RESTAURANT BRAND DIVERSIFICATION:

ITS EFFECT ON COST-EFFICIENCY AND FIRM PERFORMANCE

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by

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ABSTRACT

As a restaurant firm grows, it has the choice to remain a single brand or diversify into multiple brands. To be competitive and gain market share, some firms choose to grow by increasing the number of properties within the same brand, allowing the firm to share its costs among properties and achieve economies of scale. In contrast, some restaurant firms choose to diversify by developing or acquiring various brands as part of their growth strategy to reduce portfolio risks in business. Through this, the firms can mainly achieve economies of scope which are the formalized benefits of related diversification in terms of cost advantage by sharing internal resources through specialized management capabilities.

Both of the abovementioned business strategies are popular for restaurant firms in the United States; however, the number of research on brand diversification's effects remains scarce in the hospitality context. Moreover, previous studies on brand diversification assert that managing a diversified brand enables a firm to gain economies of scale and economies of scope, they do not provide any empirical result on cost-savings effect.

Rather than simply compare the effects of different diversification strategies on firm performance, this study identifies which strategy, either single brand or multiple brands, brings higher performance to a firm by reducing the firm's primary costs.

The purpose of this study is to fulfil a research gap by accomplishing the three primary objectives: (1) to examine the impact of business strategy, single versus multiple brands, on a restaurant firm's performance, (2) to investigate the non-linear relationship between brand diversification and firm performance, and (3) to ascertain the relationship of cost-efficiency and brand diversification in the US restaurant industry. In essence, this study investigates the effects of brand diversification on firm performance in the restaurant industry. Specifically, if brand diversification has a negative effect on firm value, the focus is to investigate whether the cause is related to cost-efficiency of the operation.

To achieve research purposes, the current study employs a two stage least square (2SLS) regression model including instrumental variable. The study sample comprises 68 publicly traded restaurant firms (36 single-brand firms and 32 multiple-brand firms) and 490 observations from 2010 to 2021. For measuring the level of diversification, the current study adopted adjusted Herfindahl index (AHI), and Tobin's q was used to measure firms' financial performance. In addition, slack-based measure (SBM) was employed to obtain overall cost-efficiency of restaurant firms' operation and main costs' inefficiency.

The results of the study indicate the restaurant firms that used a single-brand strategy

exhibited greater firm value than those adopting a multi-brand strategy. Second, there was a non-linear relationship between the degree of brand diversification and firm value. Finally, the results showed that an increase in the degree of brand diversification caused a rise in cost-inefficiency. That is, brand diversification had a negative effect on overall cost-efficiency, with selling, general, and administrative (SG&A) inefficiency being the largest. This result suggests that the negative influence of increased brand diversification on firm value arises from cost-inefficiency.

This study contributes to the hospitality literature and the diversification theory by offering empirical evidence for the effect of brand diversification on performance. Further, this study probes the effects of brand diversification from a cost perspective and measured the relative efficiency of input costs to this end. Practically, this study provides insight into decisions regarding whether US restaurant firms should expand their brands or focus on a single brand.

CHAPTER 1 INTRODUCTION

1.1. Background of the Study

In today's competitive business environment, an essential requirement for management is to create value for their stakeholders, who encompass investors, customers, and employees. Effectively, they do so by espousing corporate- and business-level strategies for increasing sales and size as well as strategies for achieving a competitive advantage. Equally important is management's responsibility to efficiently allocate/utilize internal resources to curtail costs. In other words, if management selects and pursues an appropriate growth strategy (single-approach strategy versus diversification through multiple pathways) while reducing costs, they will realize higher profitability or achieve other measures of financial performance.

Despite the recent challenges caused by the COVID-19 (2019 coronavirus disease) pandemic, the US restaurant industry has thrived, reaching a 4% growth rate per year over the past few decades and generating a sales volume of over $659 billion in 2020 (National Restaurant Association (NRA), 2021). With this continuous growth, however, come low profitability and considerable business risks mainly because of fierce competition within matured market environments and substantial operating expenses, such as food and labor costs and rent (Mun & Jang, 2018). In this situation, restaurant firms expand in terms of size by implementing diverse growth strategies, such as maintaining a single concept, as in the case of McDonald's or multiple concepts via brand diversification, as in the case of Yum! Brands' KFC, Pizza Hut and Taco Bell.

Brand diversification is beneficial for the complex restaurant industry in that it enables the sharing of operating systems with existing brands while reducing marketing costs. It falls under the larger umbrella of business diversification given that it deals with expansion into new segments within the industry where a firm already operates (Beard & Dess, 1981).

In the US context, restaurant firms suffer business failures fundamentally because of low profitability and insufficient financial liquidity. This operational vulnerability stems from the fact that even a 1% to 2% increase in operating costs has a significantly negative effect on the performance of a company (Kim & Gu, 2006). Internally, therefore, the efficient management of operating costs is critical for the survival of restaurant companies (Alonso & Krajsic, 2014; Assaf, Barros, & Matousek, 2011). Adding to these challenges is the new normal prompted by the COVID-19 pandemic, which has changed consumption behaviors and accelerated the development of food technology (Morris, 2022). These developments have confronted restaurant firms with a new, challenging business environment and the need to pursue operational efficiency to overcome the aforementioned difficulties.

This chapter provides a brief introduction and discussion of brand diversification, cost-efficiency, and their relationship with firm performance. This is followed by research questions, research purpose, and contributions of the study. The organization of the dissertation is presented at the end of the chapter.

1.2. Problem Statement and Research Questions

Restaurant firms face the challenges of increasing sales, improving productivity and profitability. In particular, the expansion of the online market into foodservice, home meal replacements (HMRs), and meal solutions and the development of food technology are both opportunities for and threats to restaurant operations. From this point of view, the selection of business strategies related to brand diversification or productivity improvement through cost savings is an important strategic task for restaurant firms. For those whose restaurant operating systems are easily replicable by applying or sharing identical operational systems, brand diversification can serve as a convenient business strategy. Brand diversification, according to Porter (2004), is the extension of an existing brand or the diversification of a brand portfolio on the basis of the marketing capabilities and operating systems of firms.

Although business diversification has long been a classical focal point of study in the fields of strategic management and finance, it remains a novel issue in scholarship directed at the restaurant industry (Park & Jang, 2012), especially in empirical examinations of the effects of brand diversification on firm performance (Kang & Lee, 2015). Among the limited studies conducted thus far, that of Choi et al. (2011) uncovered a negative relationship between brand diversification and company performance; that is, implementing a single-brand strategy is more likely than a multi-brand strategy to increase firm value. However, a comprehensive assessment of the literature provided inconclusive evidence on which strategy is better in terms of performance. Moreover, the conclusions drawn from extant empirical research are minimally generalizable (Lin &

Kim, 2020). Another issue is about the potential of a non-linear relationship between corporate diversification and firm performance (Palich, Cardinal, & Miller, 2000). It seems that in an undiversified firm with a single product, there is an increase in its performance. Gradually the performance peaks in a moderately diversified firm whose business centers on products related to its core business, and eventually it decreases in a company focusing on products unrelated to its primary trade. In addition, previous studies on brand diversification asserted that operating with diverse brands enables a firm to gain economies of scale and economies of scope, but they did not provide empirical results on cost saving effects (Choi et al., 2011; Kang & Lee, 2015).

Confirming how effective brand diversification is or whether it is reasonable to focus on one brand (single concept) is expected to present considerable implications for the restaurant industry. In this respect, this study aimed to answer the following research questions:

Q1: Does brand diversification increase firm value in the restaurant industry?

Q2: Does a non-linear relationship exist between brand diversification and firm value?

Q3: What is the impact of the cost-efficiency of a brand diversification strategy? Specifically, which business strategy (single- versus multiple-brand strategy) achieves more cost advantages?

Rather than simply comparing the effects of different diversification strategies on firm performance, the present study identified which strategy—a single- or multiple-brand

strategy—elevates performance to a greater degree through cost reduction. This cost-oriented examination of the effects of brand diversification is where the uniqueness of this study lies.

1.3. Growth Through Diversification

Companies grow through the selection of growth options for corporate strategies related to what kind of business to be in (i.e., domain definition) and business strategies related to how to do business (i.e., domain navigation). Among these strategies, two essential ones are corporate diversification and business diversification. Until the 1970s, many companies employed diversification strategies to gain entry into various industries (Rumelt, 1982), especially those that contrasted with their main businesses. However, the 1980s and 1990s saw a major transformation in how companies in the US diversified their operations. As global competition intensified, many firms that aimed for unrelated diversification (acquiring a company/business that is unrelated to the existing business of the acquired company, also called conglomeration) faced corporate restructuring, which compelled them to eliminate peripheral lines of trade that deviated from their core businesses and refocus on these principal occupations (Mohamed, Ishak, & Ahlam, 2020). In the 2000s, companies failed to reach a clear consensus on increasing corporate value through core business expansion or diversification, thereby driving each of them to choose individual diversification strategies depending on suitability (Park & Jang, 2012). In this process, hospitality companies, including hotels and restaurants, also faced diversification issues, prompting them to choose a range of diversification strategies through consolidation of companies (e.g., mergers and acquisitions or M&A) and entry

into multiple countries (e.g., internationalization) (Lee & Jang, 2007; Park & Jang, 2012). A vast number of studies have also investigated corporate diversification and its relationship with firm performance across different industries (Gyan, Brahmana, & Bakri, 2017; Miller, 2006; Nath & Ramanathan, 2016).

1.3.1. Corporate Diversification

Before discussing brand diversification, a necessary task is to elucidate corporate diversification, which has been a key controversial issue in strategic management, because the former can be analyzed on the basis of a theoretical background on the latter. Correspondingly, the present work identified studies on corporate diversification according to analogous academic findings, such as economies of scale and scope effects applicable to business or brand diversification contexts; these are major topics in academic explorations into the business discipline (Jose, Nichols, & Stevens, 1986; Lang & Stulz, 1994).

Considerable research has been devoted to corporate diversification, especially in relation to strategic management. Many firms implement corporate diversification as the key component of their strategies for growth and maximizing firm value, but others experience failure because of such diversification (Berger & Ofek, 1995). In the context of strategic management, arguments have been raised as to whether focusing on a single business or diversifying into different businesses is a more effective growth strategy. In the hospitality industry, what has always been an interesting question is whether diversification actually increases corporate value.

Diversification has been classified into related and unrelated diversification, and this classification has been studied in relation to firm performance. In his exploration of the effectiveness of diversification, Rumelt (1974) found that diversified firms operating with products related to their core businesses achieve much higher returns than those earned by companies that concentrate on businesses that diverge from their principal lines of trade. Subsequently, numerous researchers have argued about whether the higher return derived from related diversification comes from the diversification strategy itself or from other factors (Park & Jang, 2012; Rumelt, 1974). However, they have agreed that related diversification yields substantially greater returns than those produced by unrelated diversification because under the former, companies achieve economies of scope by sharing management resources (Bettis & Mahajan, 1985; Nayyar, 1993; Varadarajan, 1986; Varadarajan & Ramanujam, 1987).

In the US setting, companies in the 1960s and 1970s opened the pathway to diversification through large-scale M&A, but in the 1980s and 1990s, they began to shift from unrelated diversification to concentration in related business, gradually returning to and refocusing on their primary lines of business. This adjustment improved the performance of these firms. Since then, companies have been concerned about the strategic option to either concentrate on their main businesses or diversify, and scholars in different industries have tried to analyze these decisions through various theories (Le, 2019). An example is the work of Rumelt (1974), whose study has been succeeded by many attempts to explain how firms cope with the effects of diversification strategies on

corporate management performance. The challenge is that these empirical studies have derived mixed outcomes, with their results on diversification effects differing depending on the management theories applied (e.g., resource-based theory and agency theory), the industries investigated, the methodologies used (Tallman & Li, 1996), and the types of diversification examined (Lecraw, 1984; Palepu, 1985; Rumelt, 1982).

According to classical financial theory, corporate diversification is an important growth strategy that reduces a firm's risk and increases its ability to finance debt (Lewellen, 1971). Corporate diversification provides economies of scale related to leverage by combining businesses with unstable profit flows and increasing corporate value by lowering marginal production costs. Nevertheless, this strategy has also been evaluated as indirectly discouraging management efforts and negatively affecting employee creativity. For example, the value of diversified firms is measured as an integrated performance function of each division within a portfolio. However, if the performance of managers in each division is not evaluated from an integrated perspective, but only the simple performance of each division is reflected, problems arise in the design of an efficient compensation system (Rotemberg & Saloner, 1994). In addition, previous studies on the relationship between diversification strategies and corporate value argued that diversification discounts are caused by agency problems (Stulz, 1990). Finally, some studies pointed to a non-linear relationship between corporate diversification and firm performance (Palich, Cardinal, & Miller, 2000; Rumelt, 1974). Rumelt (1974), for instance, discovered that firm performance increases in an undiversified firm with a single product, peaks in a moderately diversified firm whose business centers on products

related to its core business, and decreases in a company focusing on products unrelated to its primary trade. On this basis, the success or failure of a company depends on the extent of its diversification.

Researchers have also accepted that conglomerate firms gradually disappear in the US and Europe because of low performance owing to unrelated diversification. Notwithstanding the value of empirical studies related to diversification in general strategic management, the hospitality sector does not have strong and consistent research findings on diversification and corporate performance due to lack of academic research related to diversification. One of the few studies on diversification in the restaurant context is that conducted by Park and Jang (2012), who classified this strategy into related and unrelated diversification. The authors argued that corporate value is maximized when restaurant companies appropriately mix these types of diversification.

1.3.2. Brand Diversification

According to theories on management resources and core competencies, each industry has different management resources and core competencies that create competitive advantages. Hospitality companies, like the rest of the service industry, are no exception. In the hospitality industry, if companies have intangible management resources, such as brands, a substantially helpful approach is to diversify into businesses where these resources can be used because the role of a brand in these companies is essential to the expansion of their businesses. Brand diversification is more relevant to business-level than corporate-level expansion because corporate diversification involves expanding core

operations into other distinct industries or product markets (Hofer & Schendel, 1978), whereas business diversification entails competing in particular businesses within a given industry using competitive advantages and core competencies (Beard & Dess, 1981). Unlike manufacturing and other service companies, hospitality firms rarely diversify into unrelated domains but actively extend their operations within their industry by creating diverse brands or operating franchises (Choi, Kang, Lee, & Lee, 2011; Wang & Chung, 2015). This also applies to restaurants, which are the central business group of the hospitality industry. Restaurant firms provide multiple brands for relatively homogeneous products or even for the similar segments of customer (Choi et al., 2011). For example, two brands (P.F. Chang's and Pei Wei Asian Diner) of P.F. Chang's China Bistro Inc. serve Asian food and are categorized as a casual dining to provide full-service to their customers. On the contrary, Yum Brands! Inc.'s KFC, Taco Bell, and Habit Burger are quick-service restaurants that provide limited service.

This study revolved around the effects of brand diversification, which is part of the business-level strategies adopted by numerous restaurant companies (Choi et al., 2011; Kang & Lee, 2015). Brand diversification in the restaurant industry is chosen for this study because brand diversification is not only an essential growth option for firms but also a pathway to duplication-driven expansion that requires systematic management (Choi et al., 2011). Compared with other general companies, hospitality firms more easily adopt current business models and replicate them in other distinct fields, and they can increase brand or corporate value by expanding into businesses that are suitable for various consumer groups. For example, in the franchise system, a franchisor operating

brand A (e.g., Dunkin Donuts) offers a given set of services or menus, which can be easily enlarged by operating brand B (e.g., Baskin Robins), which has similar but distinct products that still fall within the quick-service category of foodservice. In other words, general companies diversify by pursuing entry into businesses with few systematic similarities, whereas restaurant companies carry out diversification in a manner similar to that implemented in the business domain—they readily expand their businesses by creating new brands by applying the existing franchise system (Choi et al., 2011).

It is important for restaurant firms to accumulate their own expertise and intangible assets, such as brands (Park & Jang, 2021), by stressing their uniqueness and operational management. Restaurant companies have, in fact, given birth to new markets with their own existing brands or newly developed brands that are anchored in their core areas of trade rather than in dissimilar businesses and industries (Kang & Lee, 2015). A brand represents the product or service provided by a specific supplier (Tepeci, 1999), and it can be differentiated by name, as is the case with McDonald's and Starbucks. It also encompasses all aspects of a restaurant company, from the values that it offers to its customers' perceptions and experiences. Typically, a brand is considered a key intangible asset that contributes to firm performance (Ailawadi, Lehmann, & Neslin, 2001) and core strategizing for building market value and driving firm growth (Yang, Cao, & Yang, 2017). A brand is critical especially for restaurant firms because it influences customers' perceptions and helps identify such companies (Kim & Kim, 2005). Therefore, many chain restaurants endeavor to seek ways to capture the attention of customers, fulfill their expectations, and stand out from countless other brands in a competitive market. In this

increasingly complex world, brands bring stability to a business by protecting it from imitation and enabling customers to buy products and services with confidence (Aaker, 2000). A credible and reputable brand attracts more customers than an untrustworthy counterpart (Ghose & Lowengart, 2013).

The restaurant industry is a mature domain that is confronted with uncertainty and increasing complexity. Maturity in this industry comes with many competitors and intense competition. Thus, one of the strategies for outperforming rivals is brand diversification (Porter, 2004), which can be defined as the extension of an existing brand or the diversification of a brand portfolio on the basis of the marketing capabilities and operating systems of firms. It enables companies to achieve a competitive advantage and survive under fierce competition. In addition to brand diversification, other diverse business strategies are implemented in the restaurant industry, including product diversification, segment (or market) diversification, and geographical diversification. Product diversification focuses on growing the scope of a firm's product portfolio (Wang, Ning, & Chen, 2014). Segment diversification entails operating in different segments by serving different customer types (Lin & Kim, 2020). Restaurant firms offer products and services to multiple market segments according to customers' needs, thereby requiring them to find new markets that match their resources and capabilities. Geographical diversification involves operating in several geographic markets (Barney & Hesterly, 2008). Restaurant firms seek growth by simultaneously managing their businesses in multiple locations, whether domestic or international (Barney & Hesterly, 2008).

In the hotel industry, Lee and Jang (2007) contended that although market diversification (multiple market oriented vs. single market oriented) using hotel segmentation does not affect profit growth, it positively affects performance stability. They also asserted that a trade-off exists between financial performance and stability. Extending this insight, Lee, Xiao, and Kang (2011) similarly explored market (segment) diversification among US hotel firms and found an inverted U-shaped relationship between diversification and firm performance. Their results suggest that a moderate segment diversification strategy maximizes firm performance measured by stock return.

As a restaurant firm grows, it can remain a single-brand enterprise or diversify into operating with multiple brands (Choi et al., 2011). To be competitive and gain their desired market share, some firms expand by increasing the number of stores that offer a single brand, allowing them to distribute costs across stores and achieve economies of scale. For example, the corporations overseeing McDonald's and Starbucks businesses adopt a single-brand strategy. In 2020, McDonald's operated around 38,000 stores worldwide, and Starbucks had 32,660 stores spread across international locations. In contrast, some restaurant companies diversify by developing or acquiring various brands and reducing the portfolio risks that they encounter in business. This business strategy is related to new market development in the marketing context. It enables firms to achieve economies of scope, which are the formalized benefits of related diversification in terms of cost advantage (Helfat & Eisenhardt, 2004). The strategy is related to new product development and is implemented by Yum! Brands and Darden Restaurants, Inc. In 2020, the Yum! umbrella consisted of four brands, namely, Taco Bell, KFC, Pizza Hut, and The

Habit Burger Grill, while Darden Restaurants, Inc. operated eight brands, namely, Olive Garden, LongHorn Steakhouse, Cheddar's Scratch Kitchen, Yard House, The Capital Grille, Bahama Breeze, Seasons 52, and Eddie V's. Operating several brands enables firms to share internal resources and achieve synergies through specialized management capabilities. Although both the above-mentioned business strategies are popular among restaurant firms in the US (Kang & Lee, 2015), a comprehensive review of the literature provided inconclusive evidence on whether a single-brand strategy outperforms a multiple-brand strategy, and vice versa.

Brand diversification in the restaurant industry can be considered as a business expansion strategy that shares a management operation system and seeks growth opportunities. Instead of entering a completely different business domain, restaurant companies can easily generate cost benefits and other benefits include management and technology know-how, financial reserve, marketing strengths by transferring the brand they are currently operating into a newly launched brand. The effect of such cost reductions may vary depending on the single- and multi-brand strategy. Thus, in order to investigate the cost advantages (or cost savings) of each brand diversification strategy to engender firm performance, this study addresses the definition of cost-efficiency and how to measure it.

1.4. Cost-efficiency

Many firms grow consistently through productive activities related to minimizing costs and maximizing revenues (Alam & Sickles, 1998; Baik, Chae, Choi, & Farber, 2013; Demerjian, Lev, & McVay, 2012; Green & Segal, 2004; Kim & Ayoun, 2005; Zhu,

2000). As the US restaurant industry faces tough competition and services experience-oriented consumers, it becomes increasingly difficult for restaurant operators to increase sales and profits beyond moderate levels. Hospitality companies that provide products and services that are extremely capital and labor intensive and require enormous capabilities and resources to achieve their goals. In particular, if a firm experiences difficulty in generating revenue, it maximizes profit by minimizing costs, such as the cost of goods sold, labor costs, and selling expenses. However, simply reducing costs does not mean an increase in profitability. In practice, there should also be greater output generation than input investment—an issue closely related to the definition of operational efficiency of a firm. The business risks encountered by restaurant firms are more severe than those confronting companies in other industries, but the profitability of the former is relatively constrained (Skalpe, 2003). One of the coping strategies that they implement is enhancing efficiency (Halzack, 2016). Thus, the efficient use of resources has an important effect on the sustainable growth of restaurant firms.

Cost-efficiency is a significant mechanism by which to maximize profit in the restaurant industry also because this industry generates relatively low added value and exhibits lower productivity than other industries (Kim & Ku, 2006). Most restaurant firms systematically manage their stores because this promotes operational efficiency at the firm level (e.g., a franchisor). Regardless of whether a restaurant is company-owned or a franchisee, achieving efficiency in each establishment is the primary consideration in operation. Marketing-oriented systems for generating revenue are important to restaurant businesses, but operating systems are crucial to cost management. Ultimately, a salient

approach is to have a system that enables companies to earn substantial profits with limited resources.

Furthermore, many prior studies employed a simple financial ratio as an indicator of cost-efficiency, and numerous traditional approaches that involve the use of indicators such as the cost of goods sold to sales ratio, sales per employee ratio, and total asset turnover have been employed to measure the efficiency of a firm (Kim & Ayoun, 2005; Kukanja & Planinc, 2020). However, the drawback to these efforts is that they did not determine efficiency or recommend a corresponding benchmark based on the frontier approach which is a technique to compare the relative efficiencies of comparable operating units to evaluate the performance of a group of firms (Baik et al., 2013).

1.4.1. Effects of Operational Efficiency on Performance

A comprehensive review of the literature indicated that many researchers have delved into operational efficiency measurement, as it reflects how well resources are being used by an organization (Baik et al., 2013; Banker & Morey, 1986; Hwang & Chang, 2003; Reynolds, 2003; Roh & Choi, 2010; Zhu, 2000). Most of these researchers focused on the property levels and input–output structures of individual organizations. In the hospitality industry, the majority of productivity evaluations of restaurants involve the use of partial productivity measures, which often means a simple one-to-one ratio related to input and output. Financial ratios, such as single input and single output, were used as key indicators of productivity in the past (Reynold, 2003). Such ratios include return on investment (ROI), return on equity (ROE), return on sales (ROS), return on assets

(ROA), and profit margin (PM). However, the financial ratios used for performance evaluation provide information that is insufficient to solve the complex link to performance (Chakravarthy, 1986). Previous research also failed to interpret individual units relative to other establishments within a system, that is, with performance compared with that of comparable establishments or industry average/benchmark. For this reason, researchers called for a more rigorous quantitative methodology for measuring productivity-related efficiency (Donthu, Hershberger, & Osmonbekov, 2005).

Given that firm performance has a more complex endogenous structure than that captured by a single criterion or simple ratio, previous studies suggested multi-factor performance measures that can simultaneously consider multiple complex factors (Bagozzi & Phillips, 1982). Along with measuring various productivity issues in connection to performance, an essential task is to compare the performance of companies with that of competitors operating in a similar environment. Even if a firm's absolute productivity decreases, it may be judged as operating efficiently if the reduction is lower than the average in the industry to which it belongs. In addition, the management activity of benchmarking input and output factors in detail for companies that are highly productive is necessary for a restaurant firm that operates in a rapidly changing business environment.

In this respect, this study measured operational productivity using data envelopment analysis (DEA), which is a non-parametric efficiency measurement method that considers multiple input and output factors (Charnes, Coopers, & Rhodes, 1978). DEA is widely used to measure productivity at the organizational level (Tavares, 2002) and is proposed

as a management science technique that takes the form of a linear programming model. It is extensively employed as a mathematical tool not only for measuring the efficiency of a company but also for analyzing the cause of inefficiency and setting goals for improving efficiency. Another advantage of DEA is that it affords opportunities to explicitly deal with multiple inputs and outputs at the same time. Nevertheless, a deficiency that needs to be rectified is the deterministic nature of DEA, which prevents it from taking the effects of stochastic errors into account.

Several studies in the hospitality industry have attempted to measure operational efficiency by using DEA (Nurmatov, Lopez, & Millan, 2021) and analyzing such efficiency at the level of individual property units, such as hotels (Hwang & Chang, 2003), restaurants (Banker & Morey, 1986; Reynolds, 2003), and casinos (Liu, Wu, Lu, & Lin, 2017). In the current research, however, efficiency was determined by analyzing financial accounting data based on input–output structures at the corporate level which is the decision-making unit (DMU) of the study. In addition, in most DEA studies anchored in financial accounting data, inputs were treated as asset items on a balance sheet and expense items on an income statement, and outputs were regarded as sales revenue and profit on an income statement (Baik et al., 2013; Zhu, 2000). By contrast, the DEA in the present work was directed toward the cost-efficiency of publicly traded restaurant firms (versus individual restaurant units/properties) and measured how restaurant firm's primary costs were efficiently managed. Publicly traded restaurant firms are used because of the availability of financial data from databases like COMPUSTAT, particularly over a longitudinal study period.

1.4.2. Economies of Scale and Scope

Firms tend to increase productivity by achieving economies of scale and economies of scope (Mankiw, 2017). Economies of scale are maximized by operating a single business, selling a single product, and operating a single brand, whereas economies of scope are maximized by operating multiple businesses and having a multi-brand system. Economies of scale refer to a reduction in the average cost arising from the scale of production for a single product or single brand type, as expressed in Equation (1):

$$C(Y_1, Y_1) < C(Y_1) + C(Y_1), \quad (1)$$

where C denotes the total cost of production, and Y_1 represents the output of product 1.

Conversely, economies of scope or synergy effects refer to a reduction in the average cost arising from the scale of production for a multiple product or multiple brand type, as denoted in Equation (2):

$$C(Y_1, Y_2) < C(Y_1, 0) + C(0, Y_2), \quad (2)$$

where C refers to the total cost of production, Y_1 is the output of product 1, and Y_2 denotes the output of product 2.

