Iranian Journal of Management Studies (IJMS) 2021, 14(3): 527-545
RESEARCH PAPER

The Effect of Dynamic Competitive Capabilities on Financial Reporting Quality: The Test of Source-Based Capabilities

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(Received: April 27, 2020; Revised: October 26, 2020; Accepted: December 16, 2020)

Abstract
The competitive environment of financial markets has made companies successful in this field that rely on the creation of pluralistic values, inimitable resources, and their competitive capacity to develop a coherent manner to gain more market share based on the capabilities they acquire. While having potential future returns from a competitive perspective, developing these capabilities, can also improve the level of interaction of the company with stakeholders and enhance the company's competitive performance. The purpose of this research was to examine the effect of the dynamic competitive capabilities on financial reporting quality. In this study, 93 companies in Tehran Stock Exchange during the period 2007 to 2018 were studied. In this study, technological capability based on Data Envelopment Analysis (DEA) was used to measure dynamic competitiveness and the quality of accruals, and voluntary accruals were used to measure the quality of financial reporting. The results of statistical analysis and testing of research hypothesis showed that the technology based on source-based approach has a positive and significant effect on the quality of corporate financial reporting. This result suggests that with the development of dynamic competitiveness, the company will be more capable of creating more sustainable resources at a competitive market level, which can lead to improved quality of corporate financial reporting.

Keywords: Financial reporting quality, Technological capacity, Dynamic competitive capabilities, Source-based capabilities.

Introduction

An in-depth study of developed economies throughout the world reveals that today's economy, unlike in the past, is largely dependent on improving dynamic competitive capabilities across the capital market to facilitate its growth and dynamics through the creation of investment attraction capacity (Wang & Hsu, 2018). Under these circumstances, gaining a competitive advantage based on a resource-based approach is regarded as one of the competitive capabilities for corporate management (Barney, 1991; Piotr, 2015). The distinctive competitive strength of companies operating across the capital market was explained fundamentally in the wake of the emergence of a resource-based approach.

This approach argues that the distinctive competitive strength of companies in this field lies in their unique resources and assets, both of which must be both functional and innovative

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and based on competitive values. Not all of these unique assets and resources are necessarily purchasable because they are made of unique capabilities. For example, although technological development is an asset that is based on capital and cash resources, the value and knowledge level created whereby is based on the learner approaches at the competitive levels of firms operating in the capital market (Wu et al, 2019). In other words, this approach considers several attributes for sources such as being valuable, rare, inimitable, and non-substitutable (Akbari & Esmailzadeh, 2013). That is to say, changes in the environment and market space have led to a more intense competitive environment; therefore, companies have inevitably turned to the exploitation of dynamic competitive capabilities based on a resource-based approach to grow and realize organizational goals.

Horngren et al. (2012) point out that companies can increase the utilization of market opportunities based on resource-based competitive capabilities. According to the resource-based view (RBV), companies are always striving to enhance their various infrastructures, including technology, by focusing on several competitive capabilities such as R&D. In fact, this approach, is in line with strategies such as the Blue Ocean strategy, because despite focusing on creating new markets, they seek to gain a competitive advantage by developing technological capabilities to maintain the existing market and then to gain more market share. Thus, information feedback is conveyed to the stakeholders more dynamically, leading to an increase in the effectiveness of the interaction between the firm and the stakeholders. The stage for this type of interaction will be set throughout the capital market by providing transparent financial reporting to shareholders and investors (Dierickx & Cool, 1989; Fung, 2018). Following a review of technological capability levels in the context of dynamic competitive capabilities, Li et al. (2010) stated that the lack of technological capabilities could lead to a decrease in the quality of financial reporting, as a firm with low competitiveness cannot compete against other firms with a competitive advantage. This is because the lack of these capabilities may be interpreted as a lack of response to market changes. In such a case, shareholders may lose confidence in the competitive capabilities of the company to gain more returns. Consequently, the company will face the risk of a financial crisis under these circumstances. In light of the abovementioned points, this study can be considered from two perspectives, namely theoretical and practical ones. From the research perspective, less attention has been paid to using a resource-based view (RBV) as a basis for focusing on competitive asset capabilities. RBV conceptual and content expansion can help increase the level of theoretical concepts in this field based on theories like organizational capability theory, sustainable capabilities, and so on. Moreover, the use of data envelopment analysis (DEA) as a basis for entering data from competitive strategic approaches such as research and development (R&D) can help better identify the approaches adopted by companies at the market level based on the decile classification. Therefore, this research can contribute to creating competitive capabilities in the framework of market recognition. The identification of competitors, market competitive positioning, etc., will help companies achieve higher profitability and returns through technological capabilities.

