fundamental driver for the differences in the performance among the firms due to their difference in resources which are considered as basic requirement to build and sustain competitive advantage (Barney 1991; Wernerfelt 1984). Resource-based-view further defines firms as the collection of resources where firm resources like marketing and R&D resources are considered as stocks of knowledge/skill resources that firms own and control which they accumulate in a firm-specific, path-dependent manner which lead to differences in performance among firms. In addition, the idiosyncratic nature of these skill resources often precludes their tradability on open markets which forces firms with shortage of these skill resources to consider mergers and acquisitions as an option to acquire, exchange, or redeploy these difficult-to-duplicate resources by purchasing the target firm with similar skill resources (e.g., Capron and Hulland, 1999; Capron, Dussauge, and Mitchell, 1998). Therefore, for the acquiring firms to integrate the acquired new skill resources with its existing

knowledge base and for the learning process to bear fruit and improve post-acquisition performance, the knowledge bases of the two merging firms needs to display some level of similarity with each other (King et al., 2008).

Merger and acquisitions (M&As) can also be considered as an important part of the process of the business resource redeployment into more productive uses where firm-specific assets housed within one organization are merged with assets in another organization to improve the productivity of the resources of the combined firms (Ahuja and Katila, 2001). Even though, a firm's knowledge base as one of the intangible skill resource can grow through a series of knowledge-enhancing investments by the firm over time, firms can also grow their knowledge bases through the acquisition of external knowledge merging with similar targets. It is also suggested that related firms perform better because intangible assets 'open up the differentiation and segmentation' opportunity for the acquiring firms which help them to achieve high performance by early entry into related industries which are susceptible to entry barriers and then exploit the benefits of the combined skills of the merging firms. Furthermore, the research evidences show that firms operating in advertising or research-intensive industries diversify into industries having high research or advertising intensity which are related to their core market. Firms acquire other companies to extract value both by putting newly acquired resources into productive use and by combining them with existing but underused resources. The similarity between the merging firms advertising intensity which is the indication of the level of emphasis the firms have given to the marketing activities to generate value from their market offerings and the R&D intensity which indicates the level of innovation focus of the firms can be a signal for the skill similarity sought by diversifying firms (e.g., Farjoun, 1998; Harrison et al., 1991). As one of the external diversification option, related acquisition requires the acquiring firms to look for a target with which they have some level of skill resources similarity to generate synergy by understanding, assimilating, and integrating the skill composition of the acquired knowledge searching for a target with similar marketing and R&D intensities. Because their skill resources similarity can increases the acquirers' absorptive capacity to combine its existing skill resources with newly acquired knowledge of the target (e.g., King et al., 2008; Capron, Dussauge, and Mitchell, 1998; Harrison et al., 1991).

The value maximization theories from traditional cost-efficiency perspectives suggest that skill resources similarity between the merging firms can provide more opportunities for the acquiring firms to exploit economies of scale and scope by reducing redundant resources of the merging firms such as redundant R&D facilities and marketing personnel, and therefore create more potential for cost-saving synergies (e.g., Ramaswamy, 1997; Prahalad and Bettis, 1986). In acquisition, the transfer of resources between the acquirer and the target enables the acquiring firms to potentially reduce costs by enhancing productivity removing redundant assets with marginal benefits. For example, Capron and Pistre (2002) find out that the acquiring firms can generate value in post-acquisition performance in their study of horizontal acquisition when the acquiring firms transfer their valuable skill resources to the target firm's business context most of the time. Specifically, they state that the transfer of R&D and marketing resources and capabilities from the acquiring firms to their target firms can enable the acquirers to realize a positive post-acquisition value when the merger involves related firms. In addition to the traditional production efficiency view which emphasizes the role of increased production volume in decreasing per unit costs, reconfigurations of nonproduction resources are also necessary to produce and sell greater volumes of goods

more efficiently. For example, superior relationships with both channel and end customers can lead to lower sales and service costs. It is also stated that marketing resources being widely acknowledged as capable of generating economic rents as an important subset of the skill resources that can contribute to post-merger performance (Capron, Dussauge, and Mitchell, 1998) by contributing to firm value through value appropriation driven by advertising investments can be significant in creating competitive advantage of the acquiring firms. For example, advertising expenditures can increase the value realization potential of the acquiring firms by strengthening their brand names which in turn locks in loyal customers and increase their pricing flexibility by conveying information about product quality of the merging firms (Capron and Hulland, 1999). In addition, the acquired or the existing brand name of the acquiring firms with high equity can be extended to new categories of products without impairing its value and with relatively low investment cost to adjust the brand name to incorporate the acquired new products. In these ways, investments in marketing resources can help the acquiring firms to generate value from the innovations of the combined research teams of the merging firms and further realize a positive post acquisition value as a result of the combined efforts of the two merging firms marketing teams (Mizik & Jacobson, 2003). Furthermore, acquiring firms limit their search for the possible targets for acquisition to target firms with similar R&D allocation patterns because the ability to effectively appraise and create value from target firm resources requires the acquirers to look into the similarity of the skill resources which is believed to increase their absorptive capacity to clearly understand the skill combinations of the preferred targets (King et al., 2008). The absorptive capacity of the acquiring firms will give them the ability to understand the skill composition of the target and help to overcome the resources valuation problem which may happen due to information asymmetry residing with the resource of the target. This has a potential to help the management of the acquiring firms to value the target with some level of accuracy and create value through cost saving advantage by paying the appropriate level of premium for the acquisition transaction (Capron, Dussauge and Mitchell, 1998). In addition, the absorptive capacity which is the acquirer's ability to evaluate and utilize outside knowledge, tends to confine the acquiring firms to a particular technological domain or product market where they have some level of similarity with their internal competencies which can also affect the post-acquisition integration of the merging firms and results in improved acquiring firm post-acquisition performance (Cohen and Leventhal, 1990).