The economies of scope for two products at a point in time are defined as shown in Equation (2) (Panzar & Willig, 1981). Equation (2) is easily extended to a case involving more than two products, and the total cost incurred from manufacturing all the products together is lower than that of separately producing the products. Put differently, the total cost of producing Y_1 and Y_2 together is lower than the total cost of producing each of them separately (Helfat & Eisenhardt, 2004). By leveraging their current strategic

resources across business units, firms can achieve economies of scale and scope in their facilities or distribution channels (Pennings, Barkema, & Douma, 1994). However, inefficiency in marketing and manufacturing can be caused in a firm having large brand portfolio by fragmenting resources and economies of scale (Hill, Ettenson, & Tyson, 2005).

This study measured the cost-savings effect of brand diversification strategy in restaurant companies using economies of scale and scope. Unlike previous DEA studies in hospitality literature, this study introduced the slack-based measure (SBM), an alternative to DEA, to the measurement of overall efficiency and inefficiency in individual input (cost) variables. In other DEA models, such as the BCC model (developed by Banker, Charnes, & Cooper, 1984) and the CCR model (developed by Charnes, Cooper, & Rousseau, 1978), when an inefficient decision-making unit (DMU) is benchmarked for the efficient-frontier DMU in the peer group, the same ratio is reduced for each input variable. Efficiency is calculated by multiplying each input variable by the same ratio, while the efficient frontier is a series of points where the combination of inputs and outputs in an analysis connects the most productive units given. This approach, although suitable for the evaluation of overall DMU efficiency, does not provide information on how efficiently each input variable is used. SBM can measure the efficiency of each input variable by calculating different efficiency values on the basis of each input variable's slacks, which refers to any excess inputs and shortfall in outputs (Tone, 2001).

1.5. Brand Diversification, Cost-efficiency, and Firm Performance in the Hospitality Industry

Previous research studies have yielded inconclusive evidence regarding the impact of brand diversification on firm performance. Choi et al. (2011) showed that brand diversification reduces firm value in the US restaurant industry. Kang and Lee (2014) reported an insignificant effect of brand diversification on firm value, as measured by Tobin's q, but the results showed a positive and significant moderating effect of brand diversification on the relationship between geographic diversification and performance in the US lodging industry. In a follow-up study, the authors found a negative and moderating effect of brand diversification on the relationship between geographical diversification and firm value (Kang & Lee, 2015). In an analysis of US lodging firms, Koh (2019) found evidence that brand diversification increases the value of these companies more significantly when segment diversification happens simultaneously. The results showed that implementing brand diversification more effectively reduces hotel failure rates than geographic or segment diversification. Lin and Kim (2020) investigated the association between diversification and failure rates using a sample of Texas hotels and uncovered that failure rates are not significantly related to specific types of diversification and ownership structures. Analyzing the same sample conducted in their previous study, Kim and Lin (2021) identified a concave relationship between brand diversification and hotel performance, as measured by RevPAR (revenue per available room) and determined the optimal level of brand diversification. In relation to strategic options such as franchising (Hsu & Jang, 2009; Nikulin & Shatalov, 2013) and internationalization (Woo, Assaf, Josiassen, & Kock, 2019), there may exist a non-linear

relationship between brand diversification and firm performance in the restaurant industry. This does not simply explain that the performance of a firm is affected by whether it is diversified, but it indicates that there may be an optimal level of diversification. Restaurant firms consider various growth options when they decide to expand their operations. A necessary task, therefore, is for such companies to ascertain whether they should diversify a brand, focus on one brand, or diversify a brand geographically.

Literature review also shows that there is no study conducted that examines the relationship of brand diversification and cost efficiency and their impact on financial performance on restaurant firms. Thus, this study attempts to fill this research gap.

1.6. Research Purposes

The main purposes of this study were (1) to examine the effects of brand diversification on firm value; (2) to investigate whether a non-linear relationship exists between brand diversification and firm value and determine an optimal level of diversification, if it exists; and (3) to explore cost-savings effect in terms of how brand diversification has been affected by the economic benefits gained by restaurants considering economies of scale and scope.

The present work focused on brand diversification because the decision on whether to diversify is a challenging but important issue in the restaurant industry. Given that research regarding the impact of diversification on performance has yielded inconclusive results, this study proposes that achieving higher performance necessitates that

management realizes cost-efficient operations and internal resources. This study directed attention principally toward the cost savings that firms achieve in relation to brand diversification. Simultaneously, this study explored whether a firm's brand diversification strategy generates economies of scale and scope through cost reduction and thereby achieves good performance.

Brand diversification is expected to exert a discount effect on restaurant firm performance, as noted by Choi et al. (2011) and Kang and Lee (2015). This finding implies that brand extension by restaurant firms generates lower cost savings than those gained from employing a single-brand strategy. That is, single-brand strategies related to economies of scale lead to greater improvements in performance than those achieved with multiple-brand strategies related to both economies of scope and scale. Furthermore, because the present study inquired into the cost savings realized from brand diversification, the main costs are expected to be affected differently depending on the effects of economies of scale and synergy effects. By providing empirical results on cost advantages, this study lays a foundation from which to scrutinize the strategic choice of US restaurant companies to concentrate on a single brand or expand to other brands to effect cost reduction.

1.7. Contributions of the Study

US restaurant firms have a variety of strategic options to expand their operations. They can adopt a multi- or single-brand strategy, enter domestic US markets or the global market, or penetrate the global market while implementing a multi-brand strategy. This

study centered on brand diversification, which is one of the most popular strategies employed by restaurant firms (Kang & Lee, 2014).

Theoretically, this study attempts to apply the theory of corporate diversification in strategic management to analyze the effect of brand diversification on firm performance. To current knowledge, only a few studies investigate the relationship between brand diversification and firm performance in the restaurant industry. This study contributes to the hospitality literature and the diversification theory by suggesting empirical evidence for the effect of brand diversification on performance. More importantly, this study is also unique because it probed the effects of brand diversification from a cost perspective and measured the relative efficiency of input costs to this end. In particular, it represents the first methodological attempt to apply the concept of economies of scale and scope and introduce slack-based models (SBM) into the determination of how restaurant firms' brand diversification strategies affect firm value in terms of cost-efficiency.

From managerial implication, the results suggest that sustainable growth requires restaurant firms to determine the level of brand diversification to implement by considering the characteristics of their menus, brand cycles, and various business aspects. The study also presents implications for how restaurant firms carry out brand diversification strategies in the future under the new normal prompted by the COVID-19 pandemic since restaurant firms are facing challenges such as controlling growing operational costs or mitigating rising food costs. It provides insight into decisions regarding whether US restaurant firms should expand their brands or focus on a single

brand. Specifically, the evaluation of efficiency can shed light on the establishment of allocation priorities for policymakers and managers (Bujisic, Hutchinson, & Parsa, 2014). Additionally, measuring restaurant financial value and understanding the influence of the determinants of cost-efficiency can aid restaurant managements define their business strategies (Alberca & Parte, 2018).

1.8. Organization of the Dissertation

The rest of the dissertation is organized as follows. Chapter 2 provides the literature review, through which previous studies on the concept of diversification, cost-efficiency, and firm value in the restaurant industry were examined. Chapter 3 presents the research methodology, and Chapter 4 discusses the results of diversification and efficiency assessment, and the statistical testing of the relationship between the variables of interest. Chapter 5 summarizes the findings and conclusions, along with detailing theoretical and managerial implications, limitations, and suggestions for further research.

CHAPTER 2 LITERATURE REVIEW

2.1. Introduction

This chapter recounts the review of relevant theories and the literature on diversification, cost-efficiency, and financial performance. First, the motivations and synergies relevant to diversification are discussed, and the diversification conducted by restaurant firms is reviewed. Second, from strategic management and finance perspectives, corporate diversification and the effects of diversification are examined. Third, the definitions of "brand" and "brand extension" are laid out, and the advantages and disadvantages of using a multiple-brand strategy are evaluated, with focus on the restaurant industry. Fourth, the types of diversification and the effects of brand diversification on firm performance in the hospitality industry are elaborated. Fifth, the definitions and measures of cost-efficiency that were incorporated into the model adopted in this work are provided. The chapter ends with the hypotheses developed on the basis of theoretical foundations.

2.2. Diversification

2.2.1. Diversification for Strategic Resources

Some of the fundamental issues connected to strategic management are the differences in strategy between firms and the reasons why some firms consistently earn profits, but others do not. The resource-based theory maintains that for a company to go beyond surviving fierce competition, it must consider the various management resources that it owns, as these determine differences in firm performance. Fundamentally, this theory

focuses on a business management framework that is used to make decisions about available strategic resources so that a company can achieve a sustainable competitive advantage (Rumelt & Lamb, 1984). Such an advantage can be achieved by strategically allocating or using core resources internally rather than having this task be determined by external competitive factors. Core resources include both tangible and intangible assets that are unique, rare, and difficult to imitate (Barney, 1991) as well as resources in each functional area including finance, marketing, operation, human resource, research & development (R&D) and administration. Thus, an essential task within strategic management is to identify internal resources and understand how to allocate them in a way that achieves a sustainable competitive edge. Because each firm has heterogeneous resources and varying combinations of resources, it implements a different business strategy (Barney, 1986). Therefore, companies are dissimilar in their competitive advantage depending on the resources that they possess. Companies can also continually earn profits by identifying the competitive resources that they have and compete effectively with the espoused strategy in a market where these resources can be efficiently used and managed.

Barney (1986) emphasized that companies seeking high returns can implement a strategy that begins with an analysis of both the competitive environment where they operate and the management resources that they own because entities can have different technologies and capabilities. Grant (1991) highlighted the importance of competitive advantage, rather than external environment condition, as a source of competence, which provides a driving force for the development of competitive positions and corporate strategies; in

this situation, competitive advantage in the marketplace is the main cause of differences in profits between firms. In another work, Barney (1991) examined the association between the resources of firms and their sustained superior performance and proposed a model wherein resource heterogeneity and resource immobility in a firm can serve as sources of sustainable competitive advantage given that these aspects generate value, rarity, imperfect imitability, and substitutability. Therefore, the resource-based view expands organizational and strategic management scholarship to include firms' resources and external/environmental factors (Collis & Montgomery, 1995). The core of this perspective is finding the source of differentiation in management resources between firms operating in similar environments on the premise that such companies have different capabilities for implementing strategies. That is, a firm needs to espouse appropriate/effective business strategy (single versus multiple concepts of brand diversification) externally while managing its resources efficiently. On the grounds of previous studies, then, establishing a competitive advantage in a fiercely competitive environment is a corporate strategy that must be implemented for distinction in terms of performance.

2.2.2. Synergies from Diversification

As stated by Porter (1980), the cost leadership strategy of diversified firms is based on the hypothesis that more effective synergy can be achieved by sharing surplus resources in a segmented market. This is one of the competitive strategies that accomplishes economies of scale, minimizes management costs, and enables companies to achieve financial performance. The low-cost positions of the strategy create solid barriers to entry

with economies of scale or cost advantages and maximize efficiency by reducing distribution costs and product lines. From the early 1990s, the focus of strategic planning shifted from an analysis of a firm's external environment to an analysis of its internal management resources and core competencies. As posited by Porter, a firm's competitive advantage should be based on its management resources or core capabilities rather than its positioning within an industry (Hamel & Prahalad, 1993).

Resources are the first factors to consider in connection to the performance or goals of diversified firms, and resource sharing is the most typical way to create synergy in corporate diversification (Porter, 1985). Vancil (1980) stated that the internal resources involved in corporate diversification include research and development (R&D), manufacturing, distribution, and sales. The author added that firms diversifying into fields related to their core businesses are more likely to share resources than companies expanding into unrelated domains. Chatterjee and Wernerfelt (1991) classified diversified firm resources into physical capital, intangible, and financial resources and revealed that a surplus in physical, knowledge-based, and external financial resources is closely related to diversification. For this reason, resources, including the tangible, intangible, and human capital possessed by a firm, can serve as the driving force behind the growth of a diversified firm owing to the consequent transfer of technology and sharing of activities.

In particular, brand-diversified restaurant firms achieve economies of scale and scope by sharing resources and creating a cost advantage across the units under a restaurant firm by reducing human resources and supplying standardized products through the

establishment of facilities. From a business strategy perspective, therefore, if the ultimate goal of a diversified restaurant firm is to create synergy by gaining a competitive advantage over other companies, firms first need to evaluate their strengths and weaknesses with regard to internal resources and develop them into core competencies that can be used efficiently in comparison with competitors. Then, these core competencies can give rise to greater synergy by achieving both cost advantage and differentiation. Chatterjee and Wernerfelt (1991) empirically analyzed the usefulness of diversified companies according to the form of diversification that they go through. They approached value creation through unrelated diversification with guidance from the standpoint that pursuing only related diversification generates profits, arguing that companies execute a diversification strategy using surplus production resources.

Diversification has received considerable attention from the business field where companies operating in general industries normally diversify into totally different fields of business (unrelated diversification). For restaurant firms, focusing on a single business strategy for growth or conducting business with multiple brands has always been an interesting matter of concern (Choi et al., 2011; Kang & Lee, 2015). Unlike other industries, restaurant firms are predisposed to expand into new markets (related diversification) to maintain their businesses either by using their existing brands or by creating a new brand. In other words, restaurant firms tend to increase the number of restaurant brands with which they operate. Another intriguing issue is related to economies of scale and scope, that is, whether single- or multi-brand strategies are more cost-efficient in resource management. Nevertheless, little is known about these topics.

This study was thus aimed at probing into the effects of the extent of brand diversification among restaurant firms on their performance and the cost-efficiency of key expense items/resources.

2.3. Diversification as a Corporate-level strategy

2.3.1. Corporate Diversification

Corporate diversification means entering a new industry or market from an existing industry that manufactures products or engages in service activities (Palepu, 1985). It has a two-sided nature in that it enables companies to generate profits but also gives rise to costs for them. Research on the types and methods of corporate diversification and its effectiveness has been steadily conducted. Early initiatives identified the positive or negative effects and motivations of diversification, and those performed since the 2000s have verified the effects of diversification by considering various management and economic theories and management aspects, such as business domains, governance, and resources. Diversification as a research topic has been examined through the lens of various concepts/theories explaining the impact of diversification and operational efficiency and financial performance. These theories include resource-based view, internalization theory, transaction cost, internal transaction cost, organizational evolution, portfolio theory, agency theory, and internal capital market.

(1) Resource-based view

The resource-based view predicts and explains what corporate resources enable companies to achieve remarkable organizational performance (Barney, 1991). This

theory favors the consideration of a firm's internal determinants for survival and growth and the analysis of effects from the types and use of management resources. Since Wernerfelt's (1984) recall of the necessity of analyzing resources, research on strategy has focused on internal resources rather than external situations. Studies underlain by the resource-based view pinpointed the attributes and types of resources that determine the motivation, type, and scope of diversification strategies as well as the continuous competitive advantage derived from them (Bettis, 1981; Nayyar, 1992). That is, resources are the factors that a firm should prioritize to improve its performance or achieve its goals and resource sharing in corporate diversification is considered the most typical strategic method for creating synergy (Porter, 1985). The main motivation for corporate diversification is to increase firm performance by appropriately combining firm resources and diversifying for synergy.

Several advantages of corporate diversification can be explained on the grounds of the resource-based view. First, economies of scope are affected by a strategic and operational approach (Grant, 1991). When resource capabilities, such as manufacturing, marketing, and technology development, are identified at the operational level, synergy can be created through diversification (Nayyar, 1992). Second, the processes of creating and expanding resource capabilities can be explained clearly with a resource-based perspective. Firms own unique resources or key elements that can be described by the ambiguity implied throughout the production or management process, making these difficult for competitors to imitate. Therefore, investment in resources may be a means of differentiation and concentration, and economies of scope can be maximized through

resource sharing between diversified business units (Bettis, 1981). Likewise, when diversifying to create new capabilities based on existing company resources, information related to the creation of resource capabilities is readily available, and business units may accumulate experiences. Whereas individual firms take a long time to acquire these resources, diversified companies can obtain them relatively easily through internal resource transfer between business units or between internal divisions (Dierickx & Cool, 1989; Hamel & Prahalad, 1993). If diversification is viewed as a process of creating and transferring new resources using existing resource capabilities rather than a simple means of expanding a line of business, its results can be clearly identified.

(2) Other theories relevant to corporate diversification in strategic management

Several other theories are used to elucidate corporate diversification as part of strategic management. Internalization theory, for instance, indicates that firms going through international diversification can accumulate knowledge and experience from multiple markets (Craig & Douglas, 2000). Specifically, in accessing various markets, internationally diversified firms amass problem-solving skills and management knowledge and cultivate product innovation capabilities that can secure international competitiveness (Hitt, Hoskisson, & Kim, 1997). These companies also benefit in terms of competitive advantages, such as economies of scale, economies of scope, and differences in the prices of production factors (Kim, Hwang, & Burgers, 1993). They can reduce earnings volatility from investment (Kim, Hwang, & Burgers, 1993) and increase revenue while reducing costs by elevating market power over suppliers, distributors, and customers (Kogut, 1985).

With internal transaction cost theory as basis, one study found that diversified firms are more complicated than firms that expand via single concept and exposed to more complex factors, such as different rules and regulations in diverse markets, various cultures and customer segments, and distinct natural environments (Jones & Hill, 1988). Handling those factors may considerably engender internal transaction costs related to information, thus negatively affecting firm value.

Organizational evolution theory submits that costs related with new customers, suppliers, and competitors rise as a company diversifies (Chang & Wang, 2007). Consequently, expansion into numerous brands may encourage frequent brand-switching behaviors and lead to stringent competition. Under these conditions, US restaurant firms may experience more struggle in sustaining or building a loyal customer base, coping with suppliers, and handling competitors as the extent to which they diversify brands increases (Kang & Lee, 2015).

(3) Diversification theories on finance perspectives

In addition, corporate diversification in the financial sector has been discussed mainly based on portfolio theory, agency theory, and internal capital market theory. In particular, the interrelationship among corporate diversification, investment, and capital structure exerts both positive and negative effects on firm value. The effects of this interrelationship are summarized as follows.

From an investment point of view, corporate diversification generally reduces corporate

risk, consistent with the portfolio diversification effect (Li & Greenwood, 2004; Lin & Kim, 2020; Lintner, 1965), which occurs through the establishment of an optimal business portfolio (Khanna & Paleou, 2000). According to the coinsurance effect conceptualized by Lewellen (1971), when a company diversifies, different business portfolios are created, resulting in reduced earnings volatility, which raises the debt capacity of diversified companies to levels higher than those achieved by similarly sized individual firms. Therefore, if the extent of debt financing increases in accordance with enhanced debt capacity, the tax shield effect on interest payments will increase, also resulting in improved corporate value.

According to the efficient internal capital market allocation claimed by Weston (1970) and Stulz (1990), diversified firms can distribute more efficient resources by creating an internal capital market that allows the firms to allocate their resources efficiently than is possible in an external capital market. Diversified companies can also form a larger internal capital market than non-diversified firms, paving the way for these companies to achieve net present values greater than zero compared with individual firms. This also eases the underinvestment problem raised by Myer (1977) and increases firm value.

Stulz (1990) put forward overinvestment theory, which hypothesizes that diversified companies are inclined to overinvest in negative net present value because of increased debt financing and free cash flow. Therefore, these companies are less likely to go bankrupt given their expansion in size and can obtain a relatively high credit rating, thereby easing financing from the external capital market. These phenomena, in turn, can

diminish firm value through the discretionary allocation of resources to investments that can lead to such a decline owing to externally raised funds and internally generated free cash flows.

As postulated by agency theory (Jensen, 1986; Koh, Lee, & Boo, 2009), management and shareholders can promote diversification by increasing their private benefits, such as power and prestige, which can be enjoyed by running a large company. In this case, diversification can be promoted through debt financing. Accordingly, diversification that hinges on borrowing generates agent costs, thus decreasing corporate value. Note, however, that corporate diversification exerts different effects on corporate value depending on the financial theory applied to examinations.

Furthermore, according to Chandler (1977), the value of diversified firms increases through operational efficiency. Specifically, they create management divisions that can more effectively harmonize and integrate their respective specialized business units to elevate efficiency to levels that exceed those achieved with each business unit operating independently. Therefore, their efficiency favorably influences firm value. Meyer, Milgrom, and Roberts (1992) suggested that diversified companies grapple with the value reduction caused by cross-subsidization between business units. To be specific, business units that would have been withdrawn had they been operated independently continue to survive as the exit of failing business segments is delayed because of mutual assistance from the other strategic business units of diversified firms. The upshot of all this is a decline in firm value.

2.3.2. Related and Unrelated Diversification

When a firm diversifies via mergers and acquisitions (M&A) approach, its performance may differ depending on whether it pursues related (or concentric) or unrelated (or conglomerate) diversification. In line with this phenomenon, another stream of research classified diversification as such and examined the effects of each type of diversification (Nayyar, 1993; Rumelt, 1974, 1982; Tallman & Li, 1996). Related diversification refers to acquiring company branching out in respect of products, value chains, technologies or production methods, raw materials, and core competencies that are associated with one another of the acquired company. It is generally a desirable strategy when technology or organizational members' functions, sales networks, management know-how, and products can create synergies between the acquired and acquiring companies. In contrast, unrelated diversification presents advantages such as synergy in management, efficient cash management via the use of surplus funds, and information improvement via the pursuit of projects/businesses that are completely separated from existing activities and resources to reduce financial risks and promote profitability.

Using a specific classification for diversification, scholars analyzed the relationship between diversification strategies and performance, and many argued that related diversification provides more performance advantages than unrelated diversification (Nayyar, 1993; Tallman & Li, 1996). A representative scholar who formulated criteria for classifying related and unrelated diversification is Wrigley (1970), who used a company's specialization and the relatedness between industries in classifying diversified firms. To wit, according to specialization and relatedness ratios (SR and RR, respectively), firms

can be categorized into single (SR > 95%), dominant (95% > SR > 70%), and unrelated (SR < 70%, RR < 70%) businesses. Also, Rumelt (1974) developed an approach to classifying diversification into nine categories using three ratios (i.e., specialization, related, and vertical integration ratios) and analyzed the level of economic performance associated with these categories. His results reflected that related diversification advances stronger performance than unrelated diversification or non-diversification. To extend his study using more complete data, Rumelt (1982) classified 246 companies that implemented diversification over the course of 20 years into seven more detailed categories (i.e., single business, dominant vertical, dominant constrained, dominant liked-unrelated, related constrained, related linked, and unrelated business) on the basis of the relatedness of business units and the ratio of profits to business structures. The findings support his previous assertion (Rumelt, 1974) that diversified firms perform better than non-diversified companies because the former reduce costs and create value via resource sharing or technology transfer between multiple business units. Bettis and Mahajan (1985) investigated the risks and profitability of firms undergoing related and unrelated diversification and contended that companies carrying out related diversification outperform those going through unrelated diversification. Varadarajan (1986) and Varadarajan and Ramanujam (1987) developed a two-dimensional categorical measure and analyzed diversified firms by grouping them into four categories (i.e., very low diversified firms, related-diversified firms, unrelated-diversified firms, and very high diversified firms). The authors found that related-diversified firms achieve better performance compared with unrelated-diversified firms. Nayyar (1993) compared related and unrelated diversification and concluded that the former has a more positive effect on

corporate value than the latter. He attributed this phenomenon to the fact that related diversification advances synergy, seeing as related markets are characterized by the sharing of technology and resources and the greater effects of reputation and economies of scope. Unrelated diversification entails specific substantial costs that could adversely reduce profit as companies adapt to new and unfamiliar business environments (Park & Jang, 2012). To these insights, Markides and Williamson (1994) added that the existing measure of diversification relatedness is an incomplete scale that does not reflect strategic importance and similarity between businesses. To address this gap, the authors developed a new measure of relatedness, with the resource-based view as grounding perspective. Finally, the authors asserted that related diversification produces better results than unrelated diversification. Similarly, empirical studies presented evidence that related diversification enhances profits to a greater extent than that realized under unrelated diversification (Nayyar, 1993; Tallman & Li, 1996). By contrast, Hill and Snell (1988) implied that unrelated diversification is more profitable than related diversification. They claimed that by using various investment options, firms undergoing unrelated diversification are more likely to be in a better situation to lower the cost of capital and invest in an optimal manner.

Other studies presented results that deviated from those generated in the aforementioned research. A case in point is the work of Christensen and Montgomery (1981), who proclaimed that no difference in performance exists between related and unrelated diversification. The authors explained that the difference in performance between diversified firms does not stem from the degree of relatedness but from the characteristics

of markets where companies operate. For example, firms undergoing related diversification develop business activities in high-growth, profitable, and focused markets, whereas companies implementing unrelated diversification are engaged in industries with low profitability levels, minimal growth opportunities, and small markets. In a similar vein, Bettis and Hall (1982) claimed that the performance discrepancy between related- and unrelated-diversified firms is due to the characteristics of the firms at the time of diversification and not the diversification strategy itself. In a study conducted by Palepu (1985), no difference in profitability was found between related and unrelated diversification, but in terms of the growth rate of profitability, related diversification outperforms its unrelated counterpart. In addition, many studies have declared that the performance difference between related- and unrelated-diversified firms originates not from diversification strategies but from the structural characteristics of a market or business (Chang & Thomas, 1989; Christensen & Montgomery, 1981; Montgomery, 1985).

Much scholarly work in the financial management field has targeted diversification effects without distinguishing between related and unrelated diversification. An important issue for consideration, however, is that the effects of diversification may be influenced by whether it takes place in areas related to existing company activities or in unassociated business domains. Related diversification may favorably affect firm value, as it eases the movement of production lines, technologies, and experiences to newly added sectors, whereas unrelated diversification may not have as much of a positive effect. Nevertheless, unrelated diversification allows for the efficient use of capital because it

engenders various internal investment opportunities (Lewellen, 1971). It also facilitates the raising and movement of capital in a firm through the external capital market, thereby reducing the cost of capital increase (Meyer, Milgrom, & Roberts, 1992). As a result, unrelated-diversified firms achieve positive performance through optimized investment (Hill & Snell, 1988).

2.3.3. Effects of Corporate Diversification

From both strategic and financial points of view, contradictory results have been derived regarding the effectiveness of corporate diversification. That is, no consensus has been reached as to whether it brings positive value or negative outcomes to a firm. In addition, some studies have shown a non-linear relationship, wherein the impact of diversification on firm value varies depending on the level of diversification carried out.

