Diversification Strategy and Performance Studies: Results, Measures, and Sampling Design

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Abstract—**Product and international diversified firms play a significant role in the world economy. The number of these firms has increased during time and consequently, assessing the relationship between diversification (product and international) and performance has attracted a lot of attention. However, the results of the studies are inconclusive. This might be due to the differences in measures of diversification and performance, measurement problems, and sampling issues. The aim of this paper is to review the results of the diversification and performance studies and specifically, measurement of diversification, performance and sampling design. Through this review some avenues to improve measurement and sampling in diversification and performance studies are suggested.**

Index Terms—**inconclusive results, international diversification, performance, product diversification.**

I. INTRODUCTION

Assessing the relationship between diversification and performance has attracted a lot of attention for decades. Scholars have studied the relationship between product diversification (PD) and performance (P) as well as international diversification (ID) and P. Also, few studies have looked at PD and ID as two different dimensions of diversification strategy and assessed its relationship with P. Despite numerous researches done on the subject, the results of the studies are inconclusive and sometimes contradictory. This paper addresses these issues by reviewing results, measures and samples used by researchers in the area. The structure of the paper is as

follow: At first the result of diversification studies (PD, ID, and total diversification) will be reviewed. Then PD, ID, total diversification and P measures will be discussed and strength and weakness of each will be explained. Following that sampling and data availability in diversification study will be reviewed and finally some ways to decrease result contradiction in this area of research will be suggested.

II. THE RELATIONSHIP BETWEEN DIVERSIFICATION AND PERFORMANCE

Scholars have found non-significant [1], [2] and [3], positive [2] and [4], negative [5], [6] and [7] and inverted U-shaped [8] and [9] relationship between PD and P. Those found positive relationship between PD and P mentioned that PD can increase P as firms can use it to escape from their current unattractive industry. Meanwhile, subsidizing poorly performed segments and overinvestment problem were stated as reasons of the negative relationship between PD and P. However, the dominant view is inverted U-shaped which by following PD, firm's performance increases up to the optimum point where the firm has related portfolio of businesses, and then it decreases due to cost of control, coordination and governance [8], [9] and [10] as well as reduction of the opportunity to achieve economies of scope [11].

Results of previous studies about ID and P relationship is inconclusive; researchers have found non-significant [8] and [12], positive [13], [14] and [15], negative [16] and [17], inverted U-shaped [18], [19], [20] and [21], U-shaped [22] and [23], and horizontal S-shaped [24], [25] and [26] relationship between ID and P. Researchers who

have found positive relationship stated that the ability of exploiting the proprietary assets in larger number of markets can improve internationally diversified firm's performance [13]. Those who have found negative relationship between ID and P mentioned cross subsidization of less profitable segments, complexity of management and agency problems as the reasons for such relationship [16]. Based on the studies which have found inverted U-shaped relationship, the performance of a firm increases by raising the level of ID -as at the first stage of ID a firm diversifies to geographically and culturally close markets [27]- up to optimum point where the coordination cost of the firm's operating units and cost of governance become higher than benefits of accessing resources [19] and [28]. The theoretical rational for U-shaped relationship between ID and performance is that at the first stage of ID, firms' performance reduces due to liability of foreigners but will increase by learning and achieving new knowledge [22] and [20]. Finally, the theoretical rational for sigmoid relationship is that at the early stage of ID, firm's performance decreases because of learning cost, liability of foreigners and low level of economies of scope, then due to the learning, access to low cost resources, achieving economies of scale and scope, and decreasing transactions cost through internalization, the performance increases at the middle stage of ID, but after that the performance decreases because of coordination and governance cost [25] and [29].