The acquiring firms can also realize synergy through skill transfer between the merging firms where economies may arise from human skill relatedness. For instance, individual skill resources like marketing and R&D as well as skill combinations, for example marketing and design skills in the product development process can be shared and transferred within a firm where a particular attribute of human skill relatedness is the learning that occurs through continuous two-way transfers of knowledge and ideas between the merging firms (Ahuja and Katila, 2001). The skill/knowledge transfer to the new combined unit will become effective when there is a moderate level of relatedness between the merging firms to enhance their combination and integration potential by increasing the absorptive capacity of the acquiring firms. This learning and skill transfer can result in innovation and increased knowledge at the combined firm and in gains through both cost reduction and increased differentiation and sales (Farjoun, 1998). Farjoun, further states that there are at least two ways the related diversification strategy helps firms to create value. First, because the expense of developing a core competence has been incurred in one of the firm's businesses, transferring it to the

target's business eliminates the need for that business to allocate resources to develop it. According to Farjoun, resource intangibility is a second source of value creation because the intangible resources are difficult for competitors to understand and imitate which enables the merged unit receiving a transferred skill resources to gain an immediate competitive advantage over its rivals. Moreover, merger and acquisition activities of merging firms with skill resources similarity can enable the acquiring firms to benefit from sharing of capabilities and market-related knowledge because their similarity enhances the transfer of superior business skills from the acquirer to the target in order to maximize their operational excellence and value creation. The acquiring firms can achieve this benefit using mechanisms which may involve leveraging of past market experiences of the merging firms, internal benchmarking, or by sharing best-practices from the merging firms which may enable them to jointly develop new strategic assets faster and more cheaply than their stand-alone competitors (Markides and Williamson, 1994). According to Markides and Williamson, the access to valuable, rare, and costly-to-imitate strategic assets may provide a short-term competitive advantage, but this advantage will eventually decay as a result of asset erosion and imitation. Therefore, in order to have a long-run advantage over the competitors and to sustain this advantageous business position, the acquiring firms need to accumulate and continuously transform their resources combining the existing internal and the newly acquired resources of their targets (Capron, Dussauge, & Mitchell, 1998) to build new strategic assets more quickly and efficiently than their competitors to sustain attractive competitive advantage (Markides and Williamson, 1994). It is also important to note that scope economies can be realized in areas like distribution systems and through sharing of the intangible assets such as the brand names of the merging firms (Singh and Montgomery, 1987).

In general, prior acquisition studies state the transfer of skills and resource redeployment as a rationale for merger and acquisition activities and further suggest for the acquiring firms to look at their match in R&D intensity and advertising intensity with the preferred target firms to assess their similarity in skill resources (Brush, 1996). For instance, a long tradition of research in technology suggests that new innovative outputs are often the result of recombining existing elements of knowledge into new synthesis as a result of the similarity in R&D activities of the merging firms which may increase the acquiring firm's absorptive capacity enabling it to expand its internal knowledge base and technological capability (Ahuja & Katila, 2001). This, in turn will help the acquiring firms to expand their market offerings and products which can increase their revenue generating opportunities to improve their post-acquisition performance. Given the above discussions, it can be concluded that the similarity between the merging firms in R&D and marketing skill resources can enable the acquiring firms to realize a positive post-acquisition performance by increasing their innovative and product differentiation potential. Therefore, based on the discussions presented so far, we forwarded the following hypotheses:

Hypothesis 1a: The similarity between the acquirer and the target in R&D resources has a positive effect on the post-acquisition performance of the acquiring firms.

Hypothesis 1b: The similarity between the acquirer and the target in marketing resources has a positive effect on the post-acquisition performance of the acquiring firms.

2.2 The Moderating Effect of the Acquirers Size

The acquiring firm's size helps the acquirer to optimize the synergistic value from the acquisition process because larger size commonly means more resources that can be invested

in managing the pre- and post-acquisition processes. Larger acquiring firms also have managerial and financial resources that can enable them to engage in more complex acquisition programs than their smaller counterparts (Laamanen & Keil, 2008). For instance, the acquiring firm with financial slack which represents high-discretion slack i.e., slack resource that can be more easily deployed in the target firm's business context is believed to positively influence the post-acquisition performance of the acquirer by giving managers relative freedom to allocate resources to effectively manage the acquisition process. In addition, the extra managerial time and services of the larger acquirers may also enable them to have accumulated slack managerial capacity that can be employed for managing the acquisitions process effectively (Basuila & Datta, 2019). In contrary, the smaller acquiring firms have only a few senior-level managers who can engage in acquisitions which forces these firms to face a trade-off between whether to focus their managers' scarce time on running the operations of the existing business or on the negotiation and integration of the acquisition processes which in some level may negatively affect the firm performance (Laamanen & Keil, 2008). Hitt, Ireland, & Hoskisson (2007) state that financial slack in the form of debt equity or cash, in both the acquiring and the target firms, also has frequently contributed to success in acquisition processes management. The financial slack resources will give the acquirer the capacity for financing the acquisition transaction internally without engaging to debt and it will also enable the acquirer to maintain a low or moderate level of debt after the acquisition to keep debt costs low. Because, when substantial debt is used to finance the acquisition transaction, the acquirer with the successful acquisitions engaging into related acquisitions can reduce the debt quickly, partly by selling off redundant assets (Capron, Mitchell, & Swaminathan, 2001) as a result of the similarity with the target firm, especially by divesting non-complementary or poorly performing assets. Furthermore, for the larger acquiring firms, debt costs do not prevent long-term investments on R&D activities of the firms which are considered as the critical factors for the success of the acquisition transactions. Another attribute of successful acquisition strategies is an emphasis given on innovation which is demonstrated by continuous and consistent investments on R&D activities (Hitt, Ireland, & Hoskisson, 2007) of the acquiring firms. Because, significant R&D investments are taken as a strong managerial commitment to innovation, a characteristic that is increasingly important to overall firm competitiveness as well as the critical factor for the success of the acquisition process of the acquiring firms. Furthermore, the acquiring firms with larger size can use their excess resources to develop specialized personnel, processes, and establish dedicated teams to manage the acquisition processes effectively. These dedicated teams can act as systemic repositories of knowledge of the previous acquisition experiences which can provide a pool of acquisition specialists to help the acquiring firms to build a capacity to perform acquisition processes effectively (Laamanen & Keil, 2008). In addition, larger acquirers can use their extra resources to make continuous and consistent investments in R&D activities to ensure continuity in firm innovation and performance to realize a positive post-acquisition performance (Hitt, Ireland, & Hoskisson, 2007). In addition, the acquirer needs to make sustained investment on R&D to use the market opportunities and maintain its competitive position because consistent investment in R&D is one of the requirement for success in acquisition (Hitt, Ireland, & Hoskisson, 2007). In the contrary, as the R&D investments increase or exceed the specific technology needs of an acquirer, a target's technology resources become less beneficial (Uhlenbruck, Hitt, & Semadeni, 2006) and potentially counterproductive after it passes the threshold level of investment (King et al., 2008) on internal R&D activities. Hence, the acquiring firm has to identify targets with proved R&D technology resources where it has previous research experiences which enable it

to understand, appraise, assimilate and integrate the acquired knowledge into the new combined business context (King et al., 2008). In conclusion, the research findings suggest that the acquirer has to make consistent R&D investment in order to benefit from the change in the technological improvement later (e.g., King et al., 2008; Hitt, Ireland, & Hoskisson, 2007) because R&D investments have the capacity of improving the acquirer's absorptive capacity for the future technological development.