(1) Positive effects of corporate diversification

Many researchers have proposed numerous hypotheses regarding the positive effects of diversification on firm value (Carter, 1977; Jose, Nichols, & Stevens, 1986; Lewellen, 1971; Schoar, 2002). These perspectives include efficient resource allocation (Stulz, 1990), economies of scale (Teece, 1982), and debt financing and tax shield effects (Lewellen, 1971). A specific case is Stulz (1990), who proposed the notion of an efficient internal capital market, where diversified firms can allocate resources more efficiently than in external capital markets by creating internal equivalents of such marketplaces. Another example is Lewellen (1971), who formulated the coinsurance effect hypothesis to declare that earning streams enable the combination of different businesses for the

reduction of profit volatility and that diversified firms increase their debt financing ability, resulting in greater tax shield effects for these companies. If a firm operates in several business sectors between which there is a low correlation of cash flows, diversification facilitates the formation of internal capital markets (Stein, 1997), which in turn minimizes dependence on external capital markets. As discovered by Schoar (2002) on the basis of a longitudinal research database, diversified companies (or conglomerates) achieve higher productive efficiency than non-diversified (or stand-alone) companies.

Meanwhile, Rumelt (1974) classified and analyzed companies' diversification strategies, and his analysis of the top 500 firms in the US showed a gradual decrease in the number of firms operating a single business, accounting for only 14% of the sample. The remaining 86% are involved in related and unrelated diversification, and these types of companies continue to increase. Villalonga (2004) found a diversification premium from his re-analysis of US companies using the Business Information Tracking Series (BITS) database, which allows for a breakdown of firms' activities by industry. Likewise, some scholars claimed that a re-focusing strategy to company's primary business increases firm value (Bengtsson, 2000; Gillan, Kensinger, & Martin, 2000; John & Ofek ,1995).

(2) Negative effects of corporate diversification

A number of analyses directed at advanced capital markets generally argued that diversification discount effects diminish firm value compared with the effects of non-diversification (or business-focused strategies) because companies generate more costs than profits when they diversify (Berger & Ofek, 1995; Comment & Jarrell, 1995; Denis,

Denis, & Sarin, 1997; Jensen, 1986; Lang & Stulz, 1994; Lewellen, 1971; Wernerfelt & Montgomery, 1988). In an empirical study of the diversification discount, Lang and Stultz (1994) confirmed that diversified firms exhibit lower performance than that shown by undiversified firms, as measured using Tobin's *q*. Berger and Ofek (1995) compared the sum of the values of each business sector with the actual value of the entire company and determined that diversified firms suffer an average loss in value of 13% to 15%. The main factors for this decline are overinvestment and information asymmetry between top management teams and business managers. These occurrences can be explained by a cross-subsidization effect: When resources are transferred between business units to support underperforming businesses, mutual support between business units delays the exit of poorly performing divisions and decreases corporate value. If poorly performing businesses are independently operated, they cannot generate a value less than zero, but in the case of divisions (SBUs) that form part of a diversified company that can provide support, corporate value can decline to negative levels given the aforementioned exit delay. Furthermore, Jensen (1986) suggested that the more diversified firms are, the greater the likelihood that they will overinvest in a negative net present value owing to increased borrowing capacity and free cash flow. All these could lead to a decline in firm value.

(3) Non-linear relationship between corporate diversification and performance

Meanwhile, other scholars suggested a non-linear relationship between diversification and firm performance (Kotabe, Srinivasan, & Aulakh, 2002; Palich, Cardinal, & Miller, 2000; Rumelt, 1974; Tallman & Li, 1996). If diversification progresses to a certain level,

firms can improve their management performance by using their unique resources in various businesses, but beyond an appropriate degree, they lose management capabilities, thereby increasing agency costs and negatively affecting firm performance (Tallman & Li, 1996). This non-linear relationship also emerged in Palich et al.'s (2000) meta-analysis of data derived from 55 studies on diversification strategy (i.e., single business, related diversification, unrelated diversification) conducted over 30 years. The authors reported that the single-business strategy increases performance to some extent but that performance decreases as companies switch strategies from related diversification to unrelated diversification. In other words, the firm that is diversified into unrelated business is unexpected to have resources that can be advantageous for all their business unit. Khanna and Palepu (2000) and Lins and Servaes (2002) analyzed companies in India and emerging markets, respectively, and found that progress in corporate diversification has a significant negative effect on value up to a given threshold; beyond this level, positive effects increase, resulting in a non-linear association between diversification and firm value. In the restaurant industry, Park and Jang (2012) uncovered that corporate diversification favorably influences corporate performance when related diversification and unrelated diversification are appropriately combined.

2.4. Brand Diversification

In addition to growing through the strategy of diversification at the corporate level, there is also brand diversification occur in the business level. This study examines the impact of brand diversification and cost-efficiency on financial performance. Motivation,

advantages and disadvantages of brand diversification, brand extension in the restaurant industry is discussed as follows.

2.4.1. Brand and Brand Extension

Brands are commonly considered as key intangible assets that can tremendously contribute to performance of the firm (Simoes & Dibb, 2001). According to Ansoff's (1957) theory of growth strategy, brand diversification is the strategy closest to the product development strategy of a general company and refers to the pursuit of growth opportunities as a new product (brand) in an existing market. Brand diversification is a growth strategy in which companies expand on the basis of new products that differ from those that they already have by leveraging well-known and positively established brand names in their dealings with consumers. In particular, as a point of entry into a new market, brand extension (or brand diversification) is one of the strategies designed to minimize losses, maintain unique corporate brand value, and differentiate products (Milberg & Sinn, 2007; Seltene & Brunel, 2008). Therefore, brand extension is an efficient and effective use of positive brand assets that are related to consumers' knowledge of a parent brand, and market entry via brand extension reduces the risk of uncertainty associated with new brand production. On these bases, one of the most important and meaningful initiatives among recent corporate growth strategies is brand diversification (Aaker, 1991; Keller, 1993).

In general, there are two types of brand extension: Line extension and category extension. A line extension refers to a product that is introduced into the same category as its parent

brand, and a category extension denotes the expansion of a parent brand to new products that target completely different customer segments (Aaker & Keller, 1990). Brand extension among restaurant firms involves the use of a brand product matrix that showcases products as brands owned by the companies. Tricon owned brands of Pizza Hut, KFC and Taco Bells. Then, in 2002, when TCR extended its brands by acquired Long John Siler's and A&W Restaurants and changed the name to Yum! Brands, Inc. As a representative growth strategy for restaurants, therefore, brand diversification is closer to product development than market development (Choi et al., 2011).

2.4.2. Motivations Behind Brand Diversification

Various management and economic theories can be used to explain the motivations behind brand diversification. First, the resource-based view postulates that brand diversification is necessary for the efficient use of resources in restaurant firms. To put it another way, corporate growth can be promoted by sharing or using a company's surplus resources with the different brands that it possesses (Wernerfelt, 1984). Second, agency theory maintains that restaurant managers actively invest in brand diversification to maximize their own interests as agents rather than the interests of shareholders (Choi et al., 2011). Third, the market power view indicates that brand diversification among restaurant firms is intended to secure market dominance and gain greater bargaining power rather than fostering efficiency (Montgomery, 1994). Finally, according to modern portfolio theory, brand diversification can reduce business risks and uncertainties given the portfolio distribution effect (Lintner, 1965; Markowitz, 1952; Sharpe, 1964).

Firms perform a brand diversification strategy for many reasons. The major benefits of operating with multiple brands include reductions in the total risk to which an entire operation is exposed (Amit & Livnat, 1988), increased demand owing to the satisfaction of the needs of varied and difficult-to-please customers (Lancaster, 1990), gains in market share and profit maximization (Kekre & Srinivasan, 1990), the cultivation of specialized management capabilities through synergies generated under an umbrella brand (Aaker, 2004; Weng & Wang, 2006), and the prevention of new entrants into the market by securing price competitiveness through brand portfolios (Bodley, 2003). As postulated in modern portfolio theory, diversified firms acquire economies of scope by sharing marketing capabilities and developing specialized management know-hows for media buying and market research (Aaker & Joachimsthaler, 2000; Kapferer, 1994). From internalization theory and the resource-based view, benefits such as economies of scope can be attained by securing competitive advantages through the incorporation of business activities (Barney, 1991; Wernerfelt, 1984).

In equal measure, the literature also suggested that operating with multiple brands erodes brand loyalty because it encourages brand-switching behaviors among consumers (Quelch & Kenny, 1994). From a marketing perspective, launching multiple brands engenders inefficiency by fragmenting marketing resources and causes destruction of economies of scale (Hill, Ettenson, & Tyson, 2005). These claims are reinforced by the findings of Kumar (2003), who reported that more than 80% of a firm's profit comes from fewer than 20% of its brands and that companies may lose the opportunity to focus on more profitable brands. Furthermore, price competition may escalate because firms

possibly offer more inexpensively priced brands across different markets (Bawa, Landwehr, & Krishna, 1989).

2.4.3. Brand Extension in the Restaurant Industry

Brand extension in restaurant firms advances the tailoring of brands with respect to quality, price, and target market through brand segmentation. This can be explained by a firm's brand portfolio strategy or brand diversification strategy, which is related to the number of brands that the firm has and the number of market segments where it operates (Morgan & Rego, 2009). "Segment" is a common grouping term used by the restaurant industry, and segmentation generally requires discrimination among segments using reasonable dimensional characteristics. This process increases customer satisfaction and revisit by enabling the provision of differentiated menus, services, and values to different customer groups. The National Restaurant Association (NRA) stated that there are five major segments in the restaurant industry based on the variety of menu and level of service: Quick-service restaurants (QSRs) or fast-food establishments, fast casual, mid-scale, moderate (or casual), and fine dining (or upscale). It also distinguishes between independent and chain restaurants. For example, QSRs offer relatively low prices and provide consistent product quality along with rapid service and standardized systems. Operating under this structure necessitates reducing labor costs through self-service and lowering operating costs through the standardization of operating procedures (SOP) as well as inventory management. Contrastingly, on the other side of the spectrum, upscale restaurants provide high-quality, specialized, and differentiated menus and table service, which impress customers and continuously strengthen a restaurant's image. As can be

seen, restaurants operate their businesses with distinct concepts and different systems, resources, human skills, menus, and core strategies.

2.5. Diversification Studies in the Hospitality Industry

2.5.1. Types of Diversification in the Hospitality Industry

The hospitality literature showed four main types of diversification: Product, segment (or market), geographical, and brand diversification. Table 1 summarizes the diversification studies conducted in the hospitality industry.

Product diversification focuses on increasing the scope of a firm's product portfolio (Yang, Cao, & Yang, 2017), and it can be further classified into related and unrelated diversification on the grounds of whether expansion is aimed at a company's core product market or non-core product market (Chang & Wang, 2007). In an early study, Singh and Gu (1994) used the diversification measure developed by Rumelt (1974) to explore the association between diversification and financial performance in the food service industry. Later, Kang, Lee, and Yang (2011) classified a casino firm's products into gaming, hotel, food and beverage (F&B), and entertainment on the basis of revenue sources and product diversification, which was measured using the Herfindahl index (HI) to determine the proportions of sales generated by each business. Using a sample of Beijing hotels, Yang et al. (2017) measured the degree of product diversification with each product's revenues from accommodation, shopping, F&B, and others as bases. Park and Jang (2012, 2013) modified Rumelt's (1974) classification of related or unrelated diversification and employed an entropy measure to explore the optimal levels of such

diversification strategies.

Segment or market diversification is generally defined as operation in different quality segments to serve various customer types (Lin & Kim, 2020). In the hospitality industry, a variety of segmenting strategies are used to classify segment diversification, especially in the hotel context, for which classification is based on the portfolio strategy. For example, hotel firms operate in or diversify their segments into six categories (i.e., luxury, upper upscale, upscale, upper mid-scale, mid-scale, or economy) in accordance with the classification defined by Smith Travel Research (STR). Each category differs in terms of amenities offered and features like F&B facilities, catering, ballroom, meeting venues, spa facilities, swimming pool, and business centers, etc. Lee et al. (2011) classified companies into diversified, concentrated, and balanced companies using the HI, which provides information on the extent to which each hotel firm's segment is diversified. Lee and Jang (2007) categorized hotel firms into diversified (or multiple market oriented) or undiversified (or single market oriented) companies depending on the proportion of revenues earned from main businesses versus total revenues. Chen and Chang (2012) classified Taiwanese hotels into the F&B service and room service sub-groups on the basis of the highest proportion of generated revenue.

Geographical diversification means that firms operate their businesses simultaneously in several geographic markets (Barney & Hesterly, 2008), including the international arena, where they focus especially on increasing the magnitude of their foreign operations (Tihanyi, Griffith, & Russell, 2005). Enabling firms to pursue prospective opportunities

for growth (Lu & Beamish, 2004), geographical diversification is considered a strategy for sustaining a competitive edge (Hitt, Tihanyi, Miller, & Connelly, 2006). The more multinational a firm is, the greater its chances to leverage strategic resources while simultaneously increasing market risks, thus elevating its performance. Leverage and economies of scope and scale in resource use across national markets should enable multinational firms to expand their returns on resource investments while decreasing variances in their cash flows (Kim et al., 1993).

Finally, for restaurant firms, brand diversification through product development is a more relevant primary growth strategy than diversification via market development because it presents the opportunity to expand within their existing markets (Kang & Lee, 2015). In this context, brand diversification refers to managing many kinds of brands and restaurant concepts rather than operating a single business brand or single concept (Kang & Lee, 2014). Recent brand diversification research underlain by a management perspective concentrated on the effects of expanding the number of brands, with scholars arguing for the advantages of this strategy. For instance, brand diversification impedes entry and reduces competition by eliminating market rivals (Wang & Chung, 2015), as in the case of Pizza Hut, KFC and Taco Bell. Each brand belongs to the same restaurant firm, Yum! Brands, rather than competing as rivals. This strategy also helps firms attract a greater number of consumers by satisfying their heterogeneous needs and desires (Moreno-Perdigon, Guzman-Perez, & Ravelo Mesa, 2021). By operating with a diversified brand portfolio, companies gain economies of scale and scope given access to shared marketing resources and the development of specialized management capabilities via the

internalization of business activities (Aaker & Joachimsthaler, 2000). These endeavors ultimately improve the efficiency with which resources are allocated (Li & Greenwood, 2004). Finally, brand diversification reduces hotel failure rates, which can be explained by the increase in scope of a firm's product portfolio (Lin & Kim, 2020).

2.5.2. Brand Diversification Effects on Firm Performance

As shown in Table 1, the study of brand diversification and firm performance in the hospitality industry has generated inconclusive results. Research findings on brand diversification and firm performance in the lodging industry differ from those in the restaurant industry. There are studies in which brand diversification has a positive or negative effect on firm performance and studies wherein the relationship between the two is non-linear (Choi et al., 2011; Kang & Lee, 2015; Kim & Lin, 2021; Koh, 2019). These differences are attributed to variances in the industry structures (e.g., lodging, restaurant), firm characteristics, and methodologies (e.g., analysis periods, analysis methods, performance variables, and control variables) considered in these studies.

(1) Brand diversification effects on firm performance in the lodging industry

As shown in Table 1, Kang and Lee (2014) analyzed the effects of brand diversification on the performance of lodging firms listed on the US stock exchange from 1993 to 2010. The authors used Tobin's *q*, which treats a firm's market value and ROA (or a firm's accounting performance) as dependent variables, to confirm how company performance is affected by brand diversification. They found that brand diversification does not significantly affect such performance. Also, their study indicated that brand

diversification is a moderator with a positive and significant effect on the relationship between geographic diversification and lodging firms' performance. This means that firm performance is maximized when a business strategy combines geographic and brand diversification. Kim and Lin (2021) delved into brand diversification and the performance of hotel owners using hotel data that spanned the period 2000 to 2018. They used RevPAR as the performance variable and discovered that brand diversification positively influences performance up to a certain level, after which the effect becomes negative. In other words, there is a concave non-linear (an inverted U-shaped) link between brand diversification and hotel owner performance. Additionally, a positive moderating effect was found on the relationship between the structure of hotel ownership, which is measured as the percentage of chain-affiliated hotel units out of an overall hotel enterprise, and location, which is measured in relation to neighboring hotels.

Koh (2019) asserted that brand diversification is necessary for a lodging firm to enter various segments (i.e., luxury, upper upscale, upscale, upper mid-scale, mid-scale, and economy). She analyzed 28 hotel firms over the period 1996 to 2015 and regarded assets, the debt ratio, and geographic diversification as control variables in a regression model. The author found that lodging firms penetrate various segments to attract more customers and diversify their brands, ultimately for the purpose of increasing company value. That is, the author confirmed the moderating effect of brand diversification, thus explaining why brand diversification considerably increases lodging firm performance when simultaneously diversified its segments.

(2) Brand diversification effects on firm performance in the restaurant industry

As shown in Table 1, in Choi et al.'s (2011) inquiry into the association between brand diversification and firm performance, they uncovered that the former negatively affects the latter in the restaurant industry. Their analysis was based on 2003 to 2007 data on restaurant firms listed on the US stock exchange, and they measured the degree of brand diversification using the HI, which reflects the number of brands owned by restaurant firms. They also used Tobin's *q* as a performance variable and assets, debt ratios, and advertising costs as control variables. The value of this study lies in its presentation of the strategic direction in which brand diversification is implemented in the hospitality industry by raising the issue that such diversification is a disadvantageous component of the business strategies of restaurant firms. Kang and Lee's (2015) study echoes Choi et al.'s (2011) finding regarding the negative effect of brand diversification on firm value on the basis of a sample of 132 restaurant firms and a horizon spanning 1993 to 2010. They also pointed out the disadvantages of using ordinary least squares by pooling multi-period data from Choi et al.'s (2011) work and examining a panel model with fixed effects. They introduced only Tobin's *q* as a performance variable and incorporated geographic diversification, degree of franchising, and growth rate as control variables into their models. The results additionally demonstrated that diversification by increasing the number of brands, unlike single-brand operation, exerts an unfavorable effect on firm value. These insights verify that restaurant firms can maximize economies of scale when they focus on a single brand and that the resource sharing or transfer effect (or synergy) from brand diversification does not sufficiently offset the economies of scope arising from a single-brand strategy, as posited in the resource-based view. Finally, the authors

found an insignificant effect of geographical diversification on firm performance and a negative moderating effect of brand diversification on the relationship between geographical diversification and firm performance.

Table 1. Summary of Diversification Studies in the Hospitality Industry

No	*Authors*	*Sample*	*Period*	*Type of Diversification*	*Diversification Measure*	*Performance Measure*	*Relationship*
Context: Hotel & Casino							
1	Lee and Jang (2007)	36 US hotel firms	1997-2001	Market diversification	Diversification dummy	Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM)	Diversification partly improves the stability of performance
2	Jang and Tang (2009)	51 US hotel firms	1990-2004	Geographical (international) diversification	Ratio of international to total revenue	ROA	Inverted U-shaped relationship
3	Tang and Jang (2010)	482 US hotel firms	1990-2006	Geographical (international) diversification	Ratio of non-U.S. revenue to total revenue	Excess market value, Excess Q	U-shaped relationship
4	Lee, Xiao, and Kang (2011)	7 US hotel firms	1994-2009	Market (segment) diversification	Herfindahl index (HI)	Sharpe ratio, Stock return	Inverted U-shaped relationship
5	Chen and Chang (2012)	72 Taiwanese hotel firms	1996-2008	Market (segment) diversification	Herfindahl-Hirschman index (HHI)	Profit growth, Instability	Growth: positive relationship Instability: negative relationship
6	Kang and Lee (2014)	US hotel firms	1993-2010	Geographical and Brand diversification	Berry-Herfindahl index (BHI)	Tobin's *q*	Positive relationship
7	Yang et al. (2017)	377 Beijing hotels	1994-2005	Product diversification	HHI	Efficiency (stochastic frontier analysis, SFA model)	Positive relationship
8	Song and Kang (2019)	US hotel firms	1993-2017	Geographical diversification	BHI	Tobin's *q*	Positive relationship
9	Koh (2019)	US hotel firms	1996-2015	Brand and Segment diversification	BHI	Tobin's *q*	Positive relationship
10	Lin and Kim (2020)	Texas hotels	2000-2018	Geographical, Brand, and Segment diversification	Dummy for each diversification strategy	Failure rate	Insignificant relationship
11	Kim and Lin (2021)	Texas hotels	2000-2018	Brand diversification	BHI	RevPAR (daily revenue divided by the occupancy)	Inverted U-shaped
12	Kang et al. (2011)	15 US casino firms	2001-2008	Product diversification	Modified HI	Tobin's *q*, ROA	Inverted U-shaped relationship

13	Kang et al. (2012)	14 US casino firms	2000-2008	Geographical diversification	HI	Tobin's *q*, Risks	Negative relationship
Context: Restaurant							
14	Singh and Gu (1994)	73 US firms	1988-1991	Strategic diversification measure	Strategic diversification measure	ROA, ROE, NPM	Insignificant relationship
15	Choi et al. (2011)	46 US firms	2003-2007	Brand diversification	HI	Tobin's *q*	Negative relationship
16	Park and Jang (2012)	308 US firms	1980-2008	Product diversification (Related and unrelated diversification)	Entropy measure	Profitability (ROA, ROS), Risks	Non-linear relationship
17	Park and Jang (2013)	288 US firms	1980-2008	Within-industry diversification and related diversification	Entropy measure	ROA, Net sales	Positive effect of related diversification on ROA
18	Kang and Lee (2015)	132 US firms	1993-2010	Geographical diversification (GD) and Brand diversification (BD)	BHI	Tobin's *q*	GD: insignificant BD: negative moderating effect of BD
19	Song et al. (2017)	US firms	2000-2013	Geographical diversification	BHI	Market-based risks	Non-linear relationship
20	Park et al. (2017)	39 US firms	2000-2013	Geographical diversification	BHI	Systematic risk	Positive moderating effect of GD
21	Song et al. (2019)	US firms	2000-2015	Geographical diversification	BHI	Market-based risk, Operational risk	Insignificant relationship

2.6. Cost-efficiency

2.6.1. Definition of Efficiency

As a common aspect of a firm's production process, efficiency is an important evaluation indicator of firm performance (Baik et al., 2013). Generally, it refers to the ratio of output to input resources. Relatively high efficiency means that substantial output is produced or few input resources are used to obtain the same output even after using the same resource (Charne et al., 1978). As a concept similar to efficiency, effectiveness refers to the ratio of actual to desired outputs (Yu & Lee, 2009), but it does not consider the amount of input resources. Productivity is a measure of the input-to-output ratio, but it does not represent a relative comparison with the most productive value; rather, it absolutely represents the input-to-output ratio itself.

To clarify the meaning of efficiency that is relevant to data envelopment analysis (DEA), it is necessary to separately examine absolute efficiency and relative efficiency. Absolute efficiency pertains to the output-to-input ratio of a production unit. It is expressed as a specific ratio, such as sales per employee, which thereby eliminates restrictions on the range of efficiency measurements that can be used. For instance, absolute efficiency of McDonald's is its total sales over total number of employees. Conversely, relative efficiency is a measure of the efficiency of other organizations (e.g., competitors) against the efficiency value of the organization with the most efficient production unit organization. For instance, relative efficiency is a ratio of all publicly traded restaurants as compared to Darden's efficiency value. The highest level of efficiency is expressed as a relative ratio when standardized at 100% or 1. In most economic activities, relative competitiveness of an organization is the main object of interest, so the concept of relative efficiency is typically used

frequently. The DEA conducted in this study included a measurement of relative efficiency.

Farrell (1957) empirically measured efficiency under the influence of the studies performed by Koopmans (1951) and Debreu (1951), who illustrated the rule of efficient resource allocation. His approach was extended by Aigner and Chu (1968) in the late 1960s as a parametric method for measuring efficiency and by Chanes et al. (1978) in the late 1970s as a non-parametric approach to such a measurement. In particular, Aligner and Chu (1968) proposed a technique for ascertaining industrial efficiency on the basis of Farrell's research results within the framework of production analysis in the field of econometrics. The DEA developed with reference to such results was put forward as a management science technique and is extensively employed as a useful mathematical tool not only for determining efficiency itself but also for identifying the cause of inefficiency and resolving it. As DEA for efficiency measurement was further developed, various types of advanced models were formulated, including slack-based models, the Malmquist model, meta-frontier DEA, and network DEA.

2.6.2. Data Envelopment Analysis (DEA)

Efficiency can be measured in many ways, but the simplest method is to select crucial input and output factors in consideration of the structure and characteristics of a production activity, after which the ratio between the factors is presented. For example, the efficiency of a restaurant is calculated using the ratio of the cost of goods sold (COGS) to sales or via productivity per employee, which is represented by sales compared with the number of employees. The absolute value of these ratios

reflects a comparison of one input with one output, and these values can be used to compare the efficiency of restaurants. However, when multiple inputs and outputs exist in combination, relative efficiency cannot be calculated in this manner; this is where DEA comes into play (Reynolds, 2003).

DEA is a linear programming model suggested by Charnes et al. (1978). The DEA efficiency measure is relative to the best individual DMUs (e.g., a restaurant firm) in a peer group (e.g., a group made up of all publicly traded restaurant firms) rather than relative to any absolute predetermined standard of technical efficiency (Thanassoulis, 2001). Mathematically, DEA can be derived from the ratio of the weighted sum of outputs to the weighted sum of inputs. In a DEA model, efficient units can be separated from inefficient units in accordance with whether subject units lie on the efficient frontier.

Traditional models of DEA, such as the Charnes–Cooper–Rhodes (CCR) and Banker–Charnes–Cooper (BCC) models, were introduced. Initially suggested by Charnes et al. (1978), the CCR model assumes that production technology exhibits constant returns to scale (CRS, when change in output is proportional to change in input). This assumption was relaxed by Banker, Charnes, and Cooper (1984), who called their version the BCC model, which concerns a production frontier different from that of the CCR model. That is, the BCC model is run under the assumption of variable returns to scale (VRS, when change in output is not proportional to change in input) and incorporates a convexity condition into analysis. Figures 1 and 2 show the differences between the CCR and BCC models.

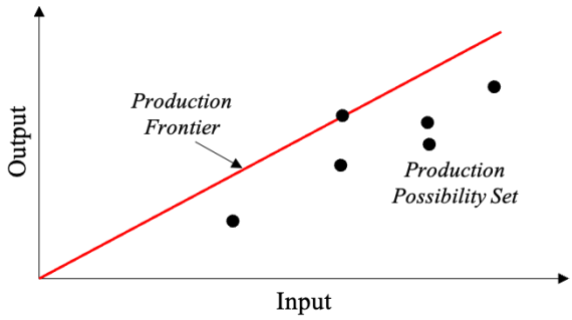


Figure 1. Production Frontier of the CCR Model

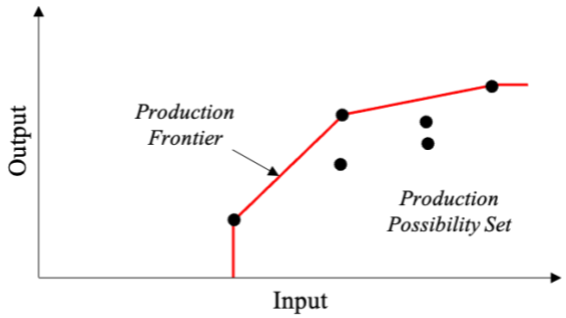


Figure 2. Production Frontier of the BCC Model

In DEA, by comparing optimal DMUs with their non-optimal or inefficient counterparts, optimal DMUs are derived from a group of DMUs, and relative efficiency is measured. The explanation of detailed calculation process was adopted from Roh & Choi (2010)'s study. Let us denote a DMU by subscript $j = \{1, 2, \ldots, n\}$, inputs by $i = \{1, 2, \ldots, m\}$, and outputs by $r = \{1, 2, \ldots, s\}$. For a given DMU j, let x_{ij} be the amount of input i used and y_{rj} the amount of output r produced. Only the case of $x_{ij} \geq 0, y_{rj} \geq 0$ is considered.