Given the abovementioned points, this study aims to investigate the effects of dynamic competitive capabilities on financial reporting quality by conceptualizing the technological capability of a company as a technical efficiency compared to competing firms in converting R&D resources into innovative products. The remainder of this paper is structured as follows. Section 2 presents theoretical foundations and approaches related to the areas of research interest based on literature review and hypothesis expansion. Section 3 introduces the research methodology based on the nature of analysis and research purposes. Section 4 illustrates the analyses. Finally, Section 5 provides theoretical discussion and argumentations related to research hypothesis testing along with practical recommendations.

Literature Review

Developing Dynamic Capabilities Based on Strategic Reference Points

Over the last two decades, scant research has been conducted on "organizational capabilities." Scattered theoretical foundations bear out this claim. It is still impossible to find an acceptable conceptual and theoretical framework that well describes organizational capabilities based on different components consistent with other organizational elements (Aruldoss et al, 2015). However, organizations are not similar; there are differences in the types of programs and actions taken by managers for development due to the nature, type, and strategic position of organizations. This can be attributed to the context in which these organizations are located (Wu & Vahlne, 2020), meaning different and influential dimensions faced by organizations (O'cass & Ngo, 2007). The SRP approach (a.k.a. congruency, matching, or coalignment) has occupied a key position in the strategic management research to better understand the market position of companies. This is because it contributes to value gain and creation in the market and improves the company's performance, interaction, and coordination between organizational elements and the environment.

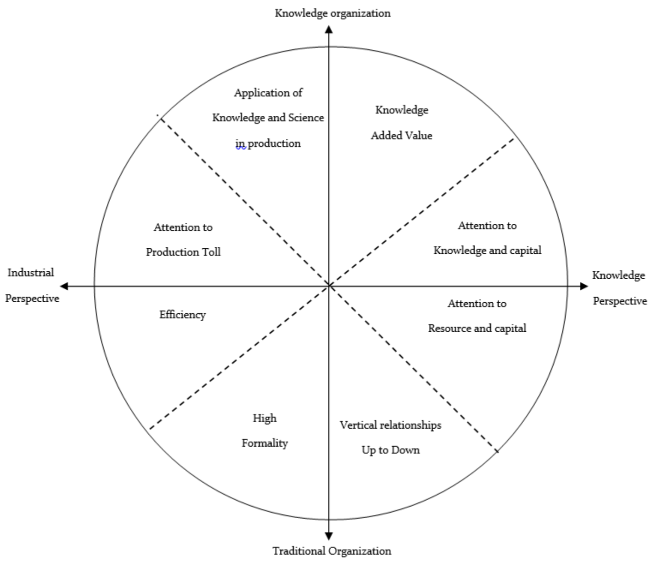

Figure 1. The Central Dimensions of Determination of the Types of Organizational Strategy Capabilities (source: Valian et al., 2017: 135)

This model is based on dynamic / stable capabilities under competitive conditions. Sustainable capabilities are usually defined as acquired and fixed from collective activities through which the organization systematically creates and modifies daily operational activities in order to achieve higher efficiency. In other words, sustainable capabilities are evolutionary and are developed through organizational learning (Attaran et al., 2012). In a conceptual definition, Helfat and Raubitschek (2007) defined sustainable capabilities as the capacity of an organization to create, develop, and modify purposefully resource-based reforms (Chang & Chuang, 2011). Sustainable capabilities can change the resources of an organization according to the circumstances. In fact, the sustainable capabilities of an organization are considered to create, develop, or purposefully modify the knowledge resources, capabilities, or routines of an organization to improve organizational effectiveness (Salunke et al., 2011). Eisenhardt (1989) states that sustainable capabilities are the daily routine by which a company acquires a new set of resources and through which the company's ability to achieve creative and innovative benefits is reflected. Sustainable capabilities can be generalized to the following two categories of capabilities.

a) Competitive Capabilities

Over the past decade, the focus of research had been on identifying the relationship between the industry environment and activity-creating activities for the company. One of approaches is competition-oriented competency (O'Cass & Weerawardena, 2009; Slater & Narver, 1995). This approach suggests that as companies learn how to overcome specific competitive challenges, they develop potentially valuable capabilities. These capabilities, in turn, can create significant competitive advantages for the company. Thus, the competitive industry environment enables companies to pursue innovative ways to create higher values for their customers, and this requires the development of distinctive capabilities (Weerawardena et al., 2006).

b) Technological Capabilities

Technological capability is the ability to control the costs associated with information technology, deliver systems when needed, and influence the business goals through the implementation of information technology (Ross et al. 1996). This capability has been studied from several perspectives such as how it relates to work design, process change, and the relationships between power and cooperation (Mulligan, 2002). A number of studies have also examined the capabilities of technology from the point of view of resource-based perspectives (Han et al., 2008; Tyler, 2001). Based on the point of view of resource-based approach to diversity, valuable, scarce, immutable, and irreplaceable resources create a competitive advantage. Therefore, information technology should be seen as an organizational capability that leads to competitive advantage by leading the company to superior performance (Zhang, 2005). Besides, based on the theory of resource advantage, Madhavaram and Hunt (2008) classified organizational resources in a hierarchy of basic resources (information, relational, and human resources), combined resources (e.g. a + b = c), and interconnected resources (e.g. a × b = c). Because organizational capabilities and/or competencies are formed through integrating basic resources (Hunt, 2000), it can be said that IT capability is a resource with combined factor. Combined resources can be measured by their components, which can be tangible or intangible at lower levels (Madhavaram & Hunt, 2008) Therefore, IT capability can have different dimensions depending on the number of IT-based virtual resources. Technological capabilities can be categorized into four sections, each with several components (Sher & Lee, 2004).