Moreover, the dynamic capabilities theory states that firms need to develop dynamic capabilities which are firm's ability to achieve new forms of competitive advantage; ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. It also refers to the ability of the acquiring firms to renew competences so as to achieve congruence with the changing business environments (Teece, Pisano, & Shuen, 1997). Therefore, the acquirer needs to build a dynamic capability which enables it to have abilities to integrate the internally owned resources and the newly acquired resources through a continuous dynamic process of resources' transformation and learning to cope up with the changing business environment (Markides & Williamson, 1994). The dynamic capability theory further suggests that capabilities development involves continuous and dynamic learning process through combination, integration and transformation of internal and acquired resources and capabilities. That is why the acquirer needs to have additional extra resources to invest on the dynamic learning process to develop organizational processes, routines, procedures and programs that enables it to continuously reconfigure and transform its resources and capabilities to cope up with the dynamism of the business environment (Teece, Pisano, & Shuen, 1997). Therefore, an acquiring firm with extra resources has the potential to invest on R&D activities which has the ability to come up with innovations constantly and equally it can invest on marketing capabilities which increase the acquiring firm's ability to commercialize these innovations into the kind of products that capture the customers' needs and preferences giving feedback and customer information to the manufacturing function of the firm (Dutta, Narasimhan, & Rajiv, 1999). The acquiring firms with larger size can also use their extra resources to organize acquisition programs and task forces (Laamanen & Keil, 2008) which can coordinate and create organizational learning environment to facilitate open communication among the personnel of the merging firms to freely interact and share R&D and marketing skills (King et al., 2008; Farjoun, 1998). Based on the above discussions, the following hypotheses are forwarded:

Hypothesis 2a: Acquirers size increase the effects of the similarity in R&D intensity between the acquirer and the target on the post-acquisition performance of the acquiring firms.

Hypothesis 2b: Acquirers size increase the effects of the similarity in marketing intensity between the acquirer and the target on the post-acquisition performance of the acquiring firms.

3. RESEARCH METHODOLOGY

3.1 Industry Context and Sample

3.1.1 Industry Context

In order to test the effects of the corporate/skill resources similarity between the acquirer and the target on the post-acquisition performance of the acquiring firms, we selected an industry context with a high incidence of merger and acquisitions (M&As) where both the operational efficiency in production/manufacturing and product innovation and differentiation are required to cope up with the pressures from customers and changes in the regulation. Because both new product innovation and product differentiation helps the acquirer to build and sustain firm competitive advantage specially for firms operating in

pharmaceutical and biotechnology industry which can be realized through intensive R&D and marketing activities (Grill & Bresser, 2013). In addition, the pharmaceutical and biotechnological firms belong to the industry with the highest growth and technological change rates worldwide. The industry is also highly regulated and firms operating in this industry need to frequently adjust to new legislative and regulatory demands which require the firms to continuously upgrade their resources and capabilities. Therefore, there is a common and frequent need for pharmaceutical and biotechnological firms to upgrade their business models, resources and capabilities which forces them to engage into merger and acquisition to acquire new resources from the external sources because internal resources and capabilities development process is often costly and time taking to cope up with the business dynamism (Qi, 2016). As one of the external development strategy merger and acquisitions (M&As) allow pharmaceutical firms to access innovative resources and capabilities especially R&D and marketing resources which are of high strategic value to the acquiring firms (Grill & Bresser, 2013).

Acquisition activities are extensive throughout the pharmaceutical industry, where firms frequently use acquisitions to enter markets quickly, to overcome the high costs of developing new products internally, and to increase the predictability of returns on their investments. For instance concerning the cost saving advantage of acquisitions, the cost of bringing a new drug to the market in 2005 increased to about $900 million where the average time it requires to launch new drugs in the market stretched to 12 years (Hitt, Ireland, & Hoskisson, 2007). Therefore, firms in this industry engage into merger and acquisitions to minimize the time and costs required to push the new product into the market and to solve the shortage of strategic resources to maintain their market share and positon.

3.1.2 Sample of the Study

The sample for this study is developed using Securities Data Corporation (SDC) database by selecting all the lists of merger and acquisition (M&A) transactions completed in pharmaceutical and biotechnology industry from 2003 to 2015. The sample is set incorporating completed merger and acquisition deals which fulfill the following basic requirements (Qi, 2016).

1. The value of the transaction is no less than $10 million because firms tend to adopt a hands-off approach with small acquisitions as their effects are likely to be negligible (Makri, Hitt, & Lane, 2010)
2. The status of the deal is completed.
3. The form of deal is merger, acquisition of majority interest or acquisition of assets.
4. The deals include all acquisitions which involve all publicly listed acquiring firms operating in USA because it is difficult to obtain performance related financial data for private firms from S&P COMPUSTAT database (Makri, Hitt, & Lane, 2010).