Mathematically, in the input-oriented CCR model, the efficiency value of a particular DMU o is calculated as follows. Let θ_o^* be the efficiency score for DMU o. Then,

$$\theta_o^* = \min \theta_o \text{ subject to}$$

$$\sum_{j=1}^{n} \lambda_j x_{ij} \leq \theta_o x_{io} \qquad i = 1, 2, \ldots, m$$

$$\sum_{j=1}^{n} \lambda_j y_{rj} \geq y_{ro} \qquad r = 1, 2, \ldots, s$$

$$\lambda_j \geq 0 \qquad j = 1, 2, \ldots, n,$$

Where:

m = number of inputs

s = number of outputs

n = number of DMUs

x_{ij} = amount of input i used by DMU j

x_{io} = amount of input i used by DMU o

y_{rj} = amount of output r produced by DMU j

y_{ro} = amount of output r produced by DMU o

Optimal score θ^* in the equation above indicates the efficiency of a particular DMU. For instance, if $\theta^* = 1$, a DMU is considered efficient, but if $\theta^* < 1$, the DMU is evaluated as inefficient. In Figures 1 and 2, the DMUs above the efficient production frontier are considered efficient, whereas those below the frontier are inefficient. The CCR model is justified when all units operate at an optimal scale. Banker et al. (1984) recommended an extension of the CCR-DEA model to account for VRS. Thus, the BCC model was developed by excluding the assumption of constant returns-to-scale stipulated in the CCR model. The BCC model, which is a VRS model has been the most widely used DEA model since the 1990s (Roh & Choi, 2010). As previously stated, it covers a necessary condition of convexity, and only a convex combination of

DMUs is allowed in constructing a hypothetical DMU. Simply put, the model includes the additional convexity constraint of $\sum_{j=1}^{n} \lambda_j = 1$, which is satisfied by unknown non-negative weight λ_j.

In general regression analysis, which is frequently carried out to evaluate productivity, specific statistical assumptions about the distribution of residuals are introduced to estimate the production function. In DEA, however, there is no need to put forward such suppositions, and efficiency is calculated by estimating the production relationship only with given data. Therefore, there is a relatively low possibility for a researcher's arbitrary judgment to be involved in this analysis. In this sense, DEA is characterized by non-parametric estimation. Meanwhile, a popular economic analysis assumes a production type, such as the Cobb–Douglas production function, for the relationship between inputs and outputs and estimates the parameters of this production function on the basis of observed data. In other words, this type of DEA does not assume the form of the production function but non-parametrically estimates the input-output production relationship with only given data. In summary, DEA can measure efficiency by simultaneously considering multiple inputs and outputs, eliminate the need for assumptions on the statistical distribution of residuals, and forgo prior assumptions about the forms that production functions take (Ozbek, Garza, & Triantis, 2009; Ramanathan, 2003; Rouse, Putterill, & Ryan, 1997).

Despite the strengths of DEA, however, it is also encumbered with several limitations. First, a certain number of DMUs are required for analysis; that is, depending on the number of input and output variables, several comparable DMUs that exceed the number of the aforementioned variables are necessary. Second, statistical hypothesis

testing is difficult because of the fundamentally non-parametric nature of the method. Third, when DMUs are compared with relatively extreme input and output values, the reliability of the efficiency value is poor. Finally, some DEA models cannot be used under differing measurements of input and output variables (Ramanathan, 2003; Rouse et al., 1997). Notwithstanding these drawbacks, DEA has become a major methodology over the past 40 years for management and economic analyses directed toward efficiency.

DEA entails probing into relative efficiency by comparing the productivity of each DMU with that of similar business environments, that is, without estimating the parameters of the production function between inputs and outputs in conditions wherein there are multiple input factors for the production of goods or services. As a result of DEA, efficient DMUs are positioned on the efficient production frontier, which yields a production possibility set (refer to Figures 1 and 2). Inefficient DMUs do not exist on the efficient production frontier, and DEA can identify the degree of inefficiency on the basis of the slacks of input and output variables. Furthermore, benchmarking on the efficient production frontier enables the identification of the extent of inefficiency in inefficient DMUs and productivity improvement through such data and information.

DEA takes the form of different models depending on the assumptions required for analysis: Whether the production relationship between input and output variables reflects CRS or VRS, whether the efficiency measurement is input based or output based, and whether the direction of efficiency improvement is radial or non-radial. Several DEA models are applicable to apply corresponding with the nature of a

research problem and the characteristics of a given set of data. In extreme cases, there may be as many DEA models as the number of applications. Recent research has used DEA models, such as network DEA, meta-frontier DEA, and SBM, which are applicable in various situations.

2.7. Operation Efficiency in the Hospitality Industry

The hospitality industry is essentially a service sector, where measuring productivity is difficult. DEA was applied to the hospitality industry a little later than manufacturing and other service sectors (Nurmatov, Lopez, & Millan, 2021). Its use for hotels and restaurants proceeded as follows. DEA for the hospitality industry began in the mid-1980s, with the first research foray focusing on restaurants (Banker & Morey, 1986). Since the mid-1990s, numerous studies have been conducted on hotels (Morey & Dittman, 1995; Parkan, 1996), but to date, there are overwhelmingly more DEA studies on these establishments than restaurants.

2.7.1. Data Envelopment Analyses in the Lodging Industry

With the development of DEA, studies applying various models to evaluate efficiency in the hotel industry have emerged. For example, Barros and Mascarenhas (2005) analyzed the technological and allocation efficiency of hotels; Anderson, Fok, and Scott (2000) evaluated the managerial efficiency of 48 hotels using CCR and BCC models; and Wöber (2002) presented benchmarking targets by examining the relative efficiency of the hotel industry using DEA. Hwang and Chang (2003) measured changes in the efficiency of Taiwanese hotels using the Malmquist DEA model, Sigala (2004) measured the productivity of three-star hotels in the UK using the stepwise DEA model, and Barros and Dieke (2008) estimated the efficiency of hotels

using the bootstrap method. Yang and Lu (2006) also used DEA to explore the managerial performance and benchmarks of 56 Taiwanese hotels and determined the hotel inefficiency caused by the insufficient use of input resources, such as the number of employees and the number of guest rooms.

Furthermore, there is likewise a stream of research aimed at casting light on the relationship of efficiency measured by DEA with various management techniques. For instance, Wang et al. (2006a, 2006b) examined the link between service quality and hotel efficiency using the CCR model; Memari, Momeni, and Ghasemi (2014) determined criteria for balanced scorecard (BSC) evaluation and applied them to the CCR model. Given the variety in input and output factors in hotel service production, there is a limit to empirically analyzing operational efficiency through conventional DEA models. In particular, Morey and Dittman's (1995) evaluation of hotel efficiency failed to identify the source of inefficiency in their chosen context or systematically analyze economies of scale. A similar deficiency occurred in the explorations of Tsaur (2001) and Hwang and Chang (2003), who could not systematically present the efficiency of business units in an organization. Other scholars were able to present appropriate DEA models for assessing the performance of business units in a hotel organization, but they failed to integrate the intrinsic relationships of performance variables (Sigala, 2004; Sun & Lu, 2005). In consideration of the service characteristics of hotels, efficiency measurements have since then been developed, with reference to the link between the process of generating hotel services and the process of earning profits through the created services (Chen & Zhu, 2004; Hsieh & Lin, 2010; Huang, Ho, & Chiu, 2014; Keh, Chu, & Xu, 2006; Yu & Lee, 2009).

2.7.2. Data Envelopment Analyses in the Restaurant Industry

Banker and Morey's (1986) work is considered an initial DEA of restaurant efficiency. The authors measured the technological and scale efficiency of fast-food restaurants using the CCR and BCC models. This endeavor stimulated succeeding research based on the two models on the restaurant industry, but researchers adopted different input and output factors as shown in Table 2 (Donthu & Yoo, 1998; Reynolds 2003; Reynolds & Biel, 2007; Reynolds & Thompson, 2002; Roh & Choi, 2010). To measure the productivity of 24 fast food restaurants, Donthu and Yoo (1998) employed four input factors, namely, business area, manager's work experience, advertising cost, and location, and two output factors, namely, sales and customer satisfaction. Reynolds and Thompson (2002) measured the efficiency of 60 restaurant chains in the US using the input-oriented CCR model. They employed business hours, number of workers, labor costs, number of seats, and store location as input factors and sales and service fees as output variables. Roh and Choi (2010) compared and evaluated the efficiency of three similar types of restaurant brands using the CCR and BCC models. Assaf, Deery, and Jago (2011) determined the efficiency of Australian restaurants using DEA and bootstrap methods. They found that restaurant size and management experience affect efficiency and that restaurants normally operate at a low level of efficiency (46.17% on average). The authors suggested that restaurants should increase output to achieve efficiency.

To date, few studies have been devoted to the efficiency of restaurant firms using publicly disclosed accounting data. When dealing with the cost-efficiency and strategic management of restaurant firms, a more appropriate approach is to ascertain the efficiency of a restaurant company's input and output resources from the

perspectives of corporate and business strategies. Relatively few studies have also been carried out on the relationship between firm efficiency and financial accounting variables using DEA (Alberca & Parte, 2018; Sanjeev, 2007). Sanjeev (2007) inquired into the relationship between operational efficiency and firm size using a sample of 68 hotel restaurant firms for the period 2004 to 2005. The authors pinpointed the top performers and found that either large or small restaurants achieve high efficiency scores. Giokas et al. (2015) examined the liquidity and sales efficiency of F&B firms listed on the Athens Exchange from 2006 to 2012 using DEA. They discovered that a firm's liquidity efficiency is higher than its sales efficiency, even if no statistically significant differences exist in their efficiency rankings estimated via Malmquist DEA, which evaluate the efficiency change over time. Alberca and Parte (2018) evaluated the efficiency of Spanish restaurant firms from 2011 to 2014 using DEA and reported that firm size affected restaurant's operational efficiency. Since 2013, advanced DEA techniques have been employed, especially in research using meta-frontier DEA (Fang & Hsu, 2014; Fang & Peng, 2013; Park, Choi, & Kang, 2020; Wang, Chiu, Hsieh, Li, Chen, & Jan, 2020).

Table 2. Summary of DEA Studies in the Restaurant Industry

No.	*Authors*	*Sample*	*Type of DEA*	*Inputs*	*Outputs*
1	Alberca & Parte (2018)	863 observations of Spanish restaurant businesses (2011-2014)	Metafrontier DEA (MDEA)	· total assets · staff costs · cost of sales	Total sales
2	Giokas et al. (2015)	21 food & beverage firms in Greece (2006-2012)	*Liquidity Model* output-oriented BCC *Sales Model* output-oriented CCR	Liquidity Model: X Sales Model · total assets · operating cost	Liquidity Model · acid test · inventories turnover · receivables turnover · fixed assets turnover · short-term liabilities turnover Sales Model · total sales
3	Fang et al. (2013)	Teppanyaki restaurant in Taiwan (6 months)	MDEA	· food costs · price · the number of food suppliers · cooking steps · cooking time per entrée · labor costs · number of full-time equivalent employees	· Popularity · Total weighted net profit
4	Assaf et al. (2011)	105 restaurant firms in Australia (2007)	DEA bootstrap method	· food expenses · beverage expenses · number of seats · total physical size of the store · the size of the Hall · the size of Kitchen	· Total food sales · Total beverage sales
5	Roh & Choi (2010)	3 US restaurant brands	CCR & BCC model	· the number of seats · the number of tables · total number of full-time employees · the number of employees in the hall · the number of kitchen employees · the monthly labor cost of employees	· Sales · Net income
6	Joo et al. (2009)	8 coffee stores (2 years)	CCR & BCC model	*Model 1* · cost of sales	*Model 1* · total sales

				· wages and benefits · other expenses · occupancy expenses *Model 2* · cost of sales · wages · other expenses · cost of goods sold · labor cost	*Model 2* · sales of restaurant · sales of retail
7	Reynolds & Biel (2007)	35 restaurant chains in US (31days)	CCR & BCC model	· employee · satisfaction · rent · taxes and insurance · square footage · number of seats	· Revenue · Controllable income (profit) · Guest satisfaction · Retention equity
8	Reynolds & Thompson (2007)	60 same brand units in US (2001)	CCR & BCC model	· server wage · seats · square Feet · in State · ST1, ST2, ST3 · years · parking · stand alone	· Sales · Tips
9	Sanjeev (2007)	68 restaurant firms in India (2004-2005)	DEA CCR model	· capital employed · gross fixed assets · current assets · operating costs	· Operating income · Profit before depreciation, interest and tax (PBDIT)
10	Giménez-García et al. (2007)	54 fast food chain restaurants in Spain (Oct 2001-May 2002)	A three-step DEA	· number of seats · number of server counters · location index · average ticket per customer · number of competitors	· Sales · Quality index
11	Lan et al. (2006)	27 fast food chain restaurants in Taiwan (2003)	CCR & BCC model	· salary of service teams · salary of management teams · social charge · public utility	· Profit after control · Cash flow · Total number of customers
12	Reynolds	38 same-brand in	CCR-DEA	· front-of-house hours worked during lunch	· Lunch sales

(2004)	US (2001)	· front-of-house hours worked during dinner · average wages · number of competitors within a two-mile radius · seating capacity	· Dinner sales · Charged tips for lunch as a percentage of charged lunch sales · Charged tips for dinner as a percentage of charged dinner sales

2.7.3. Introduction of the Slack-based Measure (SBM) to Data Envelopment Analysis

Various DEA models have been used to measure the efficiency of restaurants, but the majority of studies use the CCR and BCC models, which measure efficiency in the form of reduced or increased identical percentages of inputs or outputs. In the present research, however, SBM was introduced to measure the inefficiency of each input factor.

To understand the SBM applied in this work, a necessary task is to explain basic DEA methods. DEA models have various characteristics depending on the assumption of input- or output-oriented CCR on the existence of CRS or the assumption of BCC with respect to the presence of VRS. The characteristics of the input-oriented CCR model, which is the most basic representation, are as follows (Cooper, Seiford, & Tone, 2007). First, it assumes a feasible production set that satisfies free disposal and convexity and measures the distance between inefficient points and efficient production frontiers. Second, it imposes an efficiency rule that reduces all inputs at the same rate while maintaining the amount of outputs. Other efficiency models can be obtained by setting different rules for measuring the distance between an observation point in space and the efficient production frontier or by varying assumptions according to the shape of a feasible production set. For example, by varying the distance measurement rules of efficiency measurement, additive and slack-based models can be created (Tone & Tsutsui, 2010). In addition, if a feasible production set is constructed only with free disposal without the assumptions of convexity and CRS, the process transforms into a free disposal hull model (FDHM). In DEA, many other models are used depending on the combination of assumptions. New models have steadily been introduced to the

consideration of the characteristics of a research problem. In this study, SBM was adopted as a measure of both efficiency in operation and efficiency in the individual inputs used for inputs. The efficiency value of an SBM falls between 0 and 1, and the closer it is to 1, the more efficient an object of interest is. The most important feature of SBM is that for all observations, even if the measurement unit of a specific input or output element changes, the efficiency scale remains constant - an attribute missing from an additive model that deals with the input excesses and output shortfalls directly and can discriminate efficient and inefficient DMUs (Tone, 2001).

2.8. Economies of Scale and Scope of Diversification

The concept of economies of scope can be applied to firms that sell various products (Baumol, Panzar, & Willing, 1988; Panzar & Willing, 1981) and enter various industries. The issues of diversification and economies of scope have been extensively explored throughout a variety of fields, including the financial industry (Berger, Hanweck, & Humphrey, 1987; Dietsch, 1993; Ferrier, Grosskopf, Hyes, & Yaisawarng, 1993; Lang & Welzel, 1998), the biotechnology domain (Arora & Gambardella, 1990), environmental management (Callan & Thomas, 2001), and agriculture (De Roest, Ferrari, & Knkckel, 2018).

Many researchers are interested in whether the effects of economies of scope via diversification exceed those of economies of scale related to specialization (or concentration). Economies of diversification provide useful insights necessary for the synergy and production of multiple industries and firms that manufacture diverse

products (Chavas & Kim, 2010). A representative work is that of Chavas and Kim (2010), who determined the economic effects of diversification by categorizing them into (1) complementary effects, (2) scale effects, (3) convexity effects (in outputs) of the cost function, and (4) fixed cost effects. Here, convexity effects mean increasing marginal costs that contribute to economies of diversification under partial specialization. Simply put, economies of scale can be achieved through growing via either single concept or diversifying into multiple concepts, however economies of scope can be achieved primarily through diversification (Hamel, 1991; Kogut, 1985).

Pennings, Barkema, and Douma (1994) stated that benefits can be derived from economies of scale and scope through the use of shared production resources, distribution channels, and brand names. In an exploration centering on the insurance industry, Cummins, Weiss, Xie, and Zi (2010) found that conglomeration (i.e., unrelated diversification), which has penetrated both the life-health insurance and property-liability insurance sectors, realizes economies of scope in terms of costs, but these are offset by diseconomies of scope on revenue. To rephrase this, the effects of economies of scope in terms of cost are lower than diseconomies of scope on revenue. In this industry, companies that strategically focus on one sector have an advantage over conglomerates. Under a single-sector structure, either specialization or diversification is more economically effective depending on industry, product type, and analysis period.

Studies examining the synergy of resources through diversification can also be linked to the economic effects of brand diversification. In an extensive brand portfolio,

inefficiency may arise in marketing and manufacturing owing to the fragmentation of marketing resources and the destruction of economies of scale (Hill et al., 2005). Schwandt (2009) reasoned that operating under a multi-brand orientation requires an increase in organizations involved in operation, resulting in organizational complexity and increased internal transaction costs. Furthermore, expanding into multiple product categories or various segmental markets in terms of marketing inhibits the effects of economies of scope (Palich et al., 2000) and induces considerable cannibalization (Moorthy & Png, 1992). The costs arising from brand diversification have not been extensively investigated despite the reality that managing a firm with numerous brands generates numerous adverse effects on cost-efficiency.

In the literature, the concept of cost-efficiency is used interchangeably with operational efficiency. Cost-efficiency indicates how productively an input factor is used for a determined output. The profits that a firm earns from its production activities correspond to the remainder of the total income that it receives from product sales, excluding total expenses on production. Therefore, it is important for firms seeking profit maximization to control production costs. In maximizing profits, the first crucial step is to minimize the cost of producing a given output. The current study dealt primarily with DEA-based operational efficiency, which is related to the efficient use of input factors in generating outputs. Another essential requirement is to examine how achieving such cost-efficiency (or operational efficiency) affects firm value. Generally, scholarship on the relationship between operational efficiency and firm value measured by stock market performance has received relatively considerable attention in the business field (Alam & Sickles,

1998; Baik et al., 2013; Demerjian et al., 2012; Green & Segal, 2004; Zhu, 2000). For instance, Baik et al. (2013) found that efficiency changes are positively related to current and future returns, while Greene and Segal (2004) indicated that cost inefficiency affects revenue and growth through the negative effects of wasted resources on revenues and cash flows. Alarm and Sickles (1998) performed DEA to calculate the operational efficiency of 11 US airline panels observed quarterly from 1970 to 1990 and examine its relationship with stock market performance. The authors revealed that quarterly efficiency affects stock market performance in the succeeding two months of operation.

The restaurant industry has not actively addressed the relationship between cost-efficiency and firm performance (Alberca & Parte, 2018; Mhlanga, 2018; Mun & Jang, 2018; Park, Choi, & Kang, 2020). In relatively recent years, research on the link between restaurant efficiency and performance has centered on the measurement of cost-efficiency using DEA. A recent study by Mun and Jang (2018) which included restaurant operating expenses, found that the input costs incurred in the restaurant industry, including food costs, salaries, and selling, general, and administrative (SG&A) expenses, negatively affected firm profitability. In South Africa, Mhlanga (2018) argued that cost-efficiency is crucial to the survival of restaurants and that it facilitates the enhancement of market performance. Their results also showed that the factors influencing success for restaurants are type of business, location, and revenue per available seat instead of size. Contrary to these findings, those of Alberca and Parte (2018) indicated that cost-efficiency differs depending on the size of a restaurant, with the authors verifying that such efficiency can be better achieved in large restaurants than small and medium establishments. The study

further revealed the financial factors that affect efficiency, such as credit rating, bankruptcy probability, and leverage. Park, Choi, and Kang (2020) investigated various determinants of efficiency among coffee shop franchisors in Korea by categorizing these outlets into large, medium, and small coffee shop chains based on the number of franchisees and the size of properties. The findings confirmed significant efficiency differences between small and medium coffee shop chains and the influence of different external environmental factors on the efficiency of each group of establishments.

2.9. Hypothesis Development

2.9.1. Impact of Brand Diversification on Firm Performance

Brand diversification is largely related to the resource-based theory of strategic management and the portfolio theory of finance. According to the resource-based view, corporate diversification has a positive effect on the increase in firm value through resource sharing among several business units (or sectors) (Chatterjee & Wernerfelt, 1991; Dierickx & Cool, 1989; Grant, 1991; Hamel & Prahalad, 1993; Porter, 1985; Wernerfelt, 1984). Brand diversification is also considered a means of expanding business scope via resource sharing within an industry rather than across industries. According to the finance perspective, corporate diversification is aimed at maximizing the distribution effect of a business portfolio through the operation of several brands through brand diversification (Lewellen, 1971).

Whereas corporate diversification is an issue at the level of corporate strategy, brand diversification is a component of business strategy. In other words, diversifying brands is a means of expanding into related businesses rather than entering new domains. Even if

brand diversification falls within business strategizing, it is reasonable to develop logic on a theoretical foundation, such as corporate diversification related to corporate-level strategies (Choi et al., 2011). Past research has yet to conclude whether the impact of corporate diversification strategies on firm value is positive or negative from strategic management and finance perspectives. Corporate diversification and brand diversification remain important research topics in strategic management and finance. There are competing claims that diversification reduces corporate value (i.e., diversification discount) (Berger & Ofek, 1995; Lang & Stulz, 1994; Lewellen, 1971) and that diversification improves corporate value (Bengtsson, 2000; Gillan et al., 2000; John & Ofek, 1995; Villalonga, 2004). Some also contend that the diversification of restaurant brands is designed to expand market dominance rather than increase the efficiency of synergy through resource sharing (Montgomery, 1994). Amid the emergence of differing viewpoints, minimal research has been dedicated to illuminating how the diversification of restaurant brands affects firm value. In this context, as well, brand diversification can be explained using resource- and portfolio-based theories (Kang & Lee, 2015).

An initial study on the brand diversification of restaurants asserted that the higher the degree of brand diversification in US restaurant firms, the lower the firm value (Choi et al., 2011). Focusing resources on a single brand yields greater economies of scale effects - the economic effects of a single-brand strategy are greater than the synergistic effects of a multi-brand strategy. With an extended sample period, Kang and Lee (2015) conducted a panel analysis that generated the same findings as Choi et al. (2011). The current research was intended to extend the literature by comprehensively re-analyzing the

relationship between brand diversification and firm value to confirm the aforementioned results. Accordingly, the following hypothesis was formulated:

> *Hypothesis 1: Restaurant firms using a single-brand strategy achieve performance levels that differ from those realized by companies that adopt a multiple-brand strategy.*

2.9.2. Non-linear Relationship between Brand Diversification and Firm Performance

Even as studies have provided no conclusive findings on whether corporate diversification has a positive or negative effect on firm value, there are investigations that showed differences in diversification effects depending on the level of diversification implemented (Khanna & Palepu, 2000; Lins & Servaes, 2002; Palich et al., 2000). For example, Palich et al. (2000) reported a non-linear relationship between diversification and performance, in which companies perform well to some extent under a single-business strategy but eventually register decreased performance when they shift from related diversification to unrelated diversification. Although progress in business diversification has a significant negative effect up to a certain level, positive effects increase beyond this level (Khanna & Palepu, 2000; Lins & Servaes, 2002).

In the hospitality industry, Park and Jang (2012) found that the optimal diversification ratio exists approximately halfway through the processes of related and unrelated diversification among restaurant firms. In subsequent work, the authors examined the effects of within-industry diversification (e.g., product expansion in the same industry) and uncovered that this strategy negatively affects profitability in the short term but positively influences it in the long term (Park & Jang, 2013), suggesting that the effects

of diversification within the industry are non-linear. Kim and Lin (2021) analyzed the association of brand diversification with hotel owner performance using RevPAR as a performance variable. The authors reported that up to a certain level of brand diversification, performance is favorably affected, but beyond this level, the effect becomes negative. The study also covered brand diversification, but the primary focus was the hotel industry. None of these explorations discussed the non-linear relationship between brand diversification and firm value in the restaurant industry. On the basis of previous studies, the present work puts forward the supposition below:

Hypothesis 2: There is a non-linear relationship between brand diversification and firm performance.

2.9.3. Cost-efficiency of Brand Diversification

Hypothesis 1 revolves around how the brand diversification strategies of restaurant firms (i.e., single- and multi-brand strategies) affect firm value, and Hypothesis 3 is meant to verify which strategy facilitates improved performance on the basis of each strategy's cost-efficiency in relation to firm value. Unlike simply examining the relationship between brand diversification strategies and firm value directly, comprehensively addressing cost-efficiency according to the degree of brand diversification from economic points of view, such as the resource-based view, economies of scale, and economies of scope, provides important implications for future business strategies. Many scholars have found that diversified firms gain economies of scale and scope (Hamel, 1991; Kogut, 1985). While arguments regarding the costs and benefits of engaging brand diversification have been raised (Aaker, 2004; Kapferer, 1994), empirical evidence and

theoretical underpinnings for exploring the effects of brand diversification on firm value have been relatively insufficient.

More specifically, Hypothesis 3 was established on the basis of theories on diversification and cost-efficiency. In addition to selling various products, expansion into various business areas earns companies' economies of scope by enabling the effective use of shared resources, distribution channels, and brand names (Panzar & Willing, 1981; Pennings et al., 1994) Meanwhile, a number of studies have shown that brand diversification causes inefficiency (Hill et al., 2005; Moorthy & Png, 1992; Palich et al., 2000; Schwandt, 2009). With the strategic approach to brand diversification as basis, Hill et al. (2005) argued that brand portfolio strategies can fragment marketing resources and limit economies of scale, leading to inefficiency. Schwandt (2009) revealed that operating with multiple brands increases internal transaction costs because of consequent organizational complexity. Other scholars attested that the economic effects of economies of scope can be suppressed and inefficient under several products and brands (Moorthy & Png, 1992; Palich et al., 2000). The debate over brand diversification and cost-efficiency has yielded varying results. The present work was concerned with whether brand diversification (single brand vs. multiple brands) in the restaurant industry fosters cost-efficiency, thus establishing Hypothesis 3:

> *Hypothesis 3: The cost-efficiency of restaurant firms differs depending on the brand diversification strategies (a single- or a multiple-brand strategy) that they adopt.*

2.10. Research Framework

Within the scarce literature on the issues of interest, studies on the relationship between brand diversification and performance have provided mixed results and presented limited implications for the restaurant industry. Although this industry is characterized by a brand-oriented business structure and both strategies (single brand vs. multiple brands) are considered popular, there remain unexplained aspects of these issues. Additional comprehensive studies are needed to confirm the results regarding the impact of brand diversification on firm performance. To achieve this, various performance and control variables that may affect the relationship, brand diversification measures, and analysis methods should be substantially evaluated.