Table 1. Components of Technological Capabilities

Technological infrastructure	Implementing technology	Utilizing technology	Needed skills
Delivery of goods and services in time Sharing information Responding to software and hardware changes	Integrating its strategies with business strategies Facilitating learning process Developing knowledge and skills	Delegating IT functions to business units Mutual communication of management with IT	Technical skills Managerial skills

The resource-oriented perspective is a competitive performance model that focuses on the resources and capabilities under the control of the company as a source of competitive advantage, one of the dimensions of which is technology-oriented capability. Experimental evidence states that the structure of industry or external factors cannot be the only determinant of competitive strategy and competitive performance. This is why a group of resource-oriented theorists, with distinct strategic resource benefits, has proven that the most ultimate determinant is strategy and performance. This perspective is exactly in line with the phenomenon of knowledge-based competition. Such competition states that a company's long-term success depends on what it knows and understands. This is why competitors see competencies and capabilities as the key to success against their competitors. The source-based capability was introduced by Barney (1991) in which the key to success is to focus on intangible assets such as knowledge. In fact, these resources can act as a barrier to copying and imitating other assets. Hence, they are immutable, irreplaceable, valuable, and rare. Other capabilities include team knowledge, organizational culture, organizational history, learning, management skills, and so on. In fact, technological capabilities help the company to gain a competitive advantage and create more value for stakeholders than other competitors in the competitive market. In fact, competitive advantage includes a set of technological factors or capabilities that always enables the company to perform better than competitors (Cruz & Haugan, 2019).

Resource-Based View

According to the RBV, a firm’s competitiveness is determined by its possession of organizational resources and capabilities (Cruz & Haugan, 2019). Conceptualizing technological capability is as a firm’s technical efficiency relative to peers in transforming R&D resources into innovative output. Studies of the RBV have examined the manner in which technological capability contributes to performance and survival (e.g., Li et al., 2010), but the relationship between such capability and fraudulent financial reporting has never been examined. Drawing on the current fraudulent financial reporting literature, this study adds insights to the RBV by investigating the possible relationship between technological capabilities and accounting fraud. The RBV of a firm is a business management theory that examines markets with firm resource heterogeneity and imperfect resource mobility to determine the sources of competitive and sustained competitive advantages (Barney, 1991). Because it examines the link between a firm’s internal characteristics and its competitive advantages, the RBV is an ideal theory to study the firm’s performance. When firms provide maintenance services to a healthcare institution, two or more parties are involved, namely the agent (the maintenance service provider) and the principal (the healthcare institution). This relationship creates the potential for many problems to arise. On one hand, the principal and agent may have different interests; on the other hand, it may be difficult or expensive for the principal to verify the quality of the agent’s services (Eisenhardt, 1989).