Few studies have assessed the integrated effect of PD and ID on P. Some found that the ID moderates the PD and P relationship [30] and [31] and related product diversifiers have higher performance than unrelated product diversifiers when they have higher level of ID [30] and [32]. In contrast, others stated that this moderating effect does not exist [8] and [33]. Also, scholars stated that PD has moderating effect on ID and P relationship. In 1997, [18] found that there is a positive relationship between ID and P for firms which have high level of PD, as these firms can achieve higher level of economies of scale and scope than those just follow PD or ID. In contrast, [34] found that although the related PD positively moderates the relationship, the unrelated PD negatively moderates that. [35] mentioned that the interaction of PD and ID has positive impact on the P but they do not have any effect individually. Finally, [36] study showed that the combination of moderate level of PD and ID has positive effect on P but when the level is high the effect is negative.

Based on the reviews above, the previous results of the studies on diversification strategy and performance are inconclusive. Result contradiction may be due to diversification and performance measurement problems, the use of different measures of diversification and performance [37], [38], [39], [40] and [41], and sampling issues [42], [43] and [44].

III. DIVERSIFICATION MEASURES

A. Product Diversification Measures

Various measures have been used by previous researchers to measure PD. Some for instance, have counted the number of 4-digit Standard Industrial Classification (SIC) codes which a firm is active in [e.g.,45]. However, this measure cannot capture the relatedness among the businesses in the firm's portfolio and the size of businesses. Some researchers have used continuous measures of PD; the Herfindahl [45] measure which can capture the size of the firm's businesses, and the concentric and weighted indices [46] as well as the entropy measure [47] which can capture the relatedness among the firm's businesses and size of them. Meanwhile, researchers stated that achieving economies of scope is one reason that related product diversifiers have higher performance than unrelated product diversifiers [48]. To capture the level of economies of scope, there is a need to measure the relatedness. However, the continuous measures are only able to capture the relatedness at market or industry level and cannot capture the level of the resource sharing among the firm's businesses [49]. Moreover, simply by using the hierarchical distance in SIC classification system, one cannot capture the relatedness [50]. In fact these measures are sensitive to the number of businesses which a firm is active in [49] and the content validity of entropy and concentric measure are questioned by authors like [11]. Finally, to measure PD by using continuous measures, having access to the revenue data of a firm's business segments is necessary [51].

Two categorical measures of PD which have been used are Rumelt's classification [52] and Varadarajan and Ramanujam's [51] broad and mean narrow spectrum diversity matrix. [52] categorized firms to the nine diversification categories by the specialization ratio, related ratio and vertical ratio. However, the classification is subjective and can face researcher's bias and error as well as reliability problem [53]. Also, applying it, is difficult and time consuming [54], [55]. Finally, the classification applies "portfolio level, not activity level category designation" [50, p.1572]. Another categorical measure of PD is broad and mean narrow spectrum diversity matrix designed to overcome to requirement for business segment revenue data. But as [56] mentioned, it is a more objective form of Rumelt's classification.

Therefore, to capture the relatedness among firm's businesses, researchers have introduced relatedness measures such as skill-based relatedness [57], technological relatedness [49] and manufacturing-based relatedness [55]. These measures can capture the relatedness better than continuous and categorical measures but each of them just captures a dimension of relatedness. In 1994, [58] have introduced the coherence measures by using the survivor principle. They have used Trinet Large Establishment database and measured the relatedness between different 4-digit SIC codes combination occurred in their sample. In 2009, [50] have introduced their inter-industry relatedness index by using Longitudinal Research Database. The result of their study showed that the index has higher predictive validity than coherence measures. However, their index captures only the relatedness among manufacturing 4-digit SIC codes. In 2010, [59] have used pairwise similarity index to capture the intermarket relatedness. Moreover, they have measured trajectory and duration of relatedness. So, their

firm-market relatedness measure is dynamic. However, their study was limited to telecommunication industries due to the data availability. Among the studies which have introduced relatedness measures based on the survivor principle, only [50] revealed the values of the index to the public.