In response to this call, this study examines the economies of scale and scope generated by a firm's brand diversification strategy (single versus multiple) through reductions in core expenses or cost-efficiency, as measured by cost of goods sold (COGS), selling, general, and administration expenses (SG&A) and net property, plant, and equipment (NPPE), and the ensuing realization of firm performance as measured by Tobin's *q*. This study not only determined the association between brand diversification and performance but also derived detailed results on cost-efficiency that facilitates performance. Figure 3 provides an overview of the research framework, along with the relationship among brand diversification strategy, cost-efficiency, and firm performance. A detailed description of all the variables of the research is presented in Chapter 3.

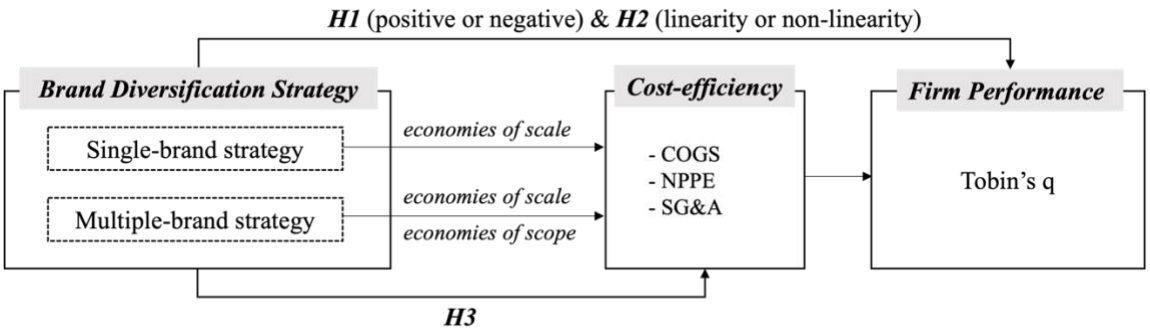


Figure 3. Research Framework

2.11. Chapter Summary

In this chapter, both theoretical and empirical evidence are provided to examine the efficiency of firms' core costs related to brand diversification for ensuring realization of firm performance. As a restaurant firm grows, it has the choice to remain a single brand or diversify into multiple brands. Both strategies are popular for restaurant firms in the US since restaurant firms have developed new markets with their own existing brand or new brand through brand diversification. However, a comprehensive review of the literature provides inconclusive evidence on which strategy performs better than the other. Moreover, previous studies on brand diversification assert that managing and operating a diversified brand allows a firm to gain economies of scale and economies of scope, but empirical result on cost saving effect has not been fully examined. Rather than simply comparing the effects of different diversification strategy on firm performance, in this study we will identify which strategy, either single brand or multiple brands, brings higher performance to a firm by reducing the firm's main operating costs. Thus, considering economies of scale and scope, this study suggests an extensive understanding of the relationship between brand diversification and firm performance.

CHAPTER 3 RESEARCH METHODOLOGY

3.1. Introduction

The main purposes of this study were (1) to examine the effects of brand diversification on firm value; (2) to investigate whether a non-linear relationship exists between brand diversification and firm value and determine an optimal level of diversification; and (3) to explore cost saving effects in terms of how diversification has been affected by the economic benefits gained by restaurants. This chapter describes the research methodology, which covers the various measurements used to measure brand diversification and cost-efficiency. It discusses the sample and data, followed by the detailed measurements of the main variables, namely, brand diversification, cost-efficiency, and firm performance. The chapter then proceeds to explain the control variables used in the regression model. Finally, it introduces the statistical models that were adopted to test the hypotheses, which revolve mainly around the impact of brand diversification on firm value and cost-efficiency.

3.2. Sample and Data Collection

Due to the limited access to financial data of privately owned companies, this study used publicly traded firms. Thus, the study sample comprised publicly traded US restaurant firms, which were categorized as such based on Standard Industrial Classification Code 5812 (eating places). Data on brand diversification (e.g., sales data and the number of entities of each brand) were collected from each restaurant firm's Form 10-K, an annual financial report required by the US Securities and Exchange Commission (SEC). Other

financial data that were necessary for the efficiency analysis, the firm performance variable (Tobin's *q*), and control variables were obtained from the COMPUSTAT database, stock information from the CRSP (Center for Research in Security Prices), and other financial data from Wharton Research Data Services (WRDS). The data of interest spanned the period 2007 to 2021 for measuring the degree of diversification and obtaining the firm's predicted value and the period 2010 to 2021 for hypotheses testing. Initially, the list of 119 sample firms were obtained from WRDS. Twenty-eight firms were excluded because their annual reports were not available, another eighteen firms were excluded due to insufficient data, another five firms were dropped because their operations were less focused in the restaurant industry. This resulted in a sample of 68 restaurant firms (36 single brand firms and 32 multiple brand firms). The name of sample firms, data period of each sample firm, number of brands that the firm operates, and all brand name operated by the firm historically are shown in Table 3. Some companies, like the case of Biglari Holdings which also owns insurance and magazine SBUs (strategic business units), in addition to the restaurant brands of Steak n Shake and Western Sizzlin. As the main focus of this study is on the restaurant business, only restaurant brands are listed.

Table 3. Publicly Traded Restaurant Firms and Their Brand Diversification

Brand Strategy	*No.*	*Company Name*	*Data Period*	*# of Brand*	*Restaurant Brand Name*
Single Brand Firms	1	BJS RESTAURANTS INC	2007-2021	1	BJ's Restaurant and Brewhouse
	2	BOJANGLES' INC	2013-2017	1	Bojangles
	3	CALIFORNIA PIZZA KITCHEN INC	2007-2010	1	California Pizza Kitchen
	4	CARIBOU COFFEE COMPANY INC	2007-2011	1	Caribou Coffee
	5	CHUY'S HOLDINGS, INC.	2009-2021	1	Chuy's
	6	COSI INC	2007-2015	1	Cosi
	7	DEL TACO RESTAURANTS INC	2015-2021	1	Del Taco
	8	DENNY'S CORP	2007-2021	1	Denny's
	9	DOMINOS PIZZA INC	2007-2021	1	Domino Pizza
	10	DUTCH BROS INC	2019-2021	1	Dutch Bros
	11	FIRST WATCH RESTAURANT GROUP INC	2019-2021	1	First Watch
	12	FLANIGANS ENTERPRISES INC	2007-2021	1	Flanigan's Seafood Bar and Grill
	13	FOGO DE CHAO INC	2013-2017	1	Fogo de Chão
	14	FRISCHS RESTAURANTS INC	2007-2014	1	Frisch's Big Boy
	15	HABIT RESTAURANTS INC	2012-2019	1	The Habit Burger Grill
	16	JAMBA INC	2007-2017	1	Jamba Juice
	17	KONA GRILL INC	2007-2018	1	Kona Grill
	18	KURA SUSHI USA INC	2017-2021	1	Kura Sushi
	19	LRI HOLDINGS INC	2009-2015	1	Logan's Roadhouse
	20	MCCORMICK & CO INC	2007-2010	1	McCormick & Schmick's Seafood
	21	MCDONALDS CORP	2007-2021	1	McDonald's
	22	NOODLES & CO	2011-2021	1	Noodles & Company
	23	PANERA BREAD CO	2007-2016	1	Panera Bread

	24	PAPA JOHNS INTERNATIONAL INC	2007-2021	1	Papa Johns
	25	PAPA MURPHY'S HOLDINGS INC	2012-2018	1	Take 'N' Bake Pizza
	26	PORTILLO'S INC	2019-2021	1	Portillo's
	27	POTBELLY CORP	2011-2021	1	Potbelly
	28	RED ROBIN GOURMET BURGERS INC	2007-2021	1	Red Robin
	29	RUBIOS RESTAURANTS INC	2007-2009	1	Rubio's Fresh Mexican Grill
	30	SHAKE SHACK INC	2012-2021	1	Shake Shack
	31	SONIC CORP	2007-2018	1	Sonic Drive-Ins
	32	STARBUCKS CORP	2007-2021	1	Starbucks
	33	SWEETGREEN INC	2019-2021	1	Sweetgreen
	34	TC GLOBAL INC	2007-2010	1	Tully's Coffee
	35	WINGSTOP INC	2013-2021	1	Wingstop
	36	ZOE'S KITCHEN INC	2012-2017	1	Zoës Kitchen
Multiple Brand Firms	1	BIGLARI HOLDINGS INC	2007-2021	2	Steak n Shake, Western Sizzlin
	2	BRAVO BRIO RESTAURANT GP INC	2010-2017	2	BRAVO! Cucina Italiana, BRIO Tuscan Grille
	3	BRINKER INTERNATIONAL INC	2010-2021	2	Chili's, Maggiano's
	4	CARROLS RESTAURANT GROUP INC	2007-2021	2	Burger King, Popeyes
	5	CHIPOTLE MEXICAN GRILL INC	2007-2021	2	Chipotle, Pizzeria, ShopHouse Southeast Asian Kitchen
	6	CKE RESTAURANTS INC	2007-2011	2	Carl s Jr., Hardee's
	7	CRACKER BARREL OLD COUNTRY STORE INC	2007-2021	2	Cracker Barrel Old Country, Maple Street Biscuit
	8	DUNKIN' BRANDS GROUP INC	2010-2019	2	Dunkin' Donut, Baskin-Robbins
	9	FIESTA RESTAURANT GROUP INC	2010-2021	2	Pollo Tropical, Taco Cabana
	10	GOOD TIMES RESTAURANTS INC	2007-2021	2	Good Times Burgers & Frozen Custard, Big Daddy's Burger
	11	JACK IN THE BOX INC	2007-2021	2	Jack in the Box, Qdoba Mexican Grill
	12	P F CHANGS CHINA BISTRO INC	2007-2011	2	P.F. Chang's China Bistro, Pei Wei Asian Diner
	13	PERKINS & MARIE CALLENDER'S INC	2007-2009	2	Perkins, Marie Callender's

14	RUBY TUESDAY INC	2007-2016	2	Ruby Tuesday, Lime Fresh
15	WENDY'S CO	2007-2021	2	Wendy's, Arby's
16	BUFFALO WILD WINGS INC	2007-2016	3	Buffalo Wild Wings, PizzaRev, R Taco
17	EINSTEIN NOAH RESTAURANT GROUP INC	2007-2013	3	Einstein Bros Bagels, Noah's New York Bagels, Manhattan Bagel
18	IGNITE RESTAURANT GROUP INC	2011-2016	3	Joe's Crab Shack, Brick House Tavern + Tap, Romano's Macaroni Grill
19	LUBYS INC	2007-2020	3	Luby's Cafeteria, Fuddruckers, Cheeseburger in Paradise
20	MORTONS RESTAURANT GROUP INC	2007-2010	3	Morton's Steakhouses, Travi, Bertolini's
21	MUSCLE MAKER INC	2017-2021	3	Muscle Maker Grill, Pokemoto, Superfit
22	O CHARLEYS INC	2007-2011	3	O'Charley's, Ninety Nine, Stoney River Legendary Steaks
23	TEXAS ROADHOUSE INC	2007-2021	3	Texas Roadhouse, Bubba's 32, Jaggers
24	BENIHANA INC	2007-2011	4	Teppanyaki, RA Sushi, Haru, Doraku
25	BLOOMIN' BRANDS INC	2011-2021	4	Outback Steakhouse, Carrabba's Italian Grill, Bonefish Grill, Fleming's Prime Steakhouse
26	CHEESECAKE FACTORY INC	2007-2021	4	The Cheesecake Factory, North Italia, Fox Restaurant Concept
27	DEL FRISCO'S RESTAURANT GROUP INC	2011-2018	4	Del Frisco's Double Eagle Steakhouse, Del Frisco's Grille, Sullivan's Steakhouse, Bartaco, Barcelona Wine Bar
28	YUM BRANDS INC	2007-2021	4	KFC, Taco Bell, Pizza Hut, Habit Burger
29	RUTHS HOSPITALITY GROUP INC	2007-2021	5	Ruth's Chris Steak House, Mitchell's Fish Market, Mitchell's Steakhouse, Cameron's Steakhouse
30	MEXICAN RESTAURANTS INC	2007-2010	6	Casa Ole, Monterey's little Mexico, Tortuga Coastal Cantina, Crazy Jose's, Mission Burrito, La Senorita
31	U-SWIRL INC	2008-2014	7	U-Swirl Frozen Yogurt, Aspen Leaf Yogurt, Yogurtini, Josie's, CherryBerry, Yogli Migli, Puzzy Peach
32	DARDEN RESTAURANTS INC	2007-2021	8	Olive Garden, LongHorn Steakhouse, The Capital Grille, Eddie V's, Cheddar's Scratch Kitchen, Yard House, Bahama Breeze, Seasons 52

Note: # of brands include the total number of restaurant brands that operated by the firm during data period (2007-2021)

In this study, the data on the restaurant firms that were analyzed constituted an unbalanced panel, with the number of listed restaurant firms changing every year due to the listing and delisting of stocks on the stock exchange during the period of interest. Although a balanced panel would have been advantageous, no problems with the analysis arose despite the use of unbalanced panel data in the estimation model. This study also collected 12 years of longitudinal data with 490 observations for hypotheses testing, which was sufficient for the analysis.

In 2008 and 2009, the US economy stagnated because of the subprime mortgage crisis, during which it registered negative growth which adversely affected the restaurant industry. Given that these periods were characterized by an unusual economic situation, this study set 2010 onwards as the analysis period for hypotheses testing. In 2010, the US economy recovered to a growth rate of 2.6% and, in succeeding years, continued to grow normally, moving back and forth from 1.6% to 2.9%. However, the COVID-19 pandemic pushed the US economic growth rate down to –3.5% in 2020, during which restaurant firms suffered financial difficulties. Nevertheless, the inclusion of this period in the sample did not significantly affect the overall analysis, as the recent years before 2020 exhibited rapid economic recovery.

3.3. Variables and Measures

3.3.1. Independent Variable: Brand Diversification

Diversification is measured through various methods that have been applied in studies carried out in the hospitality field. Diversification contrasts with concentration, and it is

obtained by measuring concentration of a restaurant firm's portfolio brands and subtracting its value from 1. Following Choi et al.'s (2011) method, two measurements are adopted to comprehensively examine the effects of the degree of diversification across each firm's brands: (1) the proportion of sales generated by each brand (or the properties numbers of each brand if sales data is not available), determined by using the Herfindahl index (HI), and (2) the number of brands owned by a company. The HI, or full name of the Herfindahl-Hirschman index, is typically used as a measure of market concentration in an industry ranging from 1 (least concentrated) to 10,000 (most concentrated) (Rhoades, 1993). Since the HI has been commonly adopted to measure the degree of diversification in a variety of contexts (Lang & Stulz, 1994), it is also used as a proxy of the degree of brand diversification in the hospitality literature; a high (or low) score on the index indicates a minimally (or considerably) diversified portfolio. To align the sign of coefficient with that of the number of brand (i.e., the higher the number, the more the diversified), this study used the adjusted Herfindahl index (AHI) by simply subtracting the HI from 1; a value ranging from 0 indicates less diversified to 1 means well diversified. The AHI for measuring brand diversification is as follows:

$$\textit{Adjusted Herfindahl index}\ (\text{AHI}) = 1 - \sum_{i=1}^{n} S_i{}^2,$$

where, S_i refers to the proportion of sales generated by each brand.

Based on the sample, similar proportions of single- and multi-brand firms constituted the US restaurant firms examined in this work. A single-brand firm (concentration) focuses its business on one brand, whereas a multi-brand firm operates its business with multiple brands. As shown in Table 3, some multi-brand firms own two brands (e.g., Texas

Roadhouse Inc.), but others have more than five (e.g., Mexican Restaurants, Inc., U-swirl, Inc., Darden Restaurants, Inc.). In this study, therefore, the number of brands owned by a company was deemed suitable for measuring the degree of brand diversification.

3.3.2. Dependent Variables

3.3.2.1. Firm Performance: Tobin's q

Firm performance is measured by market value and accounting returns. Tobin's *q*, which was developed by Tobin to estimate a firm's intangible assets, represents the ratio of a company's market value to the current replacement costs of its assets (Tobin, 1969). Although there exist various accounting measures for firm performance, including return on equity (ROE), return on assets (ROA), and profit margin (PM), Tobin's *q* was used in this research because it can be considered the most reasonable firm performance measure in a competitive market, covering accounting performance and growth opportunity. It has also been regarded as a more relevant measure of firm performance than accounting-based measures or stock returns (Chung & Pruitt, 1994). Specifically, current study used the approximate Tobin's *q*, following the suggestion of Chung and Pruitt (1994), to facilitate the use of variables from the COMPUSTAT database and ensure computational simplicity. The calculation is presented below:

$$\text{Approximate Tobin's } q = (\text{MVE} + \text{PS} + \text{DEBT})/\text{TA},$$

where MVE indicates the stock price multiplied by the number of common stock share outstanding, PS refers to the liquidating value of outstanding preferred stock, DEBT

represents the short-term liabilities net of short-term assets plus the book value of long-term debt, and TA denotes the book value of total assets.

3.3.2.2. Cost-efficiency: Slack-based measure (SBM)

Data envelopment analysis (DEA) is a linear programming model proposed by Charnes et al. (1978). The DEA efficiency measure is relative to the best decision-making unit (DMU) in a peer group rather than relative to any absolute predetermined standard of technical efficiency (Thanassoulis, 2001). Using a DEA model, it can separate efficient units from inefficient units on the basis of whether subject units lie above or below the efficient frontier which is a series of points connecting the most productive units given input and output combinations in analysis (Refer to Figures 1 and 2 in Chapter 2).

Mathematically, in the Slack-based measure (SBM), an efficiency score is given by the model with the range between 0 and 1 to each DMU after evaluation, with 1 being the efficiency frontier. The efficiency value of a particular DMU (o) is calculated as follows. Let θ_o^* be the efficiency score of DMU o. Then,

$$\theta_o^* = \min \frac{1 - \frac{1}{m}\sum_{i=1}^{m} s_i^- / x_{io}}{1 + \frac{1}{s}\sum_{r=1}^{s} s_r^+ / y_{ro}}$$

subject to

$$x_{io} = \sum_{j=1}^{n} x_{ij}\lambda_j + s_i^- \qquad \mathrm{i} = 1, \ldots, \mathrm{m}$$

$$y_{ro} = \sum_{j=1}^{n} y_{rj}\lambda_j - s_r^+ \qquad \mathrm{r} = 1, \ldots, \mathrm{s}$$

$$\lambda_j \geq 0, s_i^- \geq 0, s_r^+ \geq 0,$$

where *m* denotes the number of inputs, *s* refers to the number of outputs, *n* represents the number of DMUs, x_{ij} is the amount of input *i* used by DMU *j*, x_{io} is the amount of input *i* used by DMU *o*, y_{rj} refers to the amount of output *r* produced by DMU *j*, y_{ro} is the amount of output *r* produced by DMU *o*, s_i^- represents the input slacks for input *i*, and s_r^+ refers to the output slacks for output *r*.

The equation above shows that the efficiency score decreases as the slacks of input or output variables increase. The slacks are divided by the input variable, which yields the inefficiency rate of the input variable. In other words, the higher the slack value of input variable, the lower the efficiency of that input variable. This rate served as the main dependent variable in the regression analysis conducted in this study.

$$\text{Relative Reduction Rate} = \frac{x_{io} - s_i^-}{x_{io}}$$

$$\text{Inefficiency Rate} = \frac{s_i^-}{x_{io}}$$

The Slack-based model provides the slacks of each input and output variable, and this slack information relates to the amount of resources used inefficiently. This measures the inefficiency rate of each input variable with slacks and then identifies which input variable was the main reason for the operational inefficiency of the examined restaurant firms. The inefficiency rates of input variables serve as important guidelines for managers, as restaurant firms can improve their operational efficiency by reducing input slacks.

The SBM of efficiency is used at the firm level, employing input and output variables similar to those used by Baik et al. (2013) for this purpose. To measure cost-efficiency, this study adopted three input variables, namely, cost of goods sold (COGS), selling, general, and administration expenses (SG&A) and net property, plant, and equipment (NPPE), and used one output variable, namely, sales. Specifically, sales as the output variable which is related to a firm's primary sources of cash flows and earnings from management activities. It was defined as the ratio of original business activities carried out to the number of goods and services sold at a given price in a given period. The crucial point in DEA is to design a model based on the relationship between introduced input and output variables. The clearer the causal relationship identified by input variables, the better the DEA model (Baik et al., 2013). Other cost-related variables affect sales but incorporating all of them into the model would degrade the model's efficiency. This study therefore restricted the input variables to the COGS, SG&A expenses, and NPPE expenditure, which are strongly related to sales, for the following reasons.

First, the COGS encompasses the direct costs attributable to goods produced and sold by a business and accounts for the largest proportion of cost items in an income statement (Thore et al., 1994). In a restaurant firm, the COGS consists primarily of food, and SG&A expenses comprise sales budgets, which are needed to sell products, as well as general and administrative allocations, which are required to manage a business (Demerjian et al., 2012). They consist of salaries of managers, legal and professional fees, utilities, insurance, and rentals, among other expenses. NPPE expenditure is not a cost item in an income statement, but it is one of the asset items used to generate sales on

a balance sheet (Demerjian et al., 2012). NPPE expenditure includes long-term and tangible assets that cannot be easily converted into cash. Restaurant businesses have a higher proportion of investment in tangible assets than other industries. Because food is sold mainly in physical spaces and food ingredients are produced in restaurants, the proportion of investment in fixed assets, such as machinery in the restaurant and real estate, is high. Therefore, the risk of investing in fixed assets is greater than that presented by investment in the general service industry like accounting office, etc. (Skalpe, 2003). Furthermore, it is important to efficiently manage tangible assets in the restaurant industry. Considering these points, NPPE expenditure, a major asset item that generates future economic benefits, was introduced as an input variable.

3.3.3. Control Variables

To mitigate confounding effects on the relationships among variables, this study incorporated several control variables into the analysis. The estimation models for hypothesis testing were divided into a model with Tobin's *q* as the dependent variable (Hypothesis 1 & 2) and one with cost-efficiency as the dependent variable (Hypothesis 3). The same control factors were used in both models, that is, size (measured by asset), firm age, financial status (debt-equity ratio), growth opportunity (sales growth rate), franchising dummy and internationalization dummy. A year dummy was also introduced into the models to control time effects. The potential relationships among the variables are summarized as follows.

The size of a company (AT), which affects the firm's performance, is measured by taking a natural logarithm of the firm's total assets (Banz, 1981; Chauvin & Hirschey, 1993). As discovered by Banz (1981), small companies listed in a stock exchange have higher stock returns on average than large companies. By contrast, Chauvin and Hirschey (1993) argued that the larger the size of a company, the greater its performance. Meanwhile, Lang and Stultz (1994) indicated that the size of a company has a confounding effect on explanations of the relationship between corporate diversification and firm performance. Notwithstanding differences in findings and assertions, many studies have demonstrated that growth in company size inevitably affects company performance due to economies of scale and the expansion of market power (Hitt et al., 1997; Nachum, 2004; Tallman & Li, 1996).

A firm's age (AGE) is measured by the log of the time between the initial creation of a firm and the present time. According to the theory of business growth, companies grow faster in environments with relatively young age, but on the contrary, the survival rate is also likely to increase by accumulating the experiences (Jovanovic, 1982). Firms' age has a positive effect on their performance and market capitalization (Evans, 1987), and helps to form company's reputation and trust by acquiring business experience. It also has a positive effect on capital procurement in the capital market (Ibrahim, 2017)

A firm's financial leverage (DER), which should be controlled in an estimation model, is measured based on the debt-equity ratio. It directly affects corporate diversification and firm value because tax-shield effects occur depending on the degree of such leverage

(McConnell & Servaes, 1990). It also promotes corporate diversification (Lubakin & O'Neill, 1987). Furthermore, a company's financial variability increases capital costs because it projects a negative impression to the market, thus unfavorably affecting corporate value (Brealey & Myers, 2003).

The growth opportunity of firms related to the sales growth rate (SGR) is directly linked to diversification. According to the resource-based theory, growth opportunities positively influence firm value in terms of diversification (Barney, 1991) because firms are motivated by the slow growth of existing businesses (Stowe & Xing, 2006). However, due to excessive diversification, growth opportunities negatively affect firm value. In this study, SGR was introduced as a control variable that represents a company's growth opportunity and was measured based on the current sales growth rate compared with that of the previous year.

The degree of franchising (FR) is related to the type of business, which is directly related to the performance of restaurant firms. Especially among hospitality companies, franchising has been an important growth strategy because it presents major potential advantages, including greater administrative efficiency, risk management, and reduced constraints (Spinelli, Birley, & Leleux, 2003). From a resource-based view, franchise restaurant firms further promote growth by providing franchisees with capital requirements, and they can minimize risks by decreasing monitoring costs (Hsu & Jang, 2009). Srinivasan (2006) argued that the expansion of a franchise has a positive effect on Tobin's *q*, but Hsu and Jang (2009) and Koh et al. (2009) asserted that there is a

nonlinear relationship between FR and Tobin's *q*. FR is measured using a dummy variable that takes on the value of 1 if a company is franchised and 0 for non-franchised firm.

The degree of internationalization (ID) is also an important business determinant of the performance of restaurant firms. Many such firms in the US are actively expanding into overseas operations. As reported by Sun and Lee (2013), internationalization has an inverted U-shaped relationship with company performance, and franchising positively affects internationalization. Unlike manufacturing companies that are restricted or prohibited from entering foreign markets, international expansion is very popular with service companies (e.g., restaurants) (Ekledo & Sivakumar, 1998; Eramilli, 1990). Restrictions may limit the range of choices available for restaurants in terms of overseas expansion (Ekledo & Sivakumar, 1998). As a result, decisions to expand abroad may involve more risk and complexity than those experienced in domestic operations. These risks directly affect the value of a firm. Put differently, the diverse factors responsible for attraction to international markets, such as rich resources, growth opportunities, and cost advantages, can favorably affect decision making on internationalization (Thompson & Knox, 1991; Williams, 1992). Conversely, limited market conditions, market saturation, and excessive regulation (Thompson & Knox, 1991; Threadgold, 1991; Williams, 1992) restrict firms from entering international markets. In the end, internationalization is an important variable affecting the value of restaurant firms and controls the possible advantages and disadvantages of international markets. ID is measured using dummy

variables that takes on the value of 1 if a company enters an international market and 0 otherwise. Table 4 summarizes the main variables and their measures of this study.