Hypothesis Development

RBV-based competitive capabilities were introduced by Teece et al. (1997). They are seen as a strategic area of a company's competitive functions that help create and develop valuable resources based on an RBV (Mobini Dehkordi et al, 2016). These capabilities help integrate, create, and reshape internal and external competencies to respond to and react rapidly to the environment from various aspects, including technological, structural, environmental, etc. Companies with these capabilities seek competitive advantage by reflecting their capabilities in the market (Hosseinzadeh Shahri & Shahini, 2018). This study considers technological capability as the greatest source of sustainable competitive advantage among the dynamic competitive capabilities (Dierickx & Cool, 1989). According to the competitive performance models proposed by Wernerfelt (1984) and Barney (1991), each company is comprised of a set of resources and capabilities in which resources are a set of input factors used to fulfill business goals. Additionally, the firm's capabilities include its abilities in resource utilization (Amit & Schoemaker, 1993). According to Grant (2002) and Makadok (2001), although resources are considered as the core units of analysis, companies enjoy a competitive advantage by integrating them to create dynamic capabilities. It should be pointed out that the company's resource-based approach identifies a requirement for the capability to provide a sustainable competitive advantage. This capability cannot be transferred among companies (i.e., it is non-transferable) or imitated by competing companies (i.e., it is inimitable) (Fung, 2018). In studies such as those conducted by Dutta et al. (1999; 2005) and Li et al. (2010), the technological characteristics of a company have been conceptualized as the company's technical efficiency compared to other companies in converting R&D resources into innovative products by adopting a resource-based approach with a focus on advanced technology at the heart of competitive capabilities to enhance competitive advantage. It is found that investment in R&D resources per se could not lead to the emergence of a sustainable competitive advantage without sufficient technological capabilities because this investment could be replicated by competing firms (Fung, 2018). As one of the competitive capabilities in the form of technical efficiency compared to competing firms, technological capabilities meet the resource-based approach requirement concerning sustainable competitive advantage. This is because such capabilities are developed in the intra-organizational processes of a company, usually through internal path-dependent practical learning that cannot be transferred among companies or replicated by rivals (Coombs & Bierly, 2006). A company gains preference over its rivals by creating new knowledge in a similar research direction by practical learning through its unique understanding of its successful development processes emerging from prior knowledge (Helfat & Winter, 2011). Thus, in the absence of similar experiences, opponents cannot identify or replicate the technological capability of a company. This probably explains the ongoing inter-firm heterogeneity associated with technological capability in industries in the study of Dutta et al. (2005). The existence of the inimitable and non-transferable technological capability of a company across the capital market is certainly a key source of its sustained competitive advantage due to a distinct market and technological characteristics of companies operating throughout the capital market. The sustainable competitive advantage affects the manager's decision to disclose information in the form of financial reporting. This is due to the fact that a company with such a preference over rivals seeks a competitive advantage and a greater share in the capital market through timely disclosure of information and greater sustainability by enhancing the level of trust and confidence through the development of stakeholder interaction infrastructure (Barney, 1991). Financial and auditing research has found evidence that weaker-performing firms are likely to manipulate their financial statements to apparently improve their short-term financial performance under stable conditions (Fung, 2018). For example, Fung (2015) found that the possibility of fraudulent financial reporting by a company is increased by its poorer financial performance (e.g., earnings) compared to the mean performance of the competitors. In practice, however, the actual financial performance of the fraudulent company is not disclosed to investors as long as fraud is not detected. This indicates the low financial transparency of such companies. Therefore, the existence of competitive capabilities facilitates the promotion of inimitable and non-transferable capabilities and brings sustainable competitive advantage for companies. Accordingly, the research hypothesis states that,

- **Research hypothesis:** Technological capabilities based on a source-based approach have a significant, positive impact on the quality of corporate financial reporting.

Methodology

The present study was applied in terms of purpose and a quasi-empirical post-event research in terms of data gathering method in the field of positive accounting research, conducted using a logistic regression method. The statistical population under study was comprised of companies listed in Tehran Stock Exchange during the years 2007 to 2018, and the selected sample of the study was made of companies with the following set of conditions:

1. Companies that have been admitted to the Tehran Stock Exchange before 2007 and are on the Stock Exchange list by the end of 2018.
2. Companies whose fiscal year ends in March.
3. Companies that have not changed the business or changed fiscal year during the above-mentioned years.
4. Companies that are not part of the investment and financial intermediation companies (investment companies were not included in the statistical population because of the nature of the activity compared to other companies).

After applying the above limitations, 93 companies were selected. The data of the present study were extracted from the CDs of the statistical and image archive of the Tehran Stock Exchange, Tehran Stock Exchange web site, and other related databases, as well as from the Rahavard Novin software. Based on the given explanations, the theoretical framework of the research is as follows.