Initially, we begin with 3296 M&A deals of pharmaceutical and biotechnology firms and the number of deals gradually reduced because deals with pending, not completed and withdrawn acquisition transactions have to be removed from the deals list. Since most of the financial performance outcome records are available for publicly traded firms, we restricted the acquirers to be firms publically listed and traded which have financial outcome records. We also restricted the sample to include firms with acquisition transaction deals of value not less than $10 million dollar because the deals with less than this limit are believed to have a minimal effect on the performance of the acquiring firms. After checking for all the above listed restrictions, about 528 completed acquisition deals identified suitable for data

collection. Among those deals, we only included those merger and acquisitions (M&As) that are initiated by firms in the pharmaceutical and biotechnology industry which is defined in the context of this particular study where there is high possibility for the merging firms to have knowledge/skill resources similarity. Our final M&A sample in the pharmaceutical and biotechnology industry has 313 acquisition transaction deals initiated and completed because of the unavailability of financial data for some acquiring firms. It is also believed that emphasizing on one industry comprising several firms with a context which is very suitable for testing the theories of this particular study because the R&D and marketing resources are all equally important for the success of the acquiring firms to generate synergy (Grill & Bresser, 2013). Furthermore, focusing on one industry helps to alleviate the possible bias in result interpretation of the study which may occur due to industry heterogeneity (Qi, 2016). Finally, we matched these 528 completed acquisition transaction deals with financial data from S&P *Compustat* using common firm identifiers like CUSIP codes, ticker symbol, NAIC codes and GVKEY codes and find data for 313 completed acquisition transaction deals. We collected financial data for these combination of acquisition transaction deals between the merging firms from S&P Compustat on advertising expenses, R&D expenses, total sales, total assets and net income. We also collected data from BVD Osiris (Bureau van Dijk Osiris) on the number of employees of the acquiring firms, data on total assets, total sales, and R&D expenses for the firms whose data not available on Compustat database. For some of the target firms whose financial data not available on S&P Compustat and BVD data sets, we collected their financial data from the 10K annual reports.

3.2 Variables and Measurement

3.2.1 Dependent Variable: Post-Acquisition Performance of the Acquiring Firms

The accounting-based measures of merger and acquisition performance is guided by the basic rationale which states that the strategic aim of the acquiring firms is to earn a satisfactory return on capital they invested on merger and acquisition deals. It is further asserted that the use of accounting metrics is based on the premise that synergies obtained from an acquisition are best reflected in accounting measures such as return on assets (ROA). The commonly used merger and acquisition post-acquisition performance measurement methodology in accounting-based studies is to compare post-acquisition returns to the weighted average of the pre-merger returns of acquiring firms (Papadakis & Thanos, 2010).

The acquisitions literature indicates that from all of the accounting measures of profitability, return on assets (ROA) is found to be the least sensitive to the upward or downward estimation bias that can be induced by changes in leverage or bargaining power resulting from a merger. It is also suggested that these biases can be further minimized if the merger year is dropped from computations of profitability since it is difficult to pinpoint an exact date on which the financial accounts of the merging firms are combined and started using a single account. To determine the effects of acquisition on the acquirers' acquisition performance, ex ante performance is subtracted from the ex-post performance of the acquirers. The ex-ante performance is determined as the revenue-weighted mean of the return-on-assets (ROA) of the acquirers three years preceding the focal acquisition transaction completed deals included in the sample. Ex post profitability of the acquirers is also computed similarly, but for the three years after the year of the focal acquisition included into the sample of the study. Change in the performance of the acquirers following the completed merger and acquisition transaction deal is the difference between post-merger and premerger performance of the acquiring firms (Ramaswamy, 1997). Furthermore, the literature suggests that in calculating the premerger and post-merger acquiring firms' performance no less than 3 and no more

than 5 years data are used. Even though it is understandable that some of the effects of relatedness between the acquirer and the target associated with the knowledge resources like R&D and marketing synergy may not be fully realized within 5 years, adding years would have increased the probability of non-controllable influences (e.g., other major strategic decisions taken by the firm) on the results of the analysis. In addition, the inclusion of each additional year may result in the elimination of many recent acquisitions due to insufficient data. Therefore, using five years as a time period for calculating the premerger and post-merger values of the acquiring firm represents a tradeoff between these factors. That is why 3 years' time period is selected for this study to determine the values of the dependent variable (ROA) by calculating the premerger performance of acquiring firms three years before the focal acquisition and three years' of post-merger performance of the acquiring firms following the focal acquisition year (e.g., Ramaswamy, 1997; Harrison et al., 1991).

In addition, the prior researches show that return on assets (ROA) is the most widely used accounting-based acquisition performance measurement ratio in the merger and acquisition (M&A) literature by justifying that the evidences from the literature review indicates that it has been used by almost half of the studies of the core list of 36 papers (17 out of 36, approximately 47%) included in their study (Thanos and Papadakis, 2015). The basic reason for the frequent use of return-on-assets as a measuring tool is that ROA is less influenced by potential biases than other types of ratios such as return on equity (ROE) and return on sales (ROS) which suffer from upward and downward estimation biases. It is also suggested that it can be calculated by dividing income or net income by total assets. In the merger and acquisitions (M&As) literature, scholars most of the time compare the before the acquisition return-on-assets (ROA) of the acquiring firms (or the weighted ROA of the acquirers) with the ROA of the acquiring firms for a period after an acquisition. Therefore, as this study intends to predict the effects of the similarity in the skill resources of the merging firms, the measurement of the post-acquisition performance of the acquirers should not be a prediction where the market-based measures evaluate the merger and acquisition (M&A) performance based on the shareholders stock price offer relaying on their expectation of future profitability potential of the deal. Rather it should be measured based on the actual results which are more of the time expressed by accounting-based performance evaluation techniques because it requires relatively longer time for the innovation resources like R&D to result in realized synergy which cannot be easily evaluated based on short-term market-based reaction (Chu, 2006). That is why long-term accounting-based measures of post-acquisition performance approach is selected to be used to evaluate the acquisition performance of the acquirers in this particular study (e.g., Thanos and Papadakis, 2015; Chu, 2006; Ramaswamy, 1997; Harrison et al., 1991).

Acquirers Acquisition Performance = (Post-acquisition performance - Premerger performance)

3.2.2 Independent Variables

Corporate/Skill Resources Similarity between the Acquirer and the Target

In this study, we use the similarity in degree of intensity which refers to the level of emphasis given to marketing and R&D activities by the merging firms to measure the corporate/skill resources similarity between the merging firms to evaluate their effects on the post-acquisition performance. For example, the use of R&D expenditures as a proxy to measure R&D resources is consistent with the existing research literatures (e.g., King et al., 2008; Ahuja and Katila, 2001; Harrison et al., 1991). Thus, similar to Harrison et al (1991) and

Swaminathan, Murshed, & Hulland (2008), this study operationalized R&D intensity by dividing the dollar amount of R&D expenditures of the acquiring and target firms independently by their respective total revenues in the year preceding the completed merger and acquisitions deals included in the sample of the study.