B. International Diversification Measures

In 2007, [60] outlined the dimensions for the degree of ID which are: operational performance, operational structure, attitudinal attributes and stock ownership. The single dimension measures of ID are the most common, but they just capture a dimension of ID [61]. Researchers have used foreign sales to total, foreign assets to total assets, number of host countries and number of subsidiaries as single dimension measures of ID [60]. Other single dimension measures which have been used are the Herfindahl [9] and entropy indices [18]. In contrast to the other single dimension measures, the indices can capture the size of foreign operations. To capture multidimensionality of ID, [62] have introduced the degree of internationalization (DOI) measure which covers operational, structural and attitudinal dimensions of ID. Despite the fact that the multidimensional measure is more reliable than single dimension measures [60], the content validity of DOI - since the combination of three different dimensions is not theoretically supported - and the use of equal weights for DOI's factors were questioned by [63]. Two other composite indices are transnationality index used by world investment report [64] and transnational activities spread index [65]. [65] has multiplied transnationality index to network spread index to capture the spread of ID. Following [62], researchers have used other composite measures [19] and [26], but standardized their measures by applying principal component analysis and finding eingenvectors of the measure's components and using them as weights.

Researchers have also used categorical measures of ID. In 2003, [66] have introduced geographical configuration matrix to capture the effect of international asset dispersion and country diversity simultaneously, and [37] categorized firms to 16 categories using the matrix of multinationality. The breadth and depth of market engagement was used to design the matrix. As [40] mentioned capturing breadth and depth of ID as well as related and unrelated ID are important tasks for ID and P studies that [24] study has fulfilled them.

C. Total Diversification Measures

In 1977, [67] has introduced the total diversification measure designed for studies at industry level. [30] has used the decomposability of the entropy measure and by adding geographic dimension to it, designed global diversification measure. However, the measure cannot capture the related and unrelated international diversification. Therefore, [68] has designed total global diversification measure which contains related product diversification, unrelated product diversification, related international geographic diversification and unrelated international geographic diversification factors. However, the measure is entropy based and cannot capture

multidimensionality of ID and breadth and depth of that. Moreover, it cannot capture the relatedness among the firm's businesses based on the level of resource sharing and multidimensionality of relatedness. Finally, applying the measure needs data which are not publicly available [35].

IV. PERFORMANCE MEASURES

One of the possible reasons for the result contradiction is the differences in measures of performance [41]. Researchers have measured the firm's performance through three different categories: accounting-based (e.g., return on assets), market-based (e.g., Tobin's q) and growth-based (e.g., sales growth) [60]. [69] have suggested operational dimension for performance, and to overcome and eliminate the effect of heterogeneous accounting methods and standards among countries, scholars have paid attention to this dimension and used operational performance measures such as cost efficiency which is calculated as operating cost to sales [19]. Therefore, performance is multidimensional and to find a comprehensive view, there is a need to use multiple type measures of performance [41] as the use of single measure can be misleading [40]. Furthermore, the use of accounting-based, market-based, operational or financial measures can make the results of the studies completely different; for instance, the market-based and accounting-based measures are negatively related [70], or there is a positive relationship between ID and financial performance, and a negative relationship between ID and operational performance [19]. As market-based measures show expectation about firms' future performance and accounting-based measures show the firm performance in past periods, [26] suggested that studies which want to assess the long run effect of ID on P can use market-based measures and studies with focus on short run effect can apply accounting-based measures. Finally, accounting-based measures can be bias. For example, return on equity is not just influenced by performance and is also sensitive to the firm's capital structure [18]. Moreover, the depreciation method which is used by firms has effect on the return on assets [19].