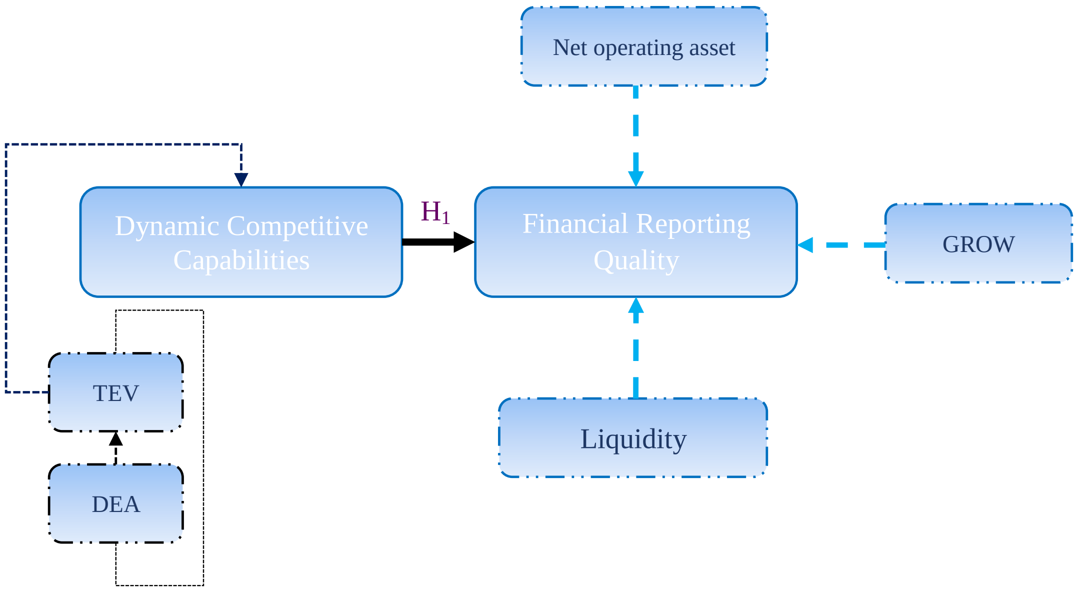

Figure 2. Theoretical Framework of Research

Research Variables

Independent Variable

Dynamic Competitive Capabilities

In his research, Makadok (2001) examined the role of technological capabilities as a criterion for the development of competitive capabilities/sustainability of companies, emphasized their role in internalizing coherent competitive processes, and introduced them as a factor in promoting economic returns of the companies. Competitive processes provides the company's economic returns through more efficient resource utilization compared to the opponents. Similarly, Amit and Schoemaker (1993) emphasized that capabilities demonstrate the ability of the company to efficiently combine resources to perform productive activities. Capabilities will lead to gaining a sustainable competitive advantage in terms of the company's technical efficiency in converting organizational resources into product-resources because these capabilities (embodied in intra-organizational processes) cannot be transferred or imitated. Following this discussion, Dutta et al. (1999) measured the capabilities of a company (defined as the company's technical efficiency in converting the input to output) over its competitors. Relying on the research by Dutta et al. (1999; 2005) and Li et al (2010) on RBV, this study measures technological capabilities in terms of competitive capability criterion as the relative technical efficiency of a company by which it transforms R&D resources into an innovative product. Following the study by Griliches (1984), the cumulative R&D resources of Company *i* in Year *t*, i.e., $RND_{i,t}$, are defined as follows:

$$RND_{i,t} = Ln\left[RDE_{i,t} + \sum_{1}^{\tau}(1-\gamma)^{\tau}\ RDE_{i,t-\tau}\right] \quad (1)$$

where: $RND_{i,t}$ is the R&D expenses of Company *i* in Year *t* and γ is the R&D investment rate measured using the natural logarithm of the total R&D expenses of the firms surveyed. Relying on the research by Namazi and Moghimi (2018) the infrastructure of technical innovation will be employed to extract R&D investment data. The DEA will be used to measure this variable; therefore, the inputs to this analysis are the ratio of training costs to total payroll costs, the number of professional staff, and R&D expenses. This cumulative measure is shown by the symbol $RDE_{i,t}$. This study used Griliches' (1984) assumption, constant value $\gamma = 0.4$, and $\tau = 3$ in Equation (1) to measure γ and τ values. Our will use the DEA to evaluate the technological capabilities of each company in terms of its technical efficiency compared to other rivals in converting cumulative R&D resources in the form of $PAT_{i,t}$ symbol into profitability. In other words, DEA outputs mean profitability. The main idea behind the DEA is to construct a nonparametric envelopment bound (i.e., production) along with the whole sample of input-output observations such that each observation is placed over or under the bound. The reason for using data envelopment analysis as a non-parametric basis is to estimate the efficiency of the performance of the surveyed companies in terms of technical efficiency as a basis for measuring technological capabilities. The measure of "relative return" for any company is derived from the distance between the company and the bound because it is interpreted as the "best performance" among its peers. Figure 1 shows the relationship among input/output, $RDE_{i,t}$ as input, and $PAT_{i,t}$ as output, based on the "constant returns to scale (CRS)" and "variable returns to scale (VRS)" approaches in the DEA.

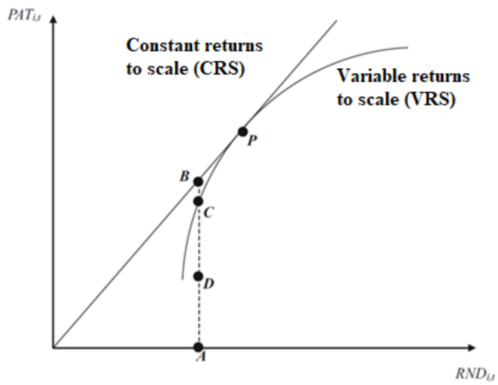

Figure 3. DEA to Measure Technological Capabilities as a Dynamic Capability Measure (Farrell, 1957: 257)

Given Company *i* active at Point *D*, its technical inefficiency in technological activities under CRS and VRS is shown by the distance between points B and D (i.e., BD) and between points C and D (i.e., CD), respectively. The difference between BD and CD, i.e., BC, indicates the scale inefficiency of the firm with respect to optimal production scale at point P. It is worth noting that Scale Inefficiency (BC) can be eliminated only by adjusting the input level to point P. On the other hand, Technical Inefficiency (CD) can be eliminated simply by improving the efficiency and utilization of existing inputs. As shown in Figure 2, the DEA efficiency measures are as follows:

$$TEV_{i,t} = AD / AC \quad (2)$$

$$SE_{i,t} = AC / AB \quad (3)$$

where $TEV_{i,t}$ is technical efficiency and $SE_{i,t}$ is the technology-based activity scale efficiency of Company *i*. The characteristics of these efficiency metrics are as follows:

- They take values between 0 and 1.
- They measure the efficiency to the best performance among the companies surveyed.
- $\frac{1}{TEV_{i,t}} - 1$ is a proportionate increase in technology-based outputs ($PAT_{i,t}$) without an increase in corporate technology-based inputs ($RND_{i,t}$) if the company maximizes its technical efficiency in moving from Point D to Point C in Figure 1.
- $\frac{1}{SE_{i,t}} - 1$ is a disproportionate increase in technology-basedness in which there is no scale efficiency at the input level (i.e., BC = 0); in this case, it indicates the distance between the current scale of production and the optimal scale at point P.

$SE_{i,t}$ is simply determined by investment in R&D resources to achieve the optimal production scale. Nevertheless, $TEV_{i,t}$ is associated with the company's non-transferrable and inimitable technological capabilities in transforming R&D resources into innovative products. The concept of "RBV" implies that $SE_{i,t}$ is less likely to be considered as a source of sustainable competitive advantage because rivals can potentially invest in R&D resources. Unlike $SE_{i,t}$, technological capability in the form of $TEV_{i,t}$ is not transferable among companies and cannot be imitated by competitors because it involves a series of intermediate steps between input and output embedded in intra-organizational processes (Dutta et al, 2005). This "non-transferable" and "inimitable" capability is regarded as a source of competitive advantage under RBV. Accordingly, this variable will be calculated based on $TEV_{i,t}$, i.e., technical efficiency. If $TEV_{i,t} \geq 0$, the technical efficiency-based technological capability would be largely inimitable, indicating the existence of technology-based capability in the companies surveyed, which take the value 1. On the other hand, $TEV_{i,t} < 0$ indicates the low technical efficiency of the companies investigated, i.e., the surveyed companies have no technology-baseness or have low technology levels, which take the value 0.

Dependent Variable

Financial Reporting Quality

Following the study by Iqbal et al. (2017), the difference between the criteria of "accruals quality" (AQ) and "discretionary accruals" (DA) is used to measure the quality of financial reporting. This is due to the fact that values lower than DA and higher than AQ indicate the firm's earnings quality and are thus more suitable for decision-makers economically. To measure the DA, the Jones-modified non-discretionary accruals are measured first:

$$NDA_{it}=\alpha_1\frac{1}{Assets_{it-1}}+\alpha_2\frac{\Delta Rev_{it}-\Delta Rec_{it}}{Assets_{it-1}}+\alpha_3\frac{PPE_{it}}{Assets_{it-1}} \quad (4)$$

where NDA_{it} is the DA of company i at time t; $Assets_{it-1}$ is the total assets of company *i* at time *t*; ΔRev_{it} is the change in earnings in company *i* at time *t*; ΔRec_{it} is the net change in accounts receivable in company *i* at time *t*; PPE_{it} is the property, machinery, and equipment owned by company *i* at time *t*, and α_1, α_2, α_3 are the specific parameters of the companies. To determine the parameters α_1, α_2, α_3 according to the modified Jones model (1991), the model is presented based on year and industry as follows:

$$\frac{TA_{it}}{Assets_{it-1}}=\alpha_1\frac{1}{Assets_{it-1}}+\alpha_2\frac{\Delta Rev_{it}-\Delta Rec_{it}}{Assets_{it-1}}+\alpha_3\frac{PPE_{it}}{Assets_{it-1}}+\varepsilon_{it} \quad (5)$$

where TA_{it} is the total assets of company *i* at time *t*, and α_1, α_2, α_3 are the OLS estimates for these parameters. The calculated total accruals are "net income" minus "operating cash flows (OCF)." Accordingly, in this model, "industry-years" of less than 10 years are excluded and the following equation is presented. DA is calculated by subtracting non-discretionary accruals (NDAs) from total accruals. A higher DA indicates diminished financial reporting quality. Therefore, it should be multiplied by -1 so that the higher values indicate greater reporting quality.

The model by Francis et al. (2005) is used to calculate AQ:

$$TCA_{it}=\varphi_0+\varphi_1 CFO_{it-1}+\varphi_2 CFO_{it}+\varphi_3 CFO_{it+1}+\varphi_4\Delta Rev_{it}+\varphi_5 PPE_{it}+v_{it} \quad (6)$$

where TCA_{it} are the total accruals of company *i* at time *t*: CFO_{it-1} is operating cash flow in company *i* at time *t – 1*; CFO_{it} is operating cash flow in company *i* at time *t*; CFO_{it+1} is operating cash flow in company *i* at time *t + 1*; ΔRev_{it} is the change in earnings in company *i* at time *t* and PPE_{it} is the net property, equipment, and land owned by company *i* at the time *t*

Control Variables

Based on the findings from the literature related to this study and following the research by Fung (2018), Mendelson and Kraemer (1998), and Bolton et al. (2006), the following control variables will be considered in this study.