The marketing intensity is another proxy used in this study to measure the similarity of the skill resources of the merging firms. The marketing intensity is also calculated by dividing the dollar amount of the advertising expenditures (which is a proxy for marketing resources) (Swaminathan, Murshed, & Hulland, 2008) by the total revenues for both the acquirer and the target firms independently in the year preceding their merger. In this study, the limitation of using advertising expenses as a proxy to measure marketing intensity is acknowledged because using advertising expenditures as a measure of marketing resources has some limitations because advertising can also be used as a source of information. However, there is a sizable literature suggesting that investment on advertising activities contributes to marketing capabilities in a significant ways (e.g., Swaminathan, Murshed, & Hulland, 2008; Capron & Hulland, 1999). Furthermore, the literature states that advertising investments represent a key component of a firm's marketing resources. Because a firm's advertising investments are highly related to its marketing know-how and its ability to build and differentiate brands from the competing offerings in the market (King et al., 2008). Thus, marketing resources can play a critical role in a firm's ability to recognize and target customer needs and to better position its products relative to competitors. Therefore, according to the existing evidence from the literature, advertising expenditures can be used to measure the marketing intensity (Swaminathan, Murshed, & Hulland, 2008) of the merging firms to determine their similarity based on the level of emphasis they give to marketing activities. In order to determine the similarity between the acquirer and the target in both R&D intensity and marketing intensity, a difference score can be used by taking the absolute value of the differences between the similarity variables of the acquiring and target firms. Because the two merging firms that have similarity in marketing and R&D skill resources will show a small difference score. Conversely, if two merging firms have different emphases in these skill resources, the corresponding difference score will be large showing low level of similarity in the degree of emphasis given to R&D and marketing activities by the two merging firms (e.g., Swaminathan, Murshed, & Hulland, 2008; Harrison et al., 1991).

Research and Development (R&D) intensity = R&D Expenditures/Total Revenue
Marketing Intensity = Advertising Expenditures/Total Revenue
Corporate R&D Resources Similarity = |Acquiring firm's R&D Intensity ***minus*** Target firm's R&D Intensity|
Corporate Marketing Similarity Resources = |Acquiring firm's Marketing Intensity ***minus*** Target firm's Marketing Intensity|
(Swaminathan, Murshed, & Hulland, 2008; Harrison et al., 1991).

3.2.3 The Moderating Variable: The Acquirers Size

Laamanen & Keil (2008) state that larger firms with slack resources can develop specialized personnel, processes, structures and establish dedicated teams to effectively manage acquisition processes. These established teams and specialized personnel can act as systemic repositories of knowledge of the previous acquisition experiences and provide a pool of acquisitions specialists and the capacity to perform acquisition processes. Therefore, based on the organizational capacity and specialization arguments, it can be hypothesized that

acquiring firms with excess resources due to their size can invest these slack resources on developing acquisition manuals, specialized teams and task forces and improve the performance of the R&D and marketing activities of the combined entity. In this study, we measured the acquirer's size using the logarithm of acquirer's total assets at the beginning of each focal acquisition year of this particular study.

3.2.4 Control Variables

There are five control variables used in this study namely, premerger return on assets (ROA) of the acquiring firms, the acquirer debt capacity, year dummy, relative size and the premerger performance of the target, to control their indirect impacts on the results of the study. Relative size is used as a control variable since prior research shows that larger firms might acquire smaller firms to realize scale-related synergies that would otherwise be difficult to obtain (Datta et al., 1991). Hence, irrespective of strategic similarities or dissimilarities, the size differential might explain some variance in post-acquisition performance. Datta et al (1991) further state that various authors like Kitching (1967) and Kusewitt (1985) have hypothesized that size differences between the acquiring and target firms influence acquisition performance. According to Datta et al., Kusewitt (1985) for example, found a negative relationship between relative size (ratio of the target firm to the acquiring firm) and acquisition performance. Based on the literature evidences, and given its potential impact, relative size is used as a control variable in this study (e.g., King et al., 2008; Ramaswamy, 1997; Datta et al., 1991). Relative size is operationalized as the ratio of the sales of the target firm to the sales of the acquirer (in the year before the focal acquisition) (Ramaswamy, 1997; Datta, 1991).

The second control variable used in this study is acquirer pre-acquisition performance because managers of more profitable acquirers may be more confident in their abilities and thus more likely to dominate during the integration process (e.g., Zeng & Schoenecker, 2015; Ramaswamy, 1997). Acquirer pre-acquisition performance is measured using its return on assets (ROA) in the 3 years before each completed focal acquisition deal. The third control variable is the target premerger performance (ROA) because larger and better-performing targets may enjoy a higher relative standing in the combined company and a lower management departure after the acquisition, reducing detrimental disruptions caused due to the termination of the experienced managers after the acquisition. The target premerger performance is measured using its return on asset (ROA) in the 3 years before each focal completed acquisitions deals included in the sample. The fourth control variable is the year dummy which is included as a control variable to reduce the effect of the year, or time impact of the acquisition transactions because of the time differences in the acquisition deal completion between acquirers using year dummy variables, with 2003 serving as the reference year.

Finally, the acquirer debt capacity is included into the regression model as a control variable. Hitt, Ireland, & Hoskisson (2007) state that financial slack in the form of debt equity or cash, in the acquiring firms also has frequently contributed to success in acquisition processes management. The financial slack resources will give the acquirer the capacity for financing the acquisition internally without engaging to debt and also still important to maintain a low or moderate level of debt after the acquisition to keep debt costs low. The acquiring firm's debt capacity is measured using its current ratio (current assets/current liabilities) in the year prior to an acquisition (King et al., 2008).