Table 4. Main Variables and Their Measures

Brand diversification	Adjusted Herfindahl Index (AHI)	AHI = $1 - \sum_{i=1}^{n} {S_i}^2$, where S_i = the proportion of sales generated by each brand
	Number of brands	The number of brands overseen by firm
Cost-efficiency	Overall cost-efficiency of employing SBM of DEA	$\theta_o^* = \min \frac{1-\frac{1}{m}\sum_{i=1}^{m} s_i^- / x_{io}}{1+\frac{1}{s}\sum_{r=1}^{s} s_r^+ / y_{ro}}$, subject to $x_{io} = \sum_{j=1}^{n} x_{ij}\lambda_j + s_i^- \quad \text{i} = 1, \dots, \text{m}$ $y_{ro} = \sum_{j=1}^{n} y_{rj}\lambda_j - s_r^+ \quad \text{r} = 1, \dots, \text{s}$ $\lambda_j \geq 0, s_i^- \geq 0, s_r^+ \geq 0,$ where m = number of inputs s = number of outputs n = number of DMUs x_{ij} = amount of input i used by DMU j x_{io} = amount of input i used by DMU o y_{rj} = amount of output r produced by DMU y_{ro} = amount of output r produced by DMU o s_i^- = input slacks for input i s_r^+ = output slacks for output r DMU = decision making unit
	Inefficiency of each input (cost)	s_i^- / x_{io}, where s_i^- = input slacks for input i x_{io} = amount of input i used by DMU o
Firm performance	Approximate Tobin's q (Q)	(MVE + PS + DEBT)/TA, where MVE = the stock price multiplied by the number of common stock outstanding PS = the liquidating value of outstanding preferred stock DEBT = the short-term liabilities net of short-term assets plus the book value of long-term debt TA = the book value of total assets
Control variables	Firm size (AT)	The log of total assets
	Financial leverage (DER)	The ratio of debts to equity
	Sales growth rate (SGR)	(CP – PP)/PP × 100, where CP = sales in the current period PP = sales in the previous period
	Franchising dummy (FR)	1 = franchise business 0 = non-franchised business
	Internationalization dummy (ID)	1 = operating in international markets 0 = operating only in a domestic market
	Firm's age (AGE)	The log of the time between the initial creation of a firm and the present time (in years)
	Year dummy	1 = corresponding year 0 = otherwise

3.4. Statistical Models for Hypothesis Testing

To inquire into the effects of brand diversification on firm performance, three hypotheses were developed:

- Hypothesis 1: Restaurant firms using a single-brand strategy achieve performance levels that differ from those realized by companies that adopt a multiple-brand strategy.
- Hypothesis 2: There is a non-linear relationship between brand diversification and firm performance.
- Hypothesis 3: The cost-efficiency of restaurant firms differs depending on the brand diversification strategies (a single- or a multiple-brand strategy) that they adopt.

This study assumed the existence of omitted variable bias in the regression model for hypothesis test. It is assumed that variables that can affect both the Tobin's *q*, a dependent variable, and adjusted Herfindahl index (AHI), an independent variable, may be omitted from the model. Even if several control variables, which are variables that affect Tobin's *q*, are included in the model, it is difficult to obtain a consistent estimate if the variables that affect both our interest variables, adjusted Herfindahl index (AHI), and Tobin's *q*, are omitted in the model. In other words, endogenous explanatory variables exist in the model.

To solve this endogeneity problem, this study employed a two stage least squares (2SLS) regression model using instrumental variable. To mitigate the confounding effect on the

main relationships of interest, several control variables are also included. They are a firm's assets, firm's age, debt–equity ratio, sales growth rate, franchise dummy, internationalization dummy, and year effects.

Basically, the estimation model used in this study was a 2SLS regression model. Ordinary least square (OLS) regression estimations could be biased due to the correlation between independent variables and error terms. In other words, for the OLS estimations to be a consistent estimator, $Cov(x_i, e_i) \neq 0$, which means the explanatory variable should not correlate with the error term. In the 2-stage least square (2SLS) regression model, as a first stage for estimate of brand diversification, the average value of brand diversification measured by adjusted Herfindahl index (AHI) for the past three years is used as an instrumental variable (IV) and brand diversification is used as a dependent variable. The model was defined as follows:

$$BD_{it} = \alpha + \beta_1 AT_{it} + \beta_2 DER_{it} + \beta_3 SGR_{it} + \beta_4 FR_{it} + \beta_5 ID_{it} + \beta_6 AGE_{it} + \beta_7 IV_{it} + \sum_{n=1}^{12} \beta_{8-19} YEAR_{2010-2021} + \epsilon_{it}$$

where, BD is the degree of brand diversification, AT refers to total assets, DER denotes the debt-equity ratio, SGR stands for sales growth rate, FR is the franchise dummy, ID is the internationalization dummy, AGE represents firm's age, IV is instrumental variable, and YEAR represents time dummies.

After obtaining predicted value of brand diversification ($\widehat{BD}$) from the first stage, a second stage of regression model was conducted for estimates of Tobin's q and cost-

efficiency. First, the estimation model was used to examine the relationship between brand diversification and firm performance (H1). The degree of brand diversification, an independent variable, was measured using the adjusted Herfindahl index (AHI) and the number of brands owned by a firm. The former (AHI) is regarded as the most appropriate method, but the latter (number of brands) offers the advantage of simplicity.

To test hypotheses 2 (H2), the square term of brand diversification was included as an independent variable to verify whether the degree of brand diversification and corporate value were nonlinearly related. Thus, the following model is suggested:

$$Q_{it} = \alpha + \beta_1 \widehat{BD}_{it} + \beta_2 \widehat{BD}_{it}^2 + \beta_3 AT_{it} + \beta_4 DER_{it} + \beta_5 SGR_{it} + \beta_6 FR_{it} + \beta_7 ID_{it}$$
$$+ \beta_8 AGE_{it} + \sum_{n=1}^{12} \beta_{9-20} YEAR_{2010-2021} + \epsilon_{it}$$

where, Q is Tobin's q, $\widehat{BD}$ denotes the predicted value of brand diversification, AT refers to total assets, DER is the debt-equity ratio, SGR stands for sales growth rate, FR is the franchise dummy, ID is the internationalization dummy, AGE represents firm's age, and YEAR represents time dummies.

Second, this study probed into the effects of brand diversification on cost-efficiency to test Hypothesis 3. In the estimation model for testing H3, regression model related to cost efficiency was conducted to investigate the relationship among brand diversification as the main interest and independent variable, seven control variables, and cost-efficiency as the dependent variable where the overall SBM efficiency value was used. Next, new

regression models related to each cost input costs (i.e., COGS, SG&A, and NPPE) as dependent variables, were employed. The model was defined thus:

$$C_{it} = \alpha + \beta_1 \widehat{BD}_{it} + \beta_2 \widehat{BD}_{it}^2 + \beta_3 AT_{it} + \beta_4 DER_{it} + \beta_5 SGR_{it} + \beta_6 FR_{it} + \beta_7 ID_{it}$$

$$+ \beta_8 AGE_{it} + \sum_{n=1}^{12} \beta_{9-20} YEAR_{2010-2021} + \epsilon_{it}$$

where, C is SBM efficiency score, and inefficiency score of COGS, SG&A, and NPPE, BD denotes the degree of brand diversification, $\widehat{BD}$ indicates the predicted value of brand diversification, AT refers to total assets, DER is the debt-equity ratio, SGR stands for sales growth rate, FR is the franchise dummy, ID is the internationalization dummy, AGE represents firm's age, and YEAR represents time dummies.

3.5. Chapter Summary

This chapter discussed sample and data collection procedures and the methodology used to test hypotheses. The study sample comprises 68 publicly traded restaurant firms (36 single brand firms and 32 multiple brand firms) and 648 observations from 2007 to 2021. For measuring the level of diversification, the current study adopted adjusted Herfindahl index (AHI), and Tobin's *q* was used to measure firms' financial performance. In addition, slack-based measure (SBM) was employed to obtain overall cost-efficiency of restaurant firms' operation and main costs' inefficiency. For hypothesis testing, primarily, a two stage least square (2SLS) regression model including instrumental variable was conducted to examine the relationship between variables of brand diversification, cost-efficiency, and firm performance. The next chapter will discuss the results of the data analysis and findings.

CHAPTER 4 ANALYSIS AND RESULTS

4.1. Introduction

This study examined three hypotheses on the effects of brand diversification on cost-efficiency and the value of US restaurant firms, as detailed in Chapter 2. As a preliminary investigation, descriptive statistical analysis involving the variables introduced in this study and correlation analysis were conducted. To validate the established hypotheses, two-stage least squares (2SLS) regression was carried out using instrumental variables.

4.2. Descriptive Statistics of the Sample

A total of 68 publicly traded restaurant companies (36 single brand firms and 32 multiple brand firms) were subjected to longitudinal analysis, yielding 648 observations covering the period 2007 to 2021 to measure brand diversification and cost-efficiency which are main interest variables of the study. But, more importantly, this study required data from 2007 to obtain the average value of brand diversification for the past three-year (from time *t*-1 to *t*-3) that is used as an instrumental variable in 2SLS. For the main analysis to test three established hypotheses, 490 observations including the data period 2010 to 2021 were examined. A comprehensive profile of the restaurant firms in the sample includes the number of brands companies owned, Adjusted Herfindahl Index (AHI), their sales, assets and financial performance (Tobin's *q*), as well as cost variables including cost of goods sold (COGS), selling, general, and administrative costs (SG&A) and net property, plant, and equipment (NPPE), as shown in Tables 5 and 6. The sample was also analyzed to determine the same set of sales and expense variables on the basis of whether

these restaurant firms are franchised or operate internationally, as shown in Tables 7 and 8.

As shown in Table 5, AHI provides information about the degree of diversification and concentration and the mean AHI value of the companies was 0.121, which was obtained by subtracting 1 from the original Herfindahl index. The higher the value of the index, the greater the degree of brand diversification (least concentration). The minimum AHI was 0 (lowest degree of diversification or highest level of concentration), implying that a given firm owned a single brand, whereas the maximum was 0.703, which was generated by the most diversified firm in terms of sales proportion of each brand owned by the firm. The average number of brands was 1.639, and the restaurant firm with the most brands had eight (e.g., Darden). The lowest Tobin's *q*, which reflects the ratio of firms' market value to the current replacement costs of its assets, was 0, the largest was 22.628, and the average was 2.183. The value of restaurant firms' assets ranged from $1.82 million to $53,854 million, with the mean value being $2,178 million; the standard deviation in this respect was $6,107 million. The results showed a large difference among the listed firms regarding company size, represented by the standard deviation of assets, sales, and expenses. In terms of main costs, the ranking followed the order → COGS (a mean of $1,533 million) → NPPE (mean = $1,242 million) → SG&A (an average of $221 million), with SG&A being particularly lower than the other expenses. This is because, in the restaurant industry, food costs account for large portions of overall operating costs. In addition, the proportion of investment in tangible assets corresponding to the physical space of the restaurant itself, inventory, or equipment is high.

Table 5. Summary of Descriptive Statistics of the Publicly Traded Restaurant Firms [no. of observations (Obs.) = 648]

Variables	Obs.	Mean	SD	Min	Max
Br_num	648	1.639	1.204	1.000	8.000
AHI	648	0.121	0.210	0.000	0.703
Q	648	2.183	2.424	0.000	22.628
AT	648	2177.950	6106.821	1.820	53854.300
SALES	648	2226.148	4711.347	0.665	29060.600
COGS	648	1533.267	2975.310	0.849	21239.100
SG&A	648	220.920	439.514	1.172	2487.900
NPPE	648	1242.444	4094.858	0.517	38785.900

Note: Obs. = observations; SD = standard deviation; Br_num = brand number; AHI = adjusted Herfindahl index; Q = Tobin's *q*; AT = assets in $millions; SALES = sales in $millions; COGS = cost of goods sold in $millions; SG&A = selling, general, and administrative costs in $millions; NPPE = net property, plant, and equipment expenses in $millions

Table 6 compares the descriptive statistical data for the major variables of the firms with a single brand (Obs. = 422) and those with multiple brands (Obs. = 226) over the same period. As denoted by their category, while the mean number of brands for the single-brand firms was 1, the overall average number of brands was 1.639. The average AHI of the multi-brand firms was 0.347 which indicates the degree of diversification. The average assets of the single-brand firms were $2,326 million, which is relatively larger than the multiple-brand firms with an asset value of $1,901 million. However, the average sales of single-brand firms ($2,159 million) were lower than the multiple-brand firms ($2,351 million). The total asset turnover ratio (sales/assets), which represents the efficiency of asset use, was higher for the multiple-brand firms (1.237) than the single-brand firms (0.928), indicating that the multi-brand firms incurred costs more efficiently than the single-brand firms. Nevertheless, the average Tobin's *q* for single-brand firms, which is a financial market-based measure of firm performance, was 2.364, whereas the

average for multi-brand firms was 1.845. This finding implies that the stock market perceives single-brand firms to have more growth opportunities than multi-brand firms under the same input. In terms of cost variables, the mean values of COGS ($1,748 million) and SG&A ($240 million) for multi-brand firms were higher than those of single-brand firms ($1,418 million and $211 million, respectively). However, the mean value of NPPE for single-brand firms ($1,380 million) was higher than that of multi-brand firms ($986 million).

Table 6. Descriptive Statistics of the Single-Brand and Multiple-Brand Restaurant Firms

Strategy	Variables	Obs.	Mean	SD	Min	Max
Single Brand	Br_num	422	1.000	0.000	1.000	1.000
	AHI	422	0.000	0.000	0.000	0.000
	Q	422	2.364	2.716	0.000	22.628
	AT	422	2326.097	7386.024	1.820	53854.300
	SALES	422	2159.203*	5446.971	0.665	29060.600
	COGS	422	1418.092	3361.090	0.849	21239.100
	SG&A	422	210.729	487.367	1.172	2487.900
	NPPE	422	1379.912	4989.446	0.517	38785.900
Multiple Brand	Br_num	226	2.832	1.404	2.000	8.000
	AHI	226	0.347	0.220	0.001	0.703
	Q	226	1.845	1.707	0.178	9.172
	AT	226	1901.321	2246.210	12.662	10656.100
	SALES	226	2351.151	2879.078	5.529	13633.000
	COGS	226	1748.329	2060.735	3.186	9212.000
	SG&A	226	239.948	332.389	2.628	1754.000
	NPPE	226	985.754	1238.862	1.543	6726.100

Note: Obs. = observations; SD = standard deviation; Br_num = brand number; AHI = adjusted Herfindahl index; Q = Tobin's *q*; AT = assets in $millions; SALES = sales in $millions; COGS = cost of goods sold in $millions; SG&A = selling, general, and administrative costs in $millions; NPPE = net property, plant, and equipment expenses in $millions

Restaurant firms have different modes of ownership, some are wholly owned companies

and others are franchisors. Table 7 reports the descriptive statistical data on the major variables of the non-franchised (Obs. = 156) and franchise (Obs. = 492) firms. Relatively, the number of franchised restaurant firms in the US was approximately three times higher than that of non-franchise firms during the period studied. Comparing the average AHI value of each type of business shows that the franchised firms (*mean* = 0.135) had a greater degree of brand diversification than the non-franchised firms (*mean* = 0.079). The franchised firms also had slightly larger assets ($2,205 million) than the non-franchised firms ($2.091 million), but the non-franchised firms had a higher value of mean sales with $2,733 million. The average Tobin's *q* values of the companies were nearly identical (2.182 for the non-franchised firms vs. 2.183 for the franchised firms). Regarding cost variables, mean value of COGS of non-franchised firms ($2,088 million) was higher than that of franchised firms ($1,357 million), but mean value of SG&A ($226 million) and NPPE ($1,316 million) were lower than that of franchised firms ($206 million and $1,009 million, respectively).

Table 7. Descriptive Statistics of the Non-franchised and Franchised Restaurant Firms

Franchise	Variables	Obs.	Mean	SD	Min	Max
No	Br_num	156	1.442	0.738	1.000	4.000
	AHI	156	0.079	0.167	0.000	0.644
	Q	156	2.182	1.797	0.000	8.341
	AT	156	2091.601	4707.123	23.160	31392.600
	SALES	156	2733.037	5404.808	37.251	29060.600
	COGS	156	2088.778	4017.829	31.490	21239.100
	SG&A	156	206.346	391.552	3.364	1932.600
	NPPE	156	1009.200	1943.939	17.000	14605.500
Yes	Br_num	492	1.701	1.312	1.000	8.000
	AHI	492	0.135	0.221	0.000	0.703
	Q	492	2.183	2.592	0.050	22.628
	AT	492	2205.329	6491.868	1.820	53854.300
	SALES	492	2065.427	4463.174	0.665	28105.700
	COGS	492	1357.130	2537.695	0.849	15704.200
	SG&A	492	225.540	453.939	1.172	2487.900
	NPPE	492	1316.399	4569.423	0.517	38785.900

Note: Obs. = observations; SD = standard deviation; Br_num = brand number; AHI = adjusted Herfindahl index; Q = Tobin's *q*; AT = assets in $millions; SALES = sales in $millions; COGS = cost of goods sold in $millions; SG&A = selling, general, and administrative costs in $millions; NPPE = net property, plant, and equipment expenses in $millions

Like many corporations in the US, restaurant firms grow by expanding their businesses internationally. As shown in the descriptive statistics of the main variables in Table 8, a greater number of the restaurant firms generated sales from international operations (Obs. = 370) than from domestic markets only (Obs. = 278). The average AHI of the international firms (0.143) was higher than that of the non-international firms (0.092), implying that brand diversification is one of the motivations for companies to enter overseas markets. The international firms also had average assets amounting to approximately $3,464 million and average sales of $3,457 million, which are about 7.4 and 6 times larger than those of the non-international firms ($466 million in assets and

$587 million in sales), respectively. These results mean that companies operating in international markets are considerably larger than domestic firms. Finally, the international firms had an average Tobin's *q* of 2.8, which is more than double that of their non-international firms (1.362). This finding suggests that compared with small firms, large firms are in a better position or have more resources necessary to operate beyond domestic markets. Regarding cost variables, the average value of COGS, SG&A, and NPPE of international firms were higher than those of non-international firms ($2,344 million vs. $453 million, $333 million vs. $72 million, $1,960 million vs. $288 million, respectively).

Table 8. Descriptive Statistics of the Non-international and International Restaurant Firms

International	Variables	Obs.	Mean	SD	Min	Max
No	Br_num	278	1.349	0.772	1.000	6.000
	AHI	278	0.092	0.184	0.000	0.644
	Q	278	1.362	0.940	0.107	6.200
	AT	278	466.228	451.504	6.999	2544.258
	SALES	278	587.442	663.014	19.706	3071.951
	COGS	278	453.395	520.476	17.282	2528.987
	SG&A	278	71.951	155.306	2.038	1461.799
	NPPE	278	288.015	325.001	2.851	1954.327
Yes	Br_num	370	1.857	1.408	1.000	8.000
	AHI	370	0.143	0.226	0.000	0.703
	Q	370	2.800	2.957	0.000	22.628
	AT	370	3464.055	7833.936	1.820	53854.300
	SALES	370	3457.392	5920.000	0.665	29060.600
	COGS	370	2344.630	3712.118	0.849	21239.100
	SG&A	370	332.848	539.740	1.172	2487.900
	NPPE	370	1959.555	5302.767	0.517	38785.900

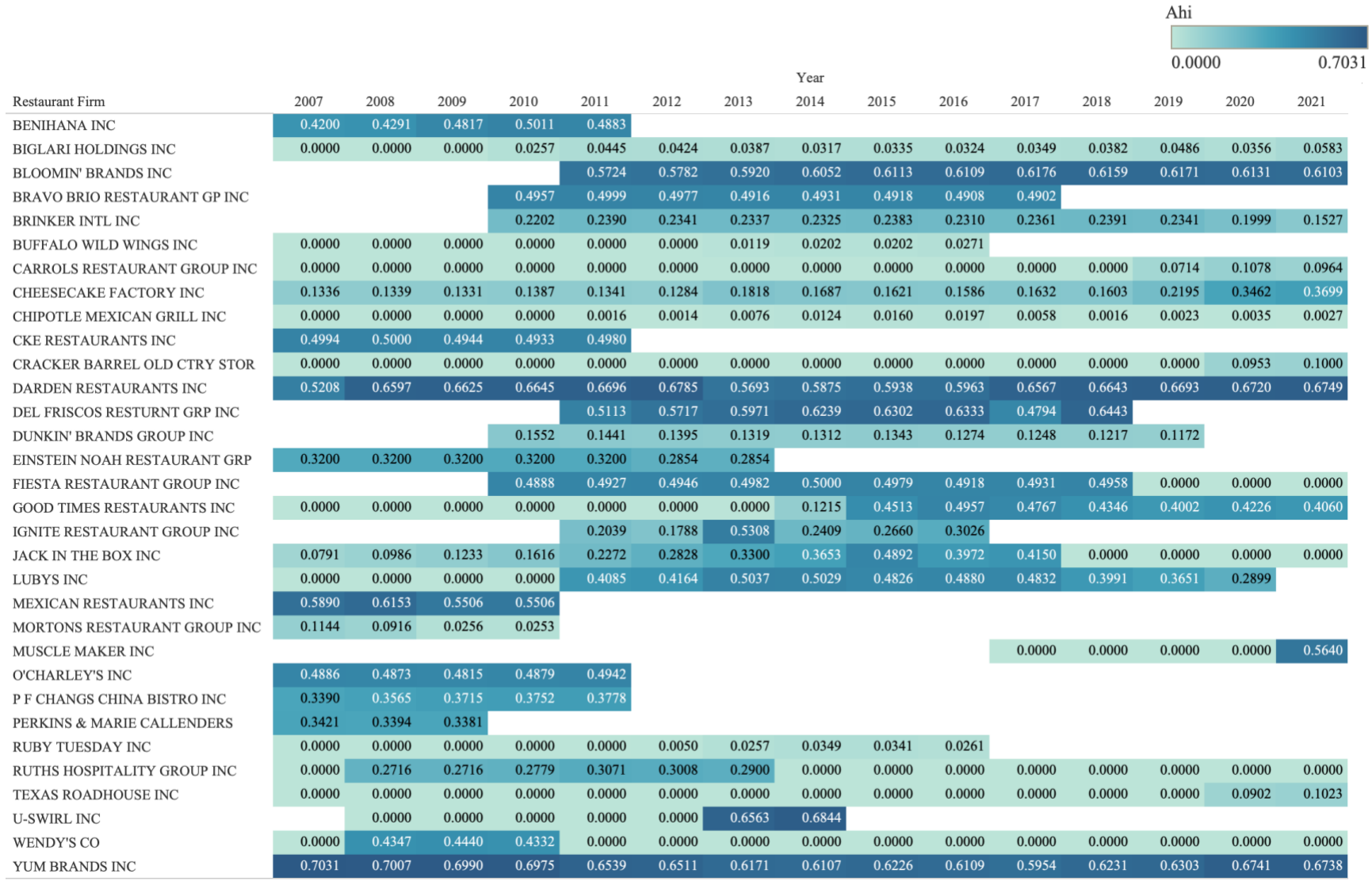
Note: Obs. = observations; SD = standard deviation; Br_num = brand number; AHI = adjusted Herfindahl index; Q = Tobin's *q*; AT = assets in $millions; SALES = sales in $millions; COGS = cost of goods sold in $millions; SG&A = selling, general, and administrative costs in $millions; NPPE = net property, plant, and equipment expenses in $millions

4.3. Brand Diversification

During inception, all restaurant firms begin with a single solution that can fill a void in the market. Over the history of restaurant firms, some grew by diversifying into multiple-brands, whereas others chose to remain single-concept companies throughout. Generally, restaurant firms expand via brand diversification to achieve economies of scope. Figure 4 illustrates the time series trend characterizing brand diversification by multi-brand firms from 2007 to 2021. The darker the color of the bars, the greater the degree of brand diversification. In 2007, for instance, Yum Brands (AHI = 0.7031) achieved the most extensive brand diversification. The average level of brand diversification among multi-brand restaurant firms was 0.347 (Table 6). On this basis, the restaurant firms' diversification was considered as a lower – or a higher level of diversification.

Not all restaurant firms have the same number of brands throughout the entire study period of 2007 to 2021 with some acquired more brands, while some firms revert to single brand. For instance, refer to Table 9, Luby's Inc. and Buffalo Wild Wings Inc., developed their businesses as single brands but switched to a multiple-brand strategy beginning in 2011 and 2013, respectively. Others, such as Wendy's Inc. and Jack in the Box Inc., abandoned their multiple-brand businesses and have focused on single-brand operations since 2011 and 2018, respectively. In addition, the firms that adopted multi-brand strategies implemented this brand strategy intended to continually regulate the extent to which they performed brand diversification such as Yum Brands Inc. and Darden Restaurants Inc.

Further to illustrate brand diversification trends, Table 9 presents the ranking of the studied restaurant firms based on the brand diversification measured by the AHI over the recent three years. The year 2019 saw Darden, which owned eight brands, engage in the highest degree of brand diversification (AHI = 0.644). In 2020, however, even though Darden had twice the number of brands as Yum Brands, Yum had a slightly higher AHI (0.674) than Darden (0.672). This is because the AHI is a more accurate measure that considers the proportion of sales generated by each brand, implying that having many brands does not always mean that greater brand diversification is achieved. As shown in Table 9, many of the sampled firms did business under one brand in 2019 (e.g., from No. 12, BJ's Restaurant, to No. 38, Wingstop).