V. SAMPLING DESIGN IN DIVERSIFICATION STRATEGY STUDIES

Other reason which may cause the contradiction in diversification and performance studies is sampling design issues [42], [44] and [71]. [42, pp. 377] stated that less than 20 percent of studies in strategic management used random sampling and "when sampling units are not selected at random, sampling variability is unpredictable, making study results less reliable and causal inferences more difficult". However, they mentioned using purposive sampling may be necessary in corporate strategy studies as the sample may not be normally distributed across the population. They also added that sampling designs were often based on data availability consideration. However, data availability is a significant limit in front of scholars who study diversification and performance relationship and it has influence on selection of PD and ID measures

for studies [51] and [72]. According to the [73] and [74, pp. 292] statement: "In practice, the matter is often settled by the data available and economist has to cut according to the cloth given him, or obtained by himself!" is still valid, and collecting data for PD and ID still are difficult because detailed data are just available for limited number of firms. Moreover, even when data is available collecting data is expensive, time consuming and work intensive. Therefore, most of the studies have focused on large manufacturing firms in developed countries such as U.S., U.K, Japan and Germany. So, it seems that there is a sampling bias in terms of countries, industries and firm size [10] and [60].

VI. AVENUES TO IMPROVE DIVERSIFICATION AND PERFORMANCE STUDIES

Continuous and categorical measures of PD cannot capture the relatedness among a firm's businesses based on the level of resource sharing and multidimensionality of it. Relatedness measures such as skill-based and technological relatedness can capture the relatedness but cannot capture its multidimensionality. Finally, relatedness measures designed based on the survivor principle have improved PD measurement as they can capture the relatedness among a firm's businesses based on the level of resource sharing and multidimensionality of relatedness. However, among them only the value of [50]'s index which is limited to the relatedness between manufacturing SIC codes, is available to the public. Calculating the indices, even if one has access to the data, is absolutely hard and time consuming [50]. Therefore, unless the authors who have designed the relatedness indices provide the value of indices to the others, the opportunity of using them as a standard measure is not high. Moreover, the indices (except [59]) used data on year 1987. So, there is an opportunity to replicate these studies by using more recent data. Finally, designing a new PD measure which can capture the relatedness among a firm's businesses and multidimensionality of that by using publicly available data is another opportunity. Based on the review, an ID measure should capture related and unrelated ID, breadth, depth and multidimensionality of ID. Single dimension measures only cover a dimension of ID. Composite measures despite the fact that are more reliable and can be multidimensional, only can assess the relationship between the combinations of the dimensions on performance. As [60] mentioned, by using categorical measures such as geographical configuration matrix, one can study separate and join effect of ID's dimensions on performance. However, as scholars [75] and [76] pointed out there is a need to a comprehensive theory about ID and P relationship. An appropriated ID measure can be designed by having such a theory. To select the most appropriate measure of performance, paying attention to the firm's main aim to follow diversification is necessary [77]. Moreover, as performance is multidimensional, using different types of measures in a single study can help to capture more comprehensive view about diversification and performance relationship [41]. Furthermore, using operational performance measures such as cost efficiency which heterogeneous standards and methods among different countries do not have effect on it, may reduce the result contradiction in diversification and performance studies. Finally, researchers in diversification strategy area always encounter problem in terms of data availability and they need to subscribe to different databases to conduct their study, which is costly and sometimes impossible. Therefore, making a specific database for diversification strategy studies is suggested. The database which contains current and historical data on firms' degree and types of PD and ID based on the different measures, can facilitate research about diversification and increases the possibility of using random sampling in diversification and performance studies. This can finally contribute to the body of knowledge in this area which will be significant to both theory and practice.

VII. CONCLUSION

Our review shows that the diversification and performance studies' results are inconclusive and use of different measures, measurement problems, sampling design and data availability may contribute to that. In sum, we suggest to design a new PD measure which only needs publicly available data and can capture relatedness among a firm's businesses and its multidimensionality, to reveal the value of survivor based relatedness indices to the public, to find a comprehensive theory for ID which is necessary in designing more appropriate measure of ID, to use multiple measures of P in diversification studies and to make a specific database for diversification studies which can increase the level of data availability and the likelihood of using random sampling, as avenues to reduce inconclusiveness in diversification and performance studies.

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