Table 1. The Variables of the Study

Variables	Measurement	Reference	Data Source
Dependent Variable	Return on Assets (ROA) = (Post-acquisition performance) minus (Premerger Performance)	Chu, 2006; Thanos and Papadakis, 2015; Ramaswamy, 1997; Harrison et al., 1991).	S&P Compustat
Independent Variables			
Corporate/Skill Resources Similarity	Similarity in R&D Intensity	Harrison et al., (1991); Swaminathan, Murshed, & Hulland, (2008)	S&P Compustat, BVD Osiris
	Similarity in Marketing Intensity		
Moderating Variables	Acquirers Size	Laamanen & Keil, 2008	S&P Compustat BVD Osiris
Control Variables	Relative size	Ramaswamy, 1997; Datta et al., 1991	S&P Compustat BVD Osiris
	Acquiring firms pre-acquisition profitability	Zeng & Schoenecker, 2015; Ramaswamy, 1997	S&P Compustat
	Target Premerger Performance	Zeng & Schoenecker, 2015	S&P Compustat
	Acquirer Debt Capacity	King et al., 2008	BVD Osiris

3.3 The Analytical Method

The literature review reveals that many previous researchers have utilized multiple hierarchical regression model to analyze the effects of similarity between the acquirer and the target on the post-acquisition performance (e.g., Lawal, 2016; Farjoun, 1998; Ramaswamy, 1997). For example, Ramaswamy (1997) employed the multiple hierarchical regression model to analyze the effects of the strategic similarity between the acquirer and the target on the post-acquisition performance and find out that strategic similarity leads to a positive post-acquisition performance for the acquiring firms. The analysis model for this research question seeks to determine the effects of the similarity in the corporate/skill resources between the merging firms on the post-acquisition performance. Hence, in this type of study where merger and acquisition activities are reported to display dynamic and complex characteristics which may be influenced by multiple factors, a multiple hierarchical regression model is best for testing the hypotheses (Lawal, 2016). It is further stated that when there is uncertainty about the complete list of the possible factors which may influence the acquirers post-acquisition performance and when the correlation analysis shows a tendency of moderate degree of relationship between some similarity indicating variables, the multiple hierarchical regression is an appropriate analytical model to reduce the serious effect of multicollinearity on the results of the study (Ramaswamy, 1997). In addition, Farjoun (1998) states that it is a preferred analytical technique for data analysis because it explicitly considers any overlap in the explanatory power of the independent variables in the regression model and reduce the possibility of a serious multicollinearity issue which may influence the results of the analysis. Furthermore, the correlation analysis indicates that there is relatively low to moderate correlation values observed especially between interaction variables whose values are determined from the interaction of two variables which are statistically expected to happen because their values are the product of the two interacting variables (Farjoun, 1998). For example, the correlation value of (-0.579***) is observed when similarity in marketing intensity and the acquirer size interact to determine the values of the interaction variable. According to Farjoun (1998), this relatively moderate correlation is

normal and acceptable because it is occurred due to the joint effect of the two interacting variables. Therefore, based on the correlation analysis, the multiple hierarchical regression analysis model is preferred to be used in this particular study to reduce the possible effect of variables overlap on the results of the analysis. Despite the use of numerous different control measures, uncertainty would still remain as to whether all focal firm level variables have been accounted for in the research design that might influence firm performance (Lawal, 2016). To account for these issues, this study utilizes a multiple hierarchical regression model in addition to considering different control variables such as the relative size of the target, the premerger performance of the acquirer, the premerger performance of the target, the acquirer debt capacity and year dummy to reduce their indirect effects on the analysis results of this particular study. This method is particularly useful in studying the effects of the similarity between the acquirer and the target on the acquirer post-acquisition performance because it helps to minimize the uncertainty that may arise due to the influence of not including every variable which may affect the post-acquisition performance of the acquiring firms. Moreover, it has a potential to reduce the effect of the possibility for the overlap in the variables which are used to measure the skill similarity between the acquirer and the target (e.g., Farjoun, 1998; Ramaswamy, 1997).

4. ANALYSIS OF THE STUDY

4.1 Results and Findings of the Study

The summary statistics of the samples indicating means and standard deviations are presented in Table 3. In addition, the correlation analysis results are presented in Table 4 where all of the values are well under the recommended 0.8 threshold that would indicate the problem of multicollinearity (King et al., 2008). According to Farjoun (1998), the relatively moderate value of correlation coefficients observed especially at the interaction variables are due to their values which are determined by the product of the values of the other two interacting variables. He further explains that it is expected to occur due to the joint effect of the two interacting variables. On top of this, the variance inflation factor (VIF) values estimated in conjunction with the regression model did not suggest the existence of a serious threat of the multicollinearity problem which may inflate the outcomes of the regression model. Because the VIFs values of all the variables at the saturated regression model are all well below 10, a conventional value that is used to assess the magnitude of multicollinearity problem (Kim & Finkelstein, 2009). Furthermore, the results of the other tests of collinearity analysis results such as auxiliary regression suggested by (Gujarati, 2003) for testing the degree of multicollinearity are indicating that there is no serious multicollinearity problem which may seriously affect the outcomes of the regression model.

Table 2. Summary of Descriptive Statistics

Variables	Mean	SD	Min	Max
R&D Similarity	2.380321	3.740246	-3.728166	3.22147
Marketing Similarity	-1.255591	3.84602	-3.737318	3.8792
Acquire Size	4.77e-06	1.934753	4.377494	7.061486
Acquirer Post-merger ROA	1.209134	4.03855	-6.31108	9.2731
R&D Similarity X Acquirer Size	-2.693062	13.39264	-78.9097	67.30315
Marketing Similarity X Acquirer Size	-8.550088	17.6709	-77.173	36.05653
Acquirer Premerger ROA	2.38e-07	4.17272	-3.315219	3.8322
Target Premerger ROA	0.7450072	0.894775	0.0071401	8.358011
Target Relative Size	2.85e-06	5.677	3.69859	6.624
Debit Capacity	2.516129	1.681262	.3585518	5.76939
N	313	313	313	313

Table 3. Correlation Analysis

Variables	1	2	3	4	5	6	7	8	9	10
(1) R&D Similarity	1.000									
(2) Marketing Similarity	0.214***	1.000								
(3) Acquire Size	-0.160***	-0.114**	1.000							
(4) Acquirer Post-merger ROA	-0.035	-0.009	0.105*	1.000						
(5) R&D Similarity X Acquirer Size	-0.288***	-0.203***	0.010	-0.069	1.000					
(6) Marketing Similarity X Acquirer Size	-0.109*	-0.579***	0.033	-0.007	0.244***	1.000				
(7) Acquirer Premerger ROA	0.033	-0.009	-0.086	0.497***	0.184***	0.015	1.000			
(8)Target Premerger ROA	-0.089	0.020	0.069	0.184***	-0.003	-0.037	-0.020	1.000		
(9) Target Relative Size	0.010	-0.001	-0.102*	-0.006	0.002	0.011	-0.011	-0.018	1.000	
(10) Debit Capacity	-0.050	0.043	-0.151***	0.031	0.040	-0.021	0.113**	-0.058	-0.012	1.000

*N = 313 *** p<0.01, ** p<0.05, * p<0.1*

Table 4 presents the results of the multiple hierarchical regression model which reports the findings of the effects of corporate/skill resources similarity between the merging firms on the post-acquisition performance of the acquiring firms.