Restaurant Firm	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
BENIHANA INC	0.4200	0.4291	0.4817	0.5011	0.4883										
BIGLARI HOLDINGS INC	0.0000	0.0000	0.0000	0.0257	0.0445	0.0424	0.0387	0.0317	0.0335	0.0324	0.0349	0.0382	0.0486	0.0356	0.0583
BLOOMIN' BRANDS INC					0.5724	0.5782	0.5920	0.6052	0.6113	0.6109	0.6176	0.6159	0.6171	0.6131	0.6103
BRAVO BRIO RESTAURANT GP INC				0.4957	0.4999	0.4977	0.4916	0.4931	0.4918	0.4908	0.4902				
BRINKER INTL INC				0.2202	0.2390	0.2341	0.2337	0.2325	0.2383	0.2310	0.2361	0.2391	0.2341	0.1999	0.1527
BUFFALO WILD WINGS INC	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0119	0.0202	0.0202	0.0271					
CARROLS RESTAURANT GROUP INC	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0714	0.1078	0.0964
CHEESECAKE FACTORY INC	0.1336	0.1339	0.1331	0.1387	0.1341	0.1284	0.1818	0.1687	0.1621	0.1586	0.1632	0.1603	0.2195	0.3462	0.3699
CHIPOTLE MEXICAN GRILL INC	0.0000	0.0000	0.0000	0.0000	0.0016	0.0014	0.0076	0.0124	0.0160	0.0197	0.0058	0.0016	0.0023	0.0035	0.0027
CKE RESTAURANTS INC	0.4994	0.5000	0.4944	0.4933	0.4980										
CRACKER BARREL OLD CTRY STOR	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0953	0.1000
DARDEN RESTAURANTS INC	0.5208	0.6597	0.6625	0.6645	0.6696	0.6785	0.5693	0.5875	0.5938	0.5963	0.6567	0.6643	0.6693	0.6720	0.6749
DEL FRISCOS RESTURNT GRP INC					0.5113	0.5717	0.5971	0.6239	0.6302	0.6333	0.4794	0.6443			
DUNKIN' BRANDS GROUP INC				0.1552	0.1441	0.1395	0.1319	0.1312	0.1343	0.1274	0.1248	0.1217	0.1172		
EINSTEIN NOAH RESTAURANT GRP	0.3200	0.3200	0.3200	0.3200	0.3200	0.2854	0.2854								
FIESTA RESTAURANT GROUP INC				0.4888	0.4927	0.4946	0.4982	0.5000	0.4979	0.4918	0.4931	0.4958	0.0000	0.0000	0.0000
GOOD TIMES RESTAURANTS INC	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1215	0.4513	0.4957	0.4767	0.4346	0.4002	0.4226	0.4060
IGNITE RESTAURANT GROUP INC					0.2039	0.1788	0.5308	0.2409	0.2660	0.3026					
JACK IN THE BOX INC	0.0791	0.0986	0.1233	0.1616	0.2272	0.2828	0.3300	0.3653	0.4892	0.3972	0.4150	0.0000	0.0000	0.0000	0.0000
LUBYS INC	0.0000	0.0000	0.0000	0.0000	0.4085	0.4164	0.5037	0.5029	0.4826	0.4880	0.4832	0.3991	0.3651	0.2899	
MEXICAN RESTAURANTS INC	0.5890	0.6153	0.5506	0.5506											
MORTONS RESTAURANT GROUP INC	0.1144	0.0916	0.0256	0.0253											
MUSCLE MAKER INC											0.0000	0.0000	0.0000	0.0000	0.5640
O'CHARLEY'S INC	0.4886	0.4873	0.4815	0.4879	0.4942										
P F CHANGS CHINA BISTRO INC	0.3390	0.3565	0.3715	0.3752	0.3778										
PERKINS & MARIE CALLENDERS	0.3421	0.3394	0.3381												
RUBY TUESDAY INC	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050	0.0257	0.0349	0.0341	0.0261					
RUTHS HOSPITALITY GROUP INC	0.0000	0.2716	0.2716	0.2779	0.3071	0.3008	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TEXAS ROADHOUSE INC	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0902	0.1023
U-SWIRL INC		0.0000	0.0000	0.0000	0.0000	0.0000	0.6563	0.6844							
WENDY'S CO	0.0000	0.4347	0.4440	0.4332	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
YUM BRANDS INC	0.7031	0.7007	0.6990	0.6975	0.6539	0.6511	0.6171	0.6107	0.6226	0.6109	0.5954	0.6231	0.6303	0.6741	0.6738

Figure 4. Adjusted Herfindahl Index (AHI) of the Multiple Brand Firms

Table 9. Ranking of the Restaurant Firms Based on the Adjusted Herfindahl Index (AHI)

No.	2019			2020			2021		
	Company	Br #	AHI	Company	Br #	AHI	Company	Br #	AHI
1	DARDEN RESTAURANTS	8	0.669	YUM BRANDS	4	0.674	DARDEN RESTAURANTS	8	0.675
2	YUM BRANDS	3	0.630	DARDEN RESTAURANTS	8	0.672	YUM BRANDS	4	0.674
3	BLOOMIN' BRANDS	4	0.617	BLOOMIN' BRANDS	4	0.613	BLOOMIN' BRANDS	4	0.610
4	GOOD TIMES RESTAURANTS	2	0.400	GOOD TIMES RESTAURANTS	2	0.423	MUSCLE MAKER	3	0.564
5	LUBYS	2	0.365	CHEESECAKE FACTORY	4	0.346	GOOD TIMES RESTAURANTS	2	0.406
6	BRINKER INTL	2	0.234	LUBYS	2	0.290	CHEESECAKE FACTORY	4	0.370
7	CHEESECAKE FACTORY	4	0.220	BRINKER INTL	2	0.200	BRINKER INTL	2	0.153
8	DUNKIN' BRANDS GROUP	2	0.117	CARROLS RESTAURANT	2	0.108	TEXAS ROADHOUSE	3	0.102
9	CARROLS RESTAURANT	2	0.071	CRACKER BARREL	2	0.095	CRACKER BARREL	2	0.100
10	BIGLARI HOLDINGS	2	0.049	TEXAS ROADHOUSE	3	0.090	CARROLS RESTAURANT	2	0.096
11	CHIPOTLE MEXICAN GRILL	2	0.002	BIGLARI HOLDINGS	2	0.036	BIGLARI HOLDINGS	2	0.058
12	BJ'S RESTAURANTS	1	0.000	CHIPOTLE MEXICAN GRILL	2	0.004	CHIPOTLE MEXICAN GRILL	2	0.003
13	CRACKER BARREL	1	0.000	BJ'S RESTAURANTS	1	0.000	BJ'S RESTAURANTS	1	0.000
14	CHUY'S HOLDINGS	1	0.000	CHUY'S HOLDINGS	1	0.000	CHUY'S HOLDINGS	1	0.000
15	DEL TACO RESTAURANTS	1	0.000	DEL TACO RESTAURANTS	1	0.000	DEL TACO RESTAURANTS	1	0.000
16	DENNYS CORP	1	0.000	DENNYS CORP	1	0.000	DENNYS CORP	1	0.000
17	DOMINO'S PIZZA	1	0.000	DOMINO'S PIZZA	1	0.000	DOMINO'S PIZZA	1	0.000
18	DUTCH BROS	1	0.000	DUTCH BROS	1	0.000	DUTCH BROS	1	0.000
19	FIESTA RESTAURANT	1	0.000	FIESTA RESTAURANT	1	0.000	FIESTA RESTAURANT	1	0.000
20	FIRST WATCH	1	0.000	FIRST WATCH	1	0.000	FIRST WATCH	1	0.000
21	FLANIGANS ENTERPRISES	1	0.000	FLANIGANS ENTERPRISES	1	0.000	FLANIGANS ENTERPRISES	1	0.000
22	HABIT RESTAURANTS	1	0.000	JACK IN THE BOX	1	0.000	JACK IN THE BOX	1	0.000
23	JACK IN THE BOX	1	0.000	KURA SUSHI USA	1	0.000	KURA SUSHI USA	1	0.000
24	KURA SUSHI USA	1	0.000	MCDONALD'S CORP	1	0.000	MCDONALD'S CORP	1	0.000
25	MCDONALD'S CORP	1	0.000	MUSCLE MAKER	1	0.000	NOODLES & CO	1	0.000
26	MUSCLE MAKER	1	0.000	NOODLES & CO	1	0.000	PAPA JOHNS	1	0.000

27	NOODLES & CO	1	0.000	PAPA JOHNS	1	0.000	PORTILLO’S	1	0.000
28	PAPA JOHNS	1	0.000	PORTILLO’S	1	0.000	POTBELLY CORP	1	0.000
29	PORTILLO’S	1	0.000	POTBELLY CORP	1	0.000	RED ROBIN BURGERS	1	0.000
30	POTBELLY CORP	1	0.000	RED ROBIN BURGERS	1	0.000	RUTHS HOSPITALITY	1	0.000
31	RED ROBIN BURGERS	1	0.000	RUTHS HOSPITALITY	1	0.000	SHAKE SHACK	1	0.000
32	RUTHS HOSPITALITY	1	0.000	SHAKE SHACK	1	0.000	STARBUCKS CORP	1	0.000
33	SHAKE SHACK	1	0.000	STARBUCKS CORP	1	0.000	SWEETGREEN	1	0.000
34	STARBUCKS CORP	1	0.000	SWEETGREEN	1	0.000	WENDY’S CO	1	0.000
35	SWEETGREEN	1	0.000	WENDY’S CO	1	0.000	WINGSTOP	1	0.000
36	TEXAS ROADHOUSE	1	0.000	WINGSTOP	1	0.000			
37	WENDY’S CO	1	0.000						
38	WINGSTOP	1	0.000						

Table 10 shows the results of the correlation analysis of the measures used to determine the degree of brand diversification (i.e., brand number, brand dummy, and AHI) carried out by the companies. The table indicates a high correlation between such measures. Simply, the degree of brand diversification can be used in analysis by using a dummy variable, which is dichotomous method (i.e., single-brand vs. multiple-brand firms). This degree can also be measured using the number of brands owned by a company. In this study, however, the main measure of brand diversification was the AHI ($1 - \Sigma S_i^2$, S_i represents the sales proportion of each brand). The coefficient of correlation between the AHI and the number of brands was 0.8180, and that between the AHI and the brand dummy was 0.7879, showing a strong and positive correlation between the measures.

Table 10. Correlations among Different Measures of Diversification

	Br_num	Br_dummy	AHI
Br_num	1.0000		
Br_dummy	0.7258***	1.0000	
AHI	0.8180***	0.7879***	1.0000

Note: *p < 0.1, **p < 0.05, ***p < 0.01, Br_num = brand number; Br_dummy = brand dummy; AHI = adjusted Herfindahl index

4.4. Cost-efficiency of Restaurant Firms

Adopting an effective business strategy is only half the story of a firm's success. Successful implementation requires the alignment of internal structures and resources to achieve operational efficiency. Thus, aside from examining brand diversification as a business strategy, this study also analyzed three cost variables (COGS, SG&A, and NPPE) to measure the operational efficiency of single- and multi-branded restaurant firms. The analysis involved the use of a Slacked-based model (SBM). COGS and SG&A

are the expenses from the income statement and NPPE is the tangible asset item from the balance sheet. These expenses are considered as main cost items, direct and fixed, to generate sales which are employed as the output variable of the SBM. Figure 5 presents the distribution of the restaurant firms' overall cost-efficiency and the inefficiency of individual input costs, as measured by the SBM, from 2007 to 2021. X axis indicates the efficiency/inefficiency value, and Y axis shows the number of restaurant firms. The average overall efficiency of the sample was 0.784, and the firms with an efficiency of 1 accounted for the largest proportion of the sample. The inefficiency of the COGS was relatively low, indicating that most of the restaurant companies efficiently managed such expenses. This achievement was made possible by the small variance in the ratio of the COGS to sales in the case companies. Conversely, the inefficiency distribution of SG&A and NPPE costs was larger than that of the COGS. COGS is the cost associated with food ingredients used to make menu items. COGS may vary depending on the restaurant firms, but roughly one-third of a restaurant's gross revenue goes toward paying for COGS, which means this cost does not change significantly in time series within a specific firm. However, SG&A or NPPE are highly variable in time series according to firm's investment. For example, in the case of SG&A, if advertising expenditures were high in a particular year, the volatility of SG&A may be large. Also, if a restaurant firm significantly increases its investment in tangible assets in a specific year, the volatility of that firm's NPPE will also increase.

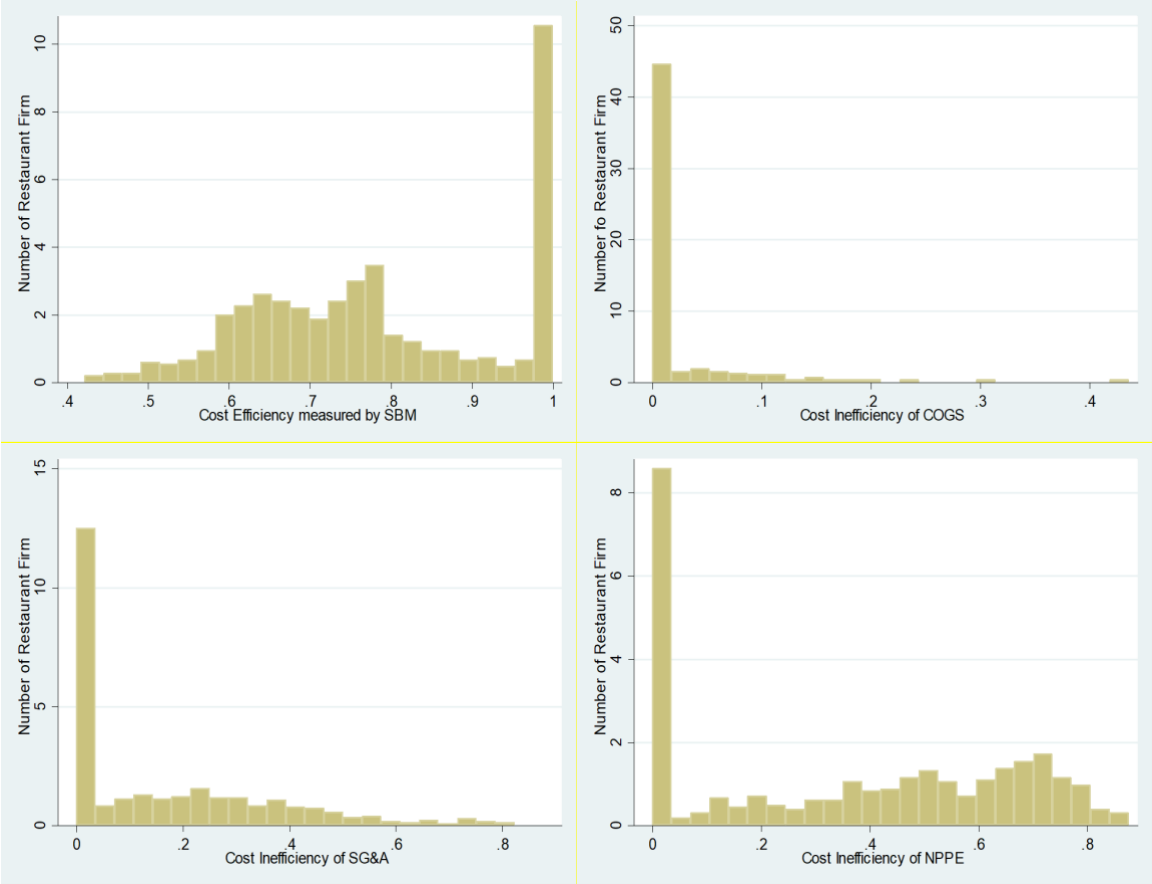


Figure 5. Distribution of Cost-efficiency in the US Restaurant Firms

Using more recent data of 2021 as an example, Table 11 lists the overall efficiency and inefficiency of each input (cost) variable, as determined by using the SBM for the sampled US restaurant firms (also labeled as decision-making units or DMUs; R1 to R34). Values related to cost-efficiency fell between 0 and 1, which were measured using the slack of corresponding cost variables. The SBM efficiency (SBM eff.) in column 3 is an efficiency value determined with a comprehensive consideration of the efficiency of the three input variables. The value of 0 in each cell means that an input variable, that is, the corresponding cost item, was efficiently used. Out of the 34 firms, 11, including Brinker International, Inc. (R1), earned an SBM efficiency score of 1, indicating that

these firms were fully efficient over the period studied. However, 23 restaurant firms, including Biglari Holdings Inc. (R2), operated inefficiently. Table 11 also provides the inefficiency rate of each input (cost) variable (columns 4 to 6, Ineff. COGS, Ineff. SG&A, and Ineff. NPPE). Inefficiency rates can be used to identify the amount of resources used inefficiently by a company. When a value other than 0 is obtained, inefficiency occurs to the extent denoted by the value. In other words, this also means that there is a certain amount of slack in inefficiently used resources. Thus, the larger the value of inefficiency, the greater the slack of the corresponding cost variable. For instance, restaurant firms such as Brinker International (R1), Wendy's Co. (R4), and McDonald's Corp. (R6) had an efficiency value of 1. Compare this with the overall cost-efficiency of Sweetgreen Inc. (R23), which was 0.495 (49.5%), rendering the company the least efficient among the sampled restaurant firms. The inefficiency of the companies potentially stemmed from tangible assets rather than from control over the cost of input, such as food.

Furthermore, Table 11 enables restaurant firms to identify which input variable was used inefficiently over 2021. For example, an examination of the inefficiency characterizing each input value of Sweetgreen Inc. (R23) showed that inefficiency did not occur in the COGS but that it typified 17.7% and 65.8% of the company's SG&A and NPPE costs, respectively. This inefficiency was due largely to the inefficient use of the firm's tangible assets. Similar results were obtained for the other companies. Most of the sampled restaurants had a COGS inefficiency of 0, implying full efficiency in terms of such expenses. The exceptions are Chipotle Mexican Grill (R30) and Bloomin' Brands Inc.

(R31), which had a COGS inefficiency of 0.1% and 0.3%, respectively. In terms of SG&A costs, the most inefficient restaurant firm in terms of SG&A costs was Dutch Bros Inc. (R20), which had an inefficiency value of 54.2%. The number of efficient and inefficient firms with regard to NPPE expenditure was 13 and 21, respectively, with Shake Shack Inc. (R13) being the most inefficient (79.3%).

Table 11. Cost-(in)efficiency of the US Restaurant Firms in 2021

DMU	Company Name	SBM eff.	Ineff. COGS	Ineff. SG&A	Ineff. NPPE
R1	BRINKER INTL	1	0	0	0
R2	BIGLARI HOLDINGS	0.636	0	0.017	0.653
R3	CRACKER BARREL OLD CTRY	0.871	0	0.141	0.223
R4	WENDY'S CO	1	0	0	0
R5	FLANIGANS ENTERPRISES	0.864	0	0	0.409
R6	MCDONALD'S CORP	1	0	0	0
R7	JACK IN THE BOX	1	0	0	0
R8	NOODLES & CO	0.738	0	0.035	0.674
R9	POTBELLY CORP	0.619	0	0	0.202
R10	DEL TACO RESTAURANT	0.712	0	0.161	0.704
R11	DENNYS CORP	0.752	0	0.189	0.554
R12	GOOD TIMES RESTAURANTS	1	0	0	0
R13	SHAKE SHACK	0.652	0	0.231	0.793
R14	WINGSTOP	1	0	0	0
R15	STARBUCKS CORP	1	0	0	0
R16	CHEESECAKE FACTORY	0.783	0	0.421	0.203
R17	PAPA JOHNS INTERNATIONAL	1	0	0	0
R18	KURA SUSHI USA	0.564	0	0	0.677
R19	MUSCLE MAKER	1	0	0	0
R20	DUTCH BROS	0.525	0	0.542	0.782
R21	FIRST WATCH RESTAURANT	0.742	0	0.086	0.688
R22	PORTILLO'S	0.777	0	0.302	0.368
R23	SWEETGREEN	0.495	0	0.177	0.658
R24	BJ'S RESTAURANTS	0.786	0	0.236	0.309
R25	YUM BRANDS	1	0	0	0
R26	RED ROBIN BURGERS	0.696	0	0.114	0.687
R27	DOMINO'S PIZZA	1	0	0	0
R28	TEXAS ROADHOUSE	0.989	0	0.033	0
R29	RUTHS HOSPITALITY GROUP	0.809	0	0	0.574
R30	CHIPOTLE MEXICAN GRILL	0.867	0.001	0.193	0.206
R31	BLOOMIN' BRANDS	0.973	0.003	0.078	0
R32	CARROLS RESTAURANT	0.748	0	0.509	0.206
R33	CHUY'S HOLDINGS	0.783	0	0.167	0.485
R34	FIESTA RESTAURANT GROUP	0.616	0	0	0.372

Note: SBM eff. is the efficiency score measured by SBM; Ineff. COGS, SG&A, and NPPE are the inefficiency scores of each input variable.

4.5. Results of Main Analyses

This study pursued three major objectives. The first was to verify the effects of brand diversification on firm performance. The second was to examine whether a non-linear relationship exists between brand diversification and firm value, and the third was to investigate the association between the brand diversification and cost-efficiency of restaurant firms. For main analyses to test hypotheses, 490 observations including the data period 2010 to 2021 were examined. Prior to regression analysis to test three hypotheses, main variables' correlation coefficient was examined as a preliminary analysis. Then, detailed results of regressions for hypotheses testing are as follows.

4.5.1. Correlation Coefficients for Regression Analysis

Table 12 summarizes the results on correlation among the major performance variables, the degree of brand diversification implemented by the US restaurant firms, and their efficiency. Tobin's *q* and brand diversification measured with the AHI had a considerably weak and negative correlation (−0.0971), denoting that more extensive brand diversification diminishes financial performance. By contrast, there was a weak but positive correlation (0.3179) between Tobin's *q*, which represents firm value, and overall cost-efficiency (or Eff.); that is, cost-efficiency increases a firm's value. Tobin's *q* was uncorrelated with COGS inefficiency but had a weak and negative relationship with the inefficiency in SG&A (−0.2486) and NPPE (−0.311) costs, respectively. These results imply that COGS has no impact on a firm's performance and that increased efficiency in SG&A and NPPE variables translates to weakened financial performance. The degree of brand diversification had no correlation with overall cost-efficiency, but it was weakly

and positively correlated with SG&A (0.0755) expenses, which were also positively affected by the existence of multiple brands. Finally, firm assets had a weak and positive correlation with Tobin's *q* (0.2273), AHI (0.1728), and overall efficiency (0.1411). The findings reflect that a restaurant firm's assets are positively related to the number of brands that it operates and its operational efficiency.

Table 12. Coefficients of Correlation among Accounting Items

	Q	AHI	Eff	Ineff. COGS	Ineff. SG&A	Ineff. NPPE	ln_AT
Q	1.0000						
AHI	−0.0971**	1.0000					
Eff	0.3179***	−0.0105	1.0000				
Ineff. COGS	−0.0550	0.0423	−0.2071***	1.0000			
Ineff. SG&A	−0.2486***	0.0755*	−0.7535***	0.1595***	1.0000		
Ineff. NPPE	−0.3110***	−0.0367	−0.6955***	−0.0797**	0.3070***	1.0000	
ln_AT	0.2273***	0.1728***	0.1411***	0.0168	0.0014	−0.1252***	1.0000

Note: *p < 0.1, **p < 0.05, ***p < 0.01, Q = Tobin's *q*; AHI = adjusted Herfindahl index; Eff = Efficiency measured by the SBM; Ineff. COGS, SG&A, NPPE = Inefficiency of each input variable; ln_AT = log of total assets

4.5.2. Impact of Brand Diversification on Firm Performance

Regression analysis was conducted to test the relationships between brand diversification and firm performance using the models outlined in Chapter 3. Specifically,

- H1: Restaurant firms using a single-brand strategy achieve performance levels that differ from those realized by companies that adopt a multiple-brand strategy.

In Table 13, models 1 to 3 show the results of regression analyses including AHI. In model 3, which consisted of all the control variables (i.e., AT, DER, SGR, FR, ID, AGE, year dummy), the regression coefficient of AHI was –1.534, which was statistically significant. However, these regressions were confronted with endogeneity problems, in

which the explanatory variable was correlated with the error term. To solve this issue, this study obtained the results of model 4 by conducting 2SLS regression on the instrumental variable, that is, the average AHI for the past three years. In this model, brand diversification also negatively affected firm value. All the four regression models considered year fixed effects. The regression coefficient of the AHI in model 4 was –1.424, and a high degree of brand diversification negatively affected firm value. The first hypothesis maintains that as the degree of brand diversification increases, the value of a firm decreases because multi-brand restaurant companies are relatively more inefficient in using inputs (costs) than single-brand firms; this means that the multi-brand firms cannot achieve economies of scale. The results relevant to the first hypothesis (H1) confirmed that brand diversification negatively influences the firm value measured by Tobin's *q*: The higher the degree of brand diversification, the more negative the outcomes in relation to firm value. That is, adopting a single-brand strategy has a more positive effect on firm value than using a multi-brand strategy. Thus, H1 is supported.

Table 13. Effect of Brand Diversification on Tobin's *q*

Variables	Tobin's *q*			
	(1)	(2)	(3)	(4) 2SLS
AHI	−1.194***	−1.293***	−1.534***	−1.424***
	(−2.95)	(−3.30)	(−3.79)	(−3.50)
AT	0.134**	0.011	0.075	0.070
	(2.46)	(0.20)	(1.19)	(1.14)
DER	3.278***	3.187***	3.210***	3.212***
	(19.94)	(20.01)	(20.19)	(20.60)
SGR	2.215***	1.960***	1.790***	1.793***
	(4.25)	(3.89)	(3.53)	(3.60)
FR	−0.682***	−0.969***	−0.877***	−0.886***
	(−3.18)	(−4.56)	(−4.07)	(−4.19)
ID		1.115***	0.975***	0.977***
		(6.03)	(5.00)	(5.11)
AGE			−0.348**	−0.336**
			(−2.20)	(−2.16)
Constant	0.061	0.517	1.370**	1.625**
	(0.12)	(1.01)	(2.15)	(2.45)
Observations	490	490	490	490
R-squared	0.5123	0.5472	0.5518	0.5517
Year FE	YES	YES	YES	YES

Note: *p < 0.1, **p < 0.05, ***p < 0.01, t-statistics in parentheses; AHI = adjusted Herfindahl index; AT = assets; DER = debt-equity ratio; SGR = sales growth rate; FR = franchise dummy; ID = internationalization dummy; AGE = log of firm's age; Year FE = year fixed effect

4.5.3. Non-linear Relationship Between Brand Diversification and Firm Performance

The results on H1 verified the relationship between brand diversification and Tobin's *q*. This study further analyzed whether this relationship is linear because the fact that an increase in the degree of brand diversification gives rise to the possibility of a negative effect on firm value is insufficient to confirm a non-linear association. Specifically,

- H2: There is a non-linear relationship between brand diversification and firm performance

As shown in Table 14, there was indeed a non-linear relationship between brand diversification and firm value, as evidenced by the regression coefficient (7.467) of the squared AHI (AHI_sq). Thus, H2 is supported.

Table 14. Non-linear Relationship of Brand Diversification and Tobin's *q*

Variables	Tobin's q
	(1)
AHI	−5.682***
	(−3.55)
AHI_sq	7.467***
	(2.68)
AT	0.055
	(0.87)
DER	3.178***
	(20.06)
SGR	1.655***
	(3.26)
FR	−0.895***
	(−4.18)
ID	1.009***
	(5.20)
AGE	−0.312**
	(−1.98)
Constant	1.454**
	(2.29)
Observations	490
R-squared	0.5585
Year FE	YES

Note: *p < 0.1, **p < 0.05, ***p < 0.01, t-statistics in parentheses; AHI = adjusted Herfindahl index; AHI_sq = squared value of AHI; AT = assets; DER = debt-equity ratio; SGR = sales growth rate; FR = franchise dummy; ID = internationalization dummy; AGE = log of firm's age; Year FE = year fixed effect

4.5.4. Cost-efficiency of Brand Diversification

The third hypothesis (H3) proposes that the cost-efficiency of restaurant firms varies depending on brand diversification strategy. Specifically,

- H3: The cost-efficiency of restaurant firms differs depending on the brand diversification strategies (a single- or a multiple-brand strategy) that they adopt.