- $GROW_{i,t}$, measured by market-to-book ratio, reflects the investors' expectations of future corporate performance. Companies operating throughout the market may lose their levels of capability due to a lack of technological capability and reduce the quality of their financial reporting due to the high investor expectations. Hence, it is expected to witness an increase in the quality of financial reporting with $GROW_{i,t}$ increase because companies with the high investor expectations have high levels of disclosure of financial information (Bolton et al, 2006).
- Net operating assets ($NOA_{i,t}$) is defined as "Shareholders Equity plus Liabilities minus Cash/Marketable Securities divided by Total Sales." This variable represents the net asset on the balance sheet. Therefore, it is expected to see a direct relationship between financial reporting quality and $NOA_{i,t}$ (Barton & Simko, 2002; Dechow et al, 2011).
- Liquidity ($LQD_{i,t}$) is defined as cash and cash equivalents (CCE) divided by current liabilities. It is expected to see an increase in the quality of financial reporting with LQDit because a firm's severely limited liquidity weakens its competitiveness by a decrease in its ability in terms of technological capabilities (Hall et al, 1998).

Research Models

Considering the characteristics of the research variables as well as the hypothesis proposed, the research hypothesis model is evaluated using Equation (7):

$$AQ_{it} = \alpha_0 + \alpha_1 TEV_{i,t} + \alpha_2 RND_{i,t} + a_3 GROW_{i,t} + \alpha_4 NOA_{i,t} + \alpha_5 LQD_{i,t} + \varepsilon_{it} \quad (7)$$

where AQ_{it} is financial reporting quality in company *i* at time *t*. Moreover, to better analyze the regression, the research hypothesis model should note that if $TEV^*_{i,t}$ is an optimal scale, i.e., $TEV_{i,t} \geq 0$ (i.e., point P, in Figure 2), based on DEA, R&D expenses ($RND_{i,t}$) are considered as desirable and effective in developing competitive capabilities of companies, according to Equation (7). This, by default, can lead to an enhanced financial reporting quality. Finally, it should be pointed out that if no distinction can be made between companies with unique technology (innovative) and companies with repetitive technology, ρ_1 and ρ_2 are expected to be equal to 0. $\rho_1 \neq \rho_2$ is also possible because scale efficiency can be easily increased when firm performance is higher than optimal rather than poor performance.

Results

This section firstly presents descriptive statistics of research variables and then inferential statistics in DEA format to measure technological capability as well as default and hybrid models, and to test research hypotheses.

Data Envelopment Analysis (DEA)

DEA is the evaluation of the relative performance of a decision-making unit (DMU) similar to the companies examined in this study. The performance score of each company (DMU) falls within the range of 0-1. The most efficient DMU achieves a performance score of 1, which is considered to be the "best performance" (i.e., boundary) criterion among peers. The lower the DMU (1, i.e., below the boundary), the more inefficient the DMU will be compared to the best performance. Following the research by Banker et al. (1984) and Rejivor (1998), this study uses the following equation, based on linear programming in technology, as an exogenous variable:

$\max \theta_h$

Provided that:

$Y\lambda \geq \theta_h PAT_h$

$X\lambda \leq RND_h$

$\lambda j = 0 \text{ if } t_j > t_h \text{ for all } j \neq h$

$I_{\acute{N}\lambda} = 1$

$\lambda \geq 0$

where $1 \leq \theta_h \leq \infty$; $Y = (PAT_1, \dots, PAT_N)$; $X = (RND_1, \dots, RND_N)$; $t_1, \dots, t_N$: is the time trend that controls exogenous technical progress, and λ is the vector $N \times 1$ of 1. By applying the constraint $\lambda j = 0 \text{ if } t_j > t_h \text{ for all } j \neq h$, this model eliminates some observations with more advanced technology than reference sets (i.e., a more favorable setting). The condition $I_{\acute{N}\lambda} = 1$ applies the variable CRS to the solution of the problem. $Y\lambda \geq \theta_h PAT_h$ and $X\lambda \leq RND_h$ are interpreted as follows. Choose a composition by weight of all input observations ($X\lambda$) that uses the largest possible input observations under the evaluation of RND_h to generate the largest possible multiplication of output observations under the evaluation of $\theta_h PAT_h$. The input-output observation is efficient when its output is produced by making the best use of its input, that is, if one cannot find a λ that produces $\theta_h > 1$. This efficient observation specifies a point at the boundary with $\theta_h = 1$ because its efficiency cannot be increased compared to other observations. If $\theta_h > 1$, then $\theta_h - 1$ will be a proportionate increase in PAT_h without an increase in RND_h. Thus, $\frac{1}{\theta_h}$ defines the efficiency score ranging between 0 and 1. The value of θ can be obtained for each input-output observation by solving the prior linear programming problem for N times. To distinguish "scale efficiency" from "technical efficiency," the former can be calculated from the difference between θ and $\acute{\theta}$. $\acute{\theta}$ is the solution to the problem but without the limitations of VRS. In view of the foregoing points, to measure the technical efficiency, according to the research period (i.e., 2007-2018), R&D and R&D investment data should be calculated based on the specified ratios. Thus, the maximum desirable technical efficiency can be determined according to the purpose of the research. In the following table, the specified deciles use the functions calculated based on the characteristics of "training costs to total payroll costs," "the number of professional staff," and "R&D expenses" as input variables and "profitability" as the output variable to analyze performance evaluation in the period.

Table 2. Calculation of Technical Efficiency

Deciles	Maximum efficiency (MAX θ)	Technical efficiency 2014	Technical efficiency 2015	Technical efficiency 2016	Technical efficiency 2017	Technical efficiency 2018
1st Decile	Bad	0.811	0.2109	0.1594	0.1881	0.0923
2nd Decile	Bad	0.975	0.7927	0.6517	0.4821	0.2127
3rd Decile	Mean	0.510	0.4603	0.7637	0.9310	0.8009
4th Decile	Good	0.629	0.7899	0.9501	1	1
5th Decile	Good	1	1	1	0.879	0.9398
6th Decile	Good	0.733	0.6534	0.9615	1	0.8541
7th Decile	Excellent	0.786	0.9425	1	1	1
8th Decile	Excellent	1	1	1	0.955	1
9th Decile	Excellent	1	1	1	1	0.9903
10th Decile	Excellent	1	1	1	1	1

In this analysis, a comparison was made between the technical efficiency of cost functions and R&D investment based on the above criteria, resulting in their efficiency score. Then, the "bad grade" and "mean grade" functions were evaluated together and the "mean grade" technical efficiency was calculated. In this model, based on the analysis of the table above, a specific coefficient was considered for each input variable since not all input variables had the same effect on output (i.e., profitability). As previously mentioned, the calculated "technical efficiency" fell within the range 0-1. Companies with a "technical efficiency" score of 1 were highly efficient companies and companies with that of less than 1 fell below the efficiency threshold. The latter should reach the efficiency boundary or technical efficiency with a reduction in expenditures or an increase in R&D investment. Technical efficiency was calculated to study technological capabilities based on R&D functions because its value was calculated more or less than the actual value due to those characteristics. On the other hand, a comparison was made between "good grade" and "bad and mean grades" and "good grade" technical efficiency. In the end, "excellent grade" technical efficiencies were evaluated along with all R&D functions. Furthermore, higher/lower technical efficiency scores were calculated because the level of technological capabilities determined was calculated based on the technical efficiency of "R&D expenses and investments" in accordance with the research hypothesis. Then, the optimal value of each output was obtained by doing a comparison between inefficient functions and reference units. Thus, it was determined how much each inefficient function increased its outputs until it reached its reference set. The following table uses the inverse technical efficiency of corporate R&D in the form of specified deciles. An "inverse efficiency" value of greater than 1 means that the decile is inefficient (Fung, 2018). It should be emphasized that the inefficient R&D functions of the companies located in these deciles need to be determined by putting them into deciles and inversing them in this section, given a large amount of data under review. For instance, the performance value of the second decile is 1.1129, indicating an inefficiency of 0.1129. It should increase output to the same extent to improve its efficiency.

Table 3. Optimal Value of Enefficient Decile Output and Values of Changes in Each (%)

		Training Costs to Total Payroll Costs		No. of Professional Staff and R&D Expenses	
Deciles	**Inverse Technical Efficiency**	**Change (%)**	**Optimal Value**	**Change (%)**	**Optimal Value**
1st Decile	1	0%	84,111,232,102	0%	523,326,783,818
2nd Decile	1.1129	6%	57,907,328,365	11%	250,252,833,111
3rd Decile	1.3438	33%	34,226,108,443	33%	252,649,114,834
4th Decile	1	0%	25,203,111,516	0%	144,487,773,556
5th Decile	1.0011	0%	5,938,333,121	0%	60,198,528,007
6th Decile	1	0%	21,318,546,126	0%	119,713,665,116
7th Decile	1	0%	14,329,870,611	0%	88,171,660,878
8th Decile	1.0443	22%	24,615,121,976	4%	141,627,148,692
9th Decile	1	0%	26,105,121,884	0%	202,600,154,590
10th Decile	1.0889	47%	26,417,299,218	8%	159,182,643,433

The following functions can be identified in the following table based on the results obtained by taking into consideration the technical efficiency of the deciles accomplished in terms of maximum efficiency.

Table 4. Low Management Performance Deciles

R&D Performance Deciles	Inverse