Table 4. Results of the Multiple Hierarchical Regression Analysis: Effects of Corporate/Skill Resources Similarity on the Post-acquisition Performance of the Acquiring Firms

DV= ROA	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Control Variables						
Acquirer Premerger ROA	0.720***	0.722***	0.722***	0.733***	0.782***	0.795***
	(0.0531)	(0.0532)	(0.0533)	(0.0526)	(0.0519)	(0.0521)
Target Premerger ROA	5.235***	5.138***	5.135***	4.958***	4.852***	4.878***
	(1.192)	(1.197)	(1.200)	(1.184)	(1.145)	(1.140)
Target Relative Size	0.000268	0.000295	0.000295	0.00150	0.00156	0.00147
	(0.00360)	(0.00360)	(0.00361)	(0.00358)	(0.00346)	(0.00344)
Debit Capacity	-0.369	-0.403	-0.405	-0.104	-0.0853	-0.220
	(0.638)	(0.640)	(0.642)	(0.639)	(0.618)	(0.620)
Similarity Variables						
Similarity in R&D		-0.109	-0.110	-0.0535	-0.214*	-0.393**
		(0.123)	(0.126)	(0.125)	(0.126)	(0.158)
Similarity in Marketing			0.00149	0.00855	-0.0112	0.325**
			(0.0282)	(0.0279)	(0.0272)	(0.184)
Acquirer Size				1.795***	1.711***	2.126***
				(0.564)	(0.546)	(0.588)
Interaction Variables						
Similarity in R&D X Acquirer Size					-0.389***	-0.466***
					(0.0819)	(0.0918)
Similarity in Marketing X Acquirer Size						0.122**
						(0.0659)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-4.159*	-4.009*	-4.000*	-24.45***	-24.73***	-27.76***
	(2.157)	(2.164)	(2.174)	(6.776)	(6.549)	(6.727)
Observations	313	313	313	313	313	313
R-squared	0.396	0.398	0.398	0.417	0.457	0.463

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In the regression output Table 4, Model 1 includes only the control variables which reports that the acquirer premerger performance and the target premerger performance are both positively and significantly related to acquirers' post-acquisition performance. This indicates that acquirers with a positive premerger performance tends to have a better post-acquisition performance as well. It can also be inferred that target firms with a better premerger performance have a tendency to positively impact the post-acquisition performance of the acquiring firms. Relative size, acquirer debit capacity and year dummy are also included into the regression model to control for their indirect effects on the post-acquisition performance of the acquiring firms. In Model 2&3 the variables with main effects (i.e., similarity in R&D intensity and similarity in marketing intensity) are introduced to the regression model to investigate their individual effects on the post-acquisition performance. The variables with the main effects are added in Model 2&3 consecutively one after the other to test Hypotheses 1a and 1b. The moderating variable, the acquirer size is introduced to the regression model at Model 4 and reported to positively and significantly affect acquirer post-acquisition performance. The goodness of fit of the models can be considered as moderate (e.g., R^2 of Model 6 = 0.463), where the addition of each set of variable significantly improved the model fit. The regression output indicates that the variables with the main effects are introduced here in Model 2&3 to investigate their individual effects on the post-acquisition performance. The result in Model 6 shows that the similarity in R&D intensity between the acquirer and the target is negatively and significantly related to the post-acquisition performance of the acquiring firms. Hypothesis 1a concerning the significance of a relationship between the acquirer and the target similarity in R&D intensity and the post-acquisition performance is statistically not supported and is not in the hypothesized direction (Model 6, β = -0.393, $p<0.05$). On the other hand, the similarity in marketing intensity between the acquirer and the target shows a positive and significant relationship with the acquirer post-acquisition performance at Model 6 (β = 0.325, $p<0.05$). Hence, Hypothesis 1b concerning the significance of the relationship between the acquirer and the target similarity in marketing intensity and the post-acquisition performance is positive and statistically supported.

The interaction between the acquirer size and the similarity in marketing intensity between the merging firms is positively and significantly related to the acquirer post-acquisition performance. Hypothesis 2b regarding the significance of the interaction between the acquirer size and the similarity in marketing intensity between the acquirer and the target and the post-acquisition performance is positive, statistically significant and in the hypothesized direction (β = 0.122, $P < 0.05$ at Model 6). Therefore, Hypothesis 2b is also statistically supported by the evidences from the study. However, the model shows that the acquirer size negatively and significantly influences the effect of the similarity in R&D intensity between the acquirer and the target on the post-acquisition performance. Hence, Hypothesis 2a which states that the acquirer size positively influences the relationship between the similarity in R&D intensity between the acquirer and the target and the post-acquisition performance is not statistically supported. In addition, the results from the regression model show that the introduction of the interaction variables into the model improves the statistical significance of variables like similarity in marketing intensity (β = 0.325, $P < 0.05$ at Model 6).