Table 15 shows the findings of the data analysis of the entire sample covering the period 2010 to 2021. An analysis was also conducted regarding the effects of brand diversification on cost-efficiency but with data from the COVID-19 period (2020 and 2021) excluded. The pandemic has had a strong negative impact on sales and customer counts in the restaurant industry in general, but it did not affect the relationship found in

the analysis: Brand diversification negatively affected overall cost-efficiency. Nevertheless, the relationship was more statistically significant when data spanning the COVID-19 period were excluded. The regression coefficient of the AHI increased from full sample (−0.052) to exclusion of COVID-19 period (−0.085).

Regarding the effects of brand diversification on the inefficiency of each input cost, this process affected only SG&A inefficiency. In the model with SG&A inefficiency as a dependent variable, the regression coefficient of the AHI was significant and positive (0.097), reflecting that the higher the degree of brand diversification, the greater the SG&A inefficiency. Hence, H3 is supported. Meanwhile, among the control variables, the debt-equity ratio and firm age significantly affected cost-efficiency. The regression coefficient of the debt-equity ratio was 0.105, indicating that the higher this ratio, the greater the likelihood of a positive impact on cost-efficiency. The regression coefficient of firm age was −0.031, which implies that the older a company is, the more negative its cost-efficiency.

Table 15. Effects of Brand Diversification on Cost-efficiency

Variables	Full Sample (2010-2021)				Excluding COVID-19 Period (2010-2019)			
	Cost Efficiency	COGS Inefficiency	SGA Inefficiency	NPPE Inefficiency	Cost Efficiency	COGS Inefficiency	SGA Inefficiency	NPPE Inefficiency
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AHI	−0.052*	0.013	0.097**	0.004	−0.085**	0.014	0.116***	0.051
	(−1.65)	(0.90)	(2.40)	(0.06)	(−2.54)	(0.89)	(2.63)	(0.80)
AT	0.016***	−0.000	−0.005	−0.018*	0.016***	−0.001	−0.005	−0.016
	(3.29)	(−0.21)	(−0.72)	(−1.96)	(3.11)	(−0.28)	(−0.74)	(−1.61)
DER	0.105***	−0.020***	−0.085***	−0.131***	0.106***	−0.023***	−0.087***	−0.122***
	(8.53)	(−3.60)	(−5.35)	(−5.62)	(7.98)	(−3.54)	(−4.95)	(−4.78)
SGR	0.112***	−0.026	−0.035	−0.084	0.084*	−0.031	−0.018	−0.065
	(2.86)	(−1.46)	(−0.70)	(−1.13)	(1.81)	(−1.36)	(−0.30)	(−0.72)
FR	0.004	0.016**	0.042*	−0.038	−0.003	0.018**	0.059**	−0.040
	(0.23)	(2.06)	(1.96)	(−1.21)	(-0.19)	(2.00)	(2.48)	(−1.14)
ID	0.033**	0.009	−0.011	−0.064**	0.024	0.012	−0.019	−0.051
	(2.17)	(1.34)	(−0.56)	(−2.25)	(1.52)	(1.59)	(−0.89)	(−1.64)
AGE	−0.031**	−0.002	0.040**	0.052**	−0.043***	−0.002	0.045***	0.061**
	(−2.53)	(−0.32)	(2.56)	(2.23)	(−3.33)	(−0.27)	(2.64)	(2.45)
Constant	0.678***	0.010	0.138**	0.512***	0.721***	0.090***	0.013	0.196**
	(13.73)	(0.44)	(2.17)	(5.46)	(13.94)	(3.56)	(0.19)	(1.97)
Observations	490	490	490	490	421	421	421	421
R-squared	0.2873	0.2478	0.2921	0.2623	0.2809	0.2425	0.3056	0.2574
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: *p < 0.1, **p < 0.05, ***p < 0.01, t-statistics in parentheses; AHI = adjusted Herfindahl index; AT = assets; DER = debt-equity ratio; SGR = sales growth rate; FR = franchise dummy; ID = internationalization dummy; AGE = log of firm's age; Year FE = year fixed effect

4.6. Chapter Summary

To investigate the research problems and fulfil the objectives of this study, a series of statistical analyses were conducted to examine the relationship between brand diversification and the operational efficiency and financial performance of 68 publicly traded restaurant firms with 648 observations from 2007 to 2021 (unbalanced panel data). The regression analysis using instrumental variables revealed that the higher the degree of brand diversification, the more negative the firm value. This confirms the results of previous studies that reflected and analyzed relatively recent data in relation to H1. It also indicates that a single-brand strategy more positively influences firm value than a multi-brand strategy and that it produces positive economies of scale. In relation to H2, there was a non-linear relationship between the degree of brand diversification and firm value. This relationship persisted even when industry and company characteristic variables were controlled for in the regression model. Finally, the relationship between cost-efficiency and brand diversification related to the main drivers of the results on H1 was examined. With a negative link between the degree of brand diversification and firm value, H3 was tested under the premise that one of the aforementioned drivers may have been due to the cost-inefficiency stemming from brand diversification. The results showed that an increase in the degree of brand diversification caused a rise in cost-inefficiency. That is, brand diversification had a negative effect on overall cost-efficiency, with SG&A inefficiency being the largest. This result suggests that the negative influence of increased brand diversification on firm value arises from cost-inefficiency.

CHAPTER 5 DISCUSSION AND CONCLUSION

5.1. Introduction

The purpose of this study was to fill a research gap by accomplishing the following three primary objectives: (1) to examine the impact of business strategy, single versus multiple brands, on a restaurant firm's performance, (2) to investigate the non-linear relationship between brand diversification and firm performance, and (3) to investigate the relationship between cost-efficiency and brand diversification in the US restaurant industry. In essence, this study examines the effects of brand diversification on firm performance in the restaurant industry. Specifically, if brand diversification has a negative effect on firm value, the focus is to investigate whether the cause is related to cost-efficiency of the operation. This study used the adjusted Herfindahl index (AHI) to measure brand diversification, Tobin's *q* to measure firm performance, and the Slack-based model (SBM) in data envelopment analysis (DEA) to measure cost-efficiency. The SBM was used to measure the inefficiency of each cost item and overall cost-efficiency of restaurant firms. Using the publicly traded US restaurant firms, a total of 68 restaurant firms, was the sample for the longitudinal analysis of the study, with a total of 490 observations from 2010 to 2021. A two-stage least square (2SLS) regression consisting of instrumental variables was also conducted. This study found a negative impact of brand diversification on firm performance. This chapter discusses the main findings, as well as the theoretical and managerial implications of the research. It ends with a description of the study's limitations and future directions for research.

5.2. Discussion of Results

This study examined the relationships of brand diversification, firm performance, and cost-efficiency and all hypotheses are supported [*H1: Restaurant firms using a single-brand strategy achieve performance levels that differ from those realized by companies that adopt a multiple-brand strategy, H2: There is a non-linear relationship between brand diversification and firm performance, and H3: The cost-efficiency of restaurant firms differs depending on the brand diversification strategies (a single- or multiple-brand strategy) that they adopt.*]. The main results drawn in relation to the hypotheses are as follows. First, the restaurant firms that used a single-brand strategy exhibited greater firm value than those adopting a multi-brand strategy. Second, there was a non-linear relationship between the degree of brand diversification and firm value. Finally, as the degree of brand diversification increased, cost-inefficiency occurred.

5.2.1. Effects of Brand Diversification on Firm Performance

Determining the degree of brand diversification is an important strategic decision-making role of top managers in restaurant firms. The sample of US restaurant companies were largely divided into firms that use a single-brand strategy such as McDonald's and Starbucks, and firms such as Yum Brands and Darden, which use a multi-brand strategy. All are global restaurant firms that have achieved remarkable success in terms of branding and economic value. Both strategies are effective in contributing to success in these global firms. However, the results showed that when all other influencing factors for firm value were controlled for, a single-brand strategy had a positive effect on firm value. The negative impact of brand diversification is consistent with the findings of Choi

et al. (2011), who also investigated the US restaurant industry. The authors used longer-term data and strong econometric methodologies, but the value of a restaurant firm that uses a single-brand strategy was still found to be greater than that of a firm using a multi-brand strategy.

Brand diversification in the restaurant industry is underscored by the theory of corporate diversification, which has been an important topic in connection with traditional management strategies. One of the core research topics in the 1980s and 1990s was the effects of corporate diversification, which has been studied from a strategic perspective in the field of business administration. This stream of research emphasizes the advantages of corporate diversification based on the resource-based view. In corporate diversification, resource sharing is the most typical way to create synergy (Porter, 1985). If resource capabilities are identified from operations, such as manufacturing, marketing capabilities, and technology development, synergy can be achieved through the diversification of these capabilities (Nayyar, 1992). Strategic management theories argue for both the positive and negative effects of corporate diversification. In particular, several studies in developed capital markets generally contended that corporate diversification causes a decline in firm value (Berger & Ofek, 1995; Bill & Mauer, 2000; Comment & Jarrell, 1995; Denis, Denis, & Sarin, 1997; Lang & Stulz, 1994; Lewellen, 1971; Servers, 1996), but other studies have concluded that such diversification exerts a premium effect rather than a discounting effect (Bengtsson, 2000; Gillan, Kensinger, & Martin, 2000; John & Ofek, 1995).

If the assertions above are valid, an important task is to examine how brand diversification in the restaurant industry affects firm value. Restaurant firms typically grow through brand diversification, which is a business-level strategy, not a corporate-level strategy. Alternatively, they implement geographical diversification, wherein their restaurants' brands grow nationwide or through international markets. Compared with firms in other industries, restaurant companies have relatively limited access to businesses in other industries. Given such business characteristics, brand diversification is an important strategy for growth among restaurant firms. Brand diversification is also closely connected to diversification in strategic management because the former is aimed at transferring and sharing the operating systems of existing restaurant brands to other brands. Accordingly, related diversification has a more positive effect on the performance of a firm than unrelated diversification (Bettis & Mahajan, 1985; Rumelt, 1974). From this point of view, brand diversification within the restaurant industry, instead of diversification to business in other industries, is expected to affect firm value favorably.

Previous studies found that the greater the degree of brand diversification, the more negatively it affects the value of a restaurant firm (Choi et al., 2011; Kang & Lee, 2015). The same result was found in this study, although it used more recent data and a research model that minimized the violations inherent in an econometric model. Specifically, compared to previous studies on the brand diversification in the restaurant industry, 12 years of data from 2010 to 2021 were analyzed and a 2SLS regression model that alleviates endogenous problems was applied to obtain consistent estimates. The matter of interest is what causes a single-brand strategy to have a positive effect on the value of a

company. From this study, one may infer that focusing on a single brand more effectively offsets the synergistic effects of diversification (economies of scope) by expanding economies of scale. Various effects of economies of scope are caused by the employment of multiple brands, such as sharing marketing capabilities and increasing market expansion, but it is not expected to offset cost, which are economies of scale achieved from a single brand. With consideration for these issues, this study attempted to clarify economic effects through H3 to verify whether the difference between the two strategies arises from cost-efficiency (further explained in Section 5.2.3).

5.2.2. Non-linearity between Brand Diversification and Firm Performance

Several researchers have empirically examined the non-linear relationship between corporate diversification and performance. Their results imply that as diversification progresses to a certain level, firms can improve management performance using economies of scale and scope by applying their unique resources to various businesses; above a certain level, however, agency costs increase, thereby negatively affecting management performance (Palich, Cardinal, & Miller, 2000; Tallman & Li, 2000). In research on the restaurant industry, Park and Jang (2012) classified diversification into related and unrelated diversification and found a non-linear relationship between the degree of diversification and firm value measured by Tobin's q. The results suggest that restaurant firms do not benefit from a low level of related diversification. Although the present study found a non-linear relationship between diversification and firm performance, it was difficult to develop a discussion concerning brand diversification, as this is the first of its kind to investigate the aforementioned relationship in the restaurant

context.

As mentioned, H1 states that as the degree of brand diversification increases, it negatively affects the value of a firm. However, an equally meaningful issue for examination is whether this negative effect on firm value similarly applies to non-linear relationships. This study found a non-linear relationship between brand diversification and firm value, meaning that in certain situations, focusing on a single brand may not be the appropriate strategy. Most of the multiple-brand restaurant firms investigated in this study operated two brands, and only six firms (i.e., Yum Brands, Darden Restaurants, Bloomin' Brands, Cheesecake Factory, Muscle Maker, and Texas Roadhouse) operated more than three in 2021. The distribution of the restaurants in terms of brand ownership has a long tail to the right, but the number of brands has not changed significantly in the past 12 years. Nonetheless, as mentioned earlier, a non-linear relationship was identified. Based on the average Tobin's q determined according to the number of brands owned by a firm, firm value was highest among those operating a single-brand, lowest for firms operating two brands, and slightly increased for firms operating three or more brands. However, because this result is merely an average value, it is important to examine the non-linear relationship between brand diversification and firm value through the findings of the regression model wherein control variables (i.e., assets, debt-equity ratio, sales growth rate, firm age, the degree of franchising, the degree of internationalization and time effect) were considered. This examination confirmed the non-linear relationship between brand diversification and firm value as hypothesis 2 is supported.

5.2.3. Effects of Brand Diversification on Cost-efficiency

The results on H3 demonstrated that brand diversification negatively affected cost-efficiency of variables COGS, NPPE, and SG&A, indicating that the operation of multiple brands damages operational efficiency. Put differently, the cost-efficiency of restaurant firms is determined by how efficiently a given input cost is incurred—a task in which single-brand firms surpass multiple-brand companies. In regard to the concepts of economies of scale and economies of scope, a single-brand strategy focuses on maximizing economies of scale rather than achieving economies of scope because this strategy involves concentrating on reducing the cost incurred per unit rather than creating synergies through resource sharing between brands. Contrastingly, both economies of scale and economies of scope occur in the operation of multiple brands. The strategic difference between single- and multiple-brand strategies in terms of cost-efficiency lies in whether to focus on one economy of scale or generate limited economies of scale and simultaneously add economies of scope through brand diversification. As confirmed by the testing on H3, maximizing economies of scale via a single-brand strategy contributed to the achievement of greater cost-efficiency. This result supports the findings related to H1 (the greater the degree of brand diversification, the more negative the effect on firm value). In other words, cost-efficiency can be one of the factors by which brand diversification influences a firm's performance.

In terms of the effects of brand diversification on the inefficiency of individual input costs, no statistically significant effects on COGS or NPPE costs were found, regardless of brand strategy. However, brand diversification caused inefficiency in SG&A expenses,

denoting that unlike other inputs, cost-efficiency related to SG&A decreases in multiple-brand firms. More specifically, if a firm focuses on one brand, SG&A cost-efficiency increases.

This study did not directly measure the outputs and costs of economies of scale and scope but used the two concepts to interpret the analytical results on the cost-efficiency of single- and multiple-brand restaurant firms. Pennings, Barkema, and Douma (1994) argued that current resources are utilized by business units to realize economies of scale and scope using production facilities, distribution channels, and brand names. However, Hill, Ettenson, and Tyson (2005) contended that if the number of brands included in a brand portfolio increases, the economies of scope in manufacturing or marketing activities may decrease. The results of the present research can be interpreted to show that maximizing economies of scale through a single-brand strategy has a positive effect on firm value as opposed to maximizing economies of scope through a multi-brand strategy. On the grounds of the resource-based view in strategic management, the synergy effect of resource sharing through diversification is inapplicable to brand diversification in the restaurant industry. Schwandt (2009) suggested that operating multiple brands requires more organizations than those entailed in operating a single brand, resulting in organizational complexity and high internal transaction costs. Applying transaction cost theory into the results of this study, the higher the level of brand diversification, the less effective the restaurant firm is in utilizing the resources across different brands. Similarly, Palich, Cardinal, and Miller (2000) asserted that expanding to multi-brand operation suppresses economies of scope given the entry of marketing into various product

categories or various sub-markets. Although few studies in the field of management have been directed to brand diversification, the results of these investigations dominantly indicate that managing a firm with many brands results in cost-inefficiency—an assertion supported by the present research.

Recently, studies on the relationship between operational efficiency and performance in the restaurant industry have been conducted to analyze efficiency using the financial ratio and DEA models (Alberca & Parte, 2018; Mhlanga, 2018; Mun & Jang, 2018; Park, Choi, & Kang, 2020). These studies suggested that firm size, restaurant type, and financial soundness are factors that influence efficiency. Controlling for these factors, the present study identified the effects of brand diversification on firm performance through a statistical model. If achieving cost-efficiency is the motivation for a firm to operate multiple brands, the strategy could fail. Other sources of motivation, such as reinforcing market dominance, should be embraced.

5.3. Implications

5.3.1. Theoretical Implications

Even though brand diversification is a crucial growth strategy for restaurants, explorations into the motivation for and performance of brand diversification in the restaurant industry are scarce, except for the studies conducted by Choi et al. (2011) and Kang and Lee (2015). Several additional studies have been carried out in hospitality businesses, such as hotels and casinos, but their scope is limited.

In the present work, H1 was accepted, and the results in this regard are consistent with existing studies. However, the current research is the first to provide evidence of the negative impact of brand diversification in the restaurant industry, verifying that firms adopting a single-brand strategy are more cost-efficient than companies operating under a multiple-brand strategy. In this regard, the first contributions of this study are its addressing of the cost-efficiency of brand diversification and its identification of the source of inefficiency that negatively affects firm value.

Only a limited number of studies, even those that cover an entire industry, have investigated the impact of brand diversification on firm performance because certain industries have rare opportunities to apply brand diversification as part of strategic management and marketing. In general, all firms have brands, but they tend to diversify their businesses into different domains or diversify their products within the same category rather than diversifying brands. Conversely, restaurant firms grow by promoting their brands to consumers. Therefore, whether to grow one brand intensively or grow multiple brands by dispersing them to different markets can be an important management decision. This can be a good opportunity to discuss brand diversification among various diversification targets. Examples can be found in the hospitality industry, mainly those related to hotels and restaurants. Accordingly, most studies on general industries revolve around corporate, product, and market diversification rather than brand diversification. In the field of marketing, a brand (or product) expansion strategy entails efficiently applying positive brand equity related to consumer knowledge of parent brands to extended products. However, a restaurant firm’s brand diversification is unlikely to be an

expansion strategy wherein the parent brand's equity is transferred (Aaker, 1991; Keller, 1993); instead, it involves applying operational knowledge and systems to new brands. Therefore, brand diversification in the restaurant context is deeply related to operational efficiency and the growth strategies of restaurant firms to attract new customers by offering them more choices.

The second contribution of this study lies in its methodology, which involved defining cost-efficiency and measuring the individual efficiency of each input cost (COGS, SG&A, NPPE) to shed light on the effects of brand diversification on cost-efficiency. In the past, financial ratios were the primary measures of efficiency in restaurant firms (Mhlanga, 2018; Mun & Jang, 2018). These measures are useful for measuring absolute efficiency, but they are constrained when it comes to determining the relative efficiency of each input cost. Furthermore, measuring the relative efficiency of individual input costs in a general DEA model combined with CCR(Charnes–Cooper–Rhodes) and BCC (Banker–Charnes–Cooper) models is difficult. The study therefore ascertained the relative efficiency of cost control by a restaurant firm, and the overall cost-efficiency and cost-inefficiency of each input cost were calculated using a SBM to simultaneously integrate the multiple inputs and outputs of a production function. In doing so, this work introduced an applicable model for measuring the efficiency of individual input costs.

Third, this study adds to the strategic management literature from a resource-based theory (RBT) perspective. According to the RBT, corporate diversification positively affects the growth value of firms through resource sharing between diverse business sectors

(Chatterjee & Wernerfelt, 1991; Dierickx & Cool, 1989; Grant, 1991; Hamel & Prahalad, 1993; Porter, 1985; Vancil, 1980; Wernerfelt, 1984). Brand diversification also pursues the synergy generated by operating systems that manage geographically dispersed restaurants. If diversification simply exerts the effects of resource sharing efficiently, it will be possible to achieve economies of scope. The reality of the restaurant industry, however, is that the degree of brand diversification negatively affects firm performance because the economies of scale from single-brand operations exceed the economies of scope that occur in multiple-brand operations. This phenomenon does not contradict the results of existing corporate diversification derived from the RBT, but it demonstrates that taking a diversification strategy may be detrimental to maximizing firm performance given the inefficient use of resources.

5.3.2. Managerial Implications

Since the global outbreak of COVID-19 in 2020, the management difficulties of many US restaurant firms have increased. Sales amounted to $799 billion in 2021, down $65 billion from the levels achieved in 2019 (NRA, 2022). The pandemic has had a greater negative impact on the restaurant industry than other industries. In addition, food ingredient costs have risen significantly owing to the increase in the prices of major agricultural products, which has emerged as another crisis factor. Amid long-term inflation, the managers of restaurant firms face a new strategic choice, and they need to effectively make management decisions related to growth strategies.

This study provides the managers of restaurant firms with invaluable insight into strategic

choices regarding brand diversification. The empirical analysis that covered the past 12 years indicated that the firms using a single-brand strategy performed better than those taking a multiple-brand strategy. This means that the effects of single-brand firms' economies of scale offset the effects of multiple brand firms' economies of scope. Facing tough competition within the market, restaurant firms consider developing new brands when existing brands enter maturity in the brand life cycle. However, this could be a poor strategic choice in terms of cost-efficiency when the growth potential of existing brands remains. The top management team of a restaurant firm should understand the diverse nature and motivations underlying diversification, such as the realization of economies of scale and scope on the basis of resource-based theory, managerial capitalism on the basis of agency theory, and portfolio risk diversification on the grounds of portfolio theory. Note that even when such motivations are explored, increasing the level of brand diversification can diminish firm value because of inefficient cost management. Additionally, the prevailing idea is that corporate diversification in the general management field has a discounting effect on diversification. This argument aligns with the nature of brand diversification in the restaurant industry, and the results of this study support the aforementioned finding on discount effects.

In the case of US restaurant firms such as McDonald's and Starbucks, there is a wide US market where a single-brand strategy can be applied, and there is also the possibility of internationalization through such strategy. These options exist because companies can generate sufficient sales with one brand in overseas markets and maximize economies of scale. This study discovered that market expansion through one brand favorably affects

firm value and cost-efficiency, with geographical diversification, including the internationalization of US restaurant firms, being an important growth strategy. In the case of firms that implemented internationalization, the inefficiency of tangible assets (NPPE) was relatively small compared with that of companies that did not operate overseas. This finding suggests that the performance of restaurant firms seeking to internationalize as a single brand is remarkable (e.g., McDonald's). It also implies that even restaurant firms that adopt multi-brand strategies can have a more positive impact on firm performance by accelerating the internationalization of brand with high growth potential instead of increasing the number of additional brands that they operate.

Despite the results related to H1, there also existed a non-linear relationship between brand diversification and firm value. If the association between the variables was simply linear, a single-brand strategy could have been a superior strategy, but the existence of a non-linear relationship suggests that the strategy to be taken—whether single- or multi-brand—depends on the business conditions surrounding a firm. Specifically, brand diversification strategies should be established according to the size, brand value, franchise business development, degree of internationalization, growth rate, and financial soundness of a firm.

Finally, this study found that SG&A expenses were the most important major costs that needed to be managed by the restaurant firms. That is, these expenses were the factors that most strongly affected overall efficiency in relation to brand diversification. SG&A expenses include sales and general administrative expenses, sales-related labor costs,

advertising costs, and overall operational costs. These costs are addressed more efficiently by single-brand restaurant firms than their multiple-brand firms. For example, if a firm has a single brand, the efficiency of advertising costs will be more than that of operating multiple brands. In addition, the costs incurred in each brand can reduce economies of scope.

5.4. Limitations and Future Study

5.4.1. Limitations

Although this study has presented interesting findings and implications, it still has some limitations. First, the results of the study may not be generalizable in worldwide setting because the sample included only publicly traded U.S. restaurant firms. Therefore, the findings may not be applicable to restaurant firms operating in other countries or private restaurant companies. Many restaurant firms fail to create or manage new brands, and only strong brands survive and are known to customers in competitive markets. Moreover, single-brand restaurant firms that have remarkable performance also experience countless failures in brand diversification. Correspondingly, growing unlisted private companies may need to exert effort to develop new brands instead of focusing only on one existing brand.

Second, this study did not examine the moderating effects related to brand diversification in clarifying the research problem and satisfying the research purpose. Some studies uncovered the interaction effects of brand diversification and geographic diversification or franchising level, whereas the current study formulated no hypotheses in these

respects.

Third, this study introduced an SBM for measuring cost-efficiency, but not all costs were considered in the input. Attention was restricted to tangible assets (NPPE) among asset items and COGS and SG&A among cost items. For example, the input variable SG&A was not subdivided into advertising, sales, and general and administrative expenses. Because the number of sampled restaurant firms is around 30 each year, the SBM may not work appropriately if more than four or five inputs are examined. That is, when applying the SBM, the number of input and output factors should not be excessively large relative to the total number of DMUs.

Fourth, an appropriate instrumental variable was not found in the regression model introduced to test the hypotheses in this study. Based on existing studies, it was examined whether the number of executives, annual salary and compensation of executives, and firm age play a role as instrumental variables, but the condition for using as an instrumental variable were not met. Instead, the average value of AHI over the past three years, which represents the degree of brand diversification, was used as an instrumental variable. This might somewhat be insufficient to accurately obtain the consistent estimates in ordinary least squares (OLS) regression.

5.4.2. Future Study

This study left many research tasks to pursue in the future. For the restaurant firms, making strategic decisions about brand diversification is important, but some may seek

growth opportunities through various related and non-related businesses, that is, through corporate diversification. Future studies can explore the relationship between brand diversification and corporate performance in connection with related and unrelated diversification. To put it another way, researchers can comprehensively examine restaurant firms' strategies and performance levels through the keyword "diversification."

As mentioned in the limitations section, examining the moderating effects of brand diversification in consideration of various business characteristics played an important role in presenting the management implications of the study. In particular, it could be an interesting direction to identify the existence of an interaction effect of brand diversification by classifying the process into franchising, internationalization, and business type (quick service, fast-casual, fine dining). Many restaurant firms deliberate on whether to take a single-brand strategy or a multi-brand strategy, but the solution to such concerns is not simply brand diversification, and it is reasonable to weigh various strategic options simultaneously for company success.

Also, as a follow-up to this study, it would be interesting to examine in detail the motivation and performance changes of restaurant firms based on brand diversification strategies. As addressed in Chapter 4, there were three major trends in terms of brand diversification strategies across the restaurant firms; (1) the restaurant firms reverted their strategy from a single brand to multi-brand, (2) restaurant firms developed their business as multi-brands but switched to a single brand strategy, and (3) restaurant firms adopted a multi-brand strategy and managed the extent the level of diversification. Examining the

motivation and performance evaluation both quantitatively and qualitatively according to strategic changes would enrich study findings and provide more detailed strategic directions to restaurant firms.

Finally, given the considerable impact of COVID-19 on the restaurant industry, scholars can investigate financial performance in relation to the pandemic, with consideration for brand diversification strategies (a single-brand strategy vs. a multi-brand strategy), which group suffers management damage, or which group efficiently manages costs. Despite the importance of brand diversification in the restaurant industry, the number of studies on this matter remains insufficient. Applying various management and economic theories is expected to contribute to the development of the US restaurant industry.

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