5. Discussion, Study Contributions and Conclusions

Based on the support from the literature review, this study investigates the effects of corporate/skill resources similarity between the acquirer and the target on the post-

acquisition performance of the acquiring firms from the marketing and R&D resources perspectives. The findings of the study indicate that the similarity in the degree of emphasis given to R&D by the acquirer and the target has a negative effect on the acquirer post-acquisition performance. On one hand, the acquisition literature claims that the acquirer needs to have absorptive capacity which implies that it must display similarity in the degree of emphasis given to R&D in the same general areas with the target firm to overcome information asymmetries that hinder identification, evaluation, redeployment and integration of the technology resources of the merging firms (King et al., 2008). On the other hand, this may result in redundancy of the R&D resources between the acquirer and the target based on the relative size of the acquired knowledge from the target (Ahuja & Katila, 2001) which may lead to a diminishing return for the acquirer R&D resources (King et al., 2008). In contrary to this claim, Hitt, Ireland, & Hoskisson (2007) suggest a consistent investment on R&D by the acquirer to ensure the success of the acquisition transaction because a consistent R&D investment is believed to be one of the acquisition success factors which facilitates the learning environment for knowledge sharing between the R&D teams of the merging firms which in turn enhances continuous innovation performance. In addition, King et al (2008) also suggest that the acquirer's decision to determine the appropriate level of R&D investment level is required in order to develop the right amount of absorptive capacity which enhances its capacity to use the future business opportunities which may require continuous innovations to cope up with changes in the business environment. The possibility for the R&D resource redundancy in a combined firm will increase with the relative size of the acquired target firm's R&D investment intensity which is found to be negatively related to acquirer post-acquisition innovation performance (Ahuja & Katila, 2001). In addition to the relative size of the acquired R&D resources, the level of the internal R&D investment which is believed to enhance the acquirer absorptive capacity may lead to R&D resource redundancy which in turn may negatively affect the acquirer post-acquisition performance. As the acquirer's R&D investments increase or exceed the specific technology needs of an acquirer, the acquired target's technology resources become less beneficial (Uhlenbruck et al., 2006) and potentially may sometimes become counterproductive.

Therefore, the basic questions which are beyond the scope of this study which need to be further explored in the future researches are; first, 'what is the right level of internal R&D investment that is enough to develop the right level of absorptive capacity which can enable the acquirer to identify, evaluate, redeploy and integrate the acquired R&D resources from the target by minimizing a counterproductive effect of the R&D resources redundancy?' The second question which can be considered as the direction for the future research is the investigation of the effect of the interaction between the relative size of the acquired knowledge base of the target and the right level of internal R&D intensity of the acquirer which can facilitate a productive integration process between the knowledge resources of the merging firms. The similarity in the degree of emphasis given to the marketing resources between the acquirer and the target shows a positive and significant effect on the post-acquisition performance of the acquiring firms. The acquirer can benefit from the merger with a target which displays similarity in marketing intensity by overselling its products to the target's market and customers, by sharing the expertise of the experienced sales forces of the merging firms and by using a well-recognized and accepted brand and reputations in the target firm's market without making a major investment for their adjustment to incorporate the newly acquired products (Capron & Hulland, 1999). The finding of this study is supported by the research results of Capron & Hulland (1999) which find out that the redeployment of

the marketing skill resources from the acquirer to the target can enable the acquiring firms to realize a significant and positive benefit through the attainment of market share and profitability which can improve their post-acquisition performance. The acquirer size positively and significantly ($\beta = 0.122$, $P<0.05$) influences the relationship between acquirer post-acquisition performance and the similarity in marketing resources between the acquirer and the target. This indicates that larger acquirers have extra resources to invest on marketing activities to facilitate the integration and the learning process for the marketing teams of the merging firms to share ideas and knowledge.

At first, this study contributes to the merger and acquisitions literature by investigating the effects of the interaction of the resources of the merging firms from resource-based-view's perspective, organizational learning theory's perspective and the dynamic capability theory's perspectives on the post-acquisition performance of the acquiring firms. The finding of this study is supported by the research results of Capron & Hulland (1999) which find out that the redeployment of the marketing skill resources from the acquirer to the target can enable the acquirer to realize a significant and positive benefit through the attainment of both market share and profitability which can improve the post-acquisition performance of the acquiring firms. Secondly, the present study also contributes to the merger and acquisition performance literature by investigating the moderating role of the acquirer size which is found to positively influence the effect of similarity in marketing skill resources of the merging firms on the post-acquisition performance of the acquiring firms. Therefore, this study has made a great contribution to the merger and acquisition literature by investigating the effects of the acquirer size which plays the positive role enhancing the capacity of the acquirer to manage the integration process through the facilitation of the learning process between the merging firms' personnel sharing ideas and skills.

6. Limitations and Future Research Directions

Like any study in the acquisition literature, this study has encountered with several limitations. The major limitation of this study is its limited sampling which includes samples of acquiring firms only from the pharmaceutical and biotechnology industry which are publicly traded in American market whose financial data are publicly available on SDC and S&P COMPUSTAT databases. Therefore, the sampling limited to specific industry and country context can limit the generalizability of the findings of this study to other industry and cultural contexts. Hence, there is a clear future research opportunity for researchers to consider sampling from different industry and country context which may enhance the generalizability of the findings of this study shedding more light on the post-acquisition performance literature. Secondly, the findings of this study indicate that the similarity in R&D intensity between the merging firms negatively affects the post-acquisition performance of the acquiring firms. Ahuja & Katila (2001) state that the reason for the negative post-acquisition performance effect of similarity in technology resources between the merging firms may happen due to redundancy in technology resources which may occur as a result of the relative size of the acquired knowledge base in addition to the internal R&D investment of the acquirers. As a limitation, this study did not consider the appropriate level of internal R&D investment which is enough to build the absorptive capacity of the acquirer to enable it integrate the acquired knowledge resources with a minimum redundancy effect. Therefore, the future research can better investigate the effect of similarity in research and development intensity between the merging firms determining the appropriate level of the acquirer's internal R&D intensity which is stated as a requirement to enhance absorptive capacity with a

minimum negative effect of the technology resources redundancy. Thirdly, we measured the similarity in the intensity of R&D and marketing skill resources using the similarity in the degree of emphasis given to the input side of these resources such as R&D expenditures to measure R&D intensity and advertising expenditure to measure marketing intensity of the merging firms. The merger and acquisition literature states that the degree of R&D investment is recognized as the foundation of a firm's technological resources and absorptive capacity. Further, the literature claims that other measures such as the patent content and citation count may provide a better measure for R&D intensity and can better isolate the effect of redundant components of technology resources which may happen due to similarity in such resources between the merging firms and may provide better insight into the post-acquisition performance (King et al., 2008). Therefore, the future merger and acquisition research can better improve the findings of this study by using the output side measures such as patent count or citation to measure the similarity in R&D and other measures for similarity in marketing resources between the merging firms to shed a better understanding to the post-acquisition performance literature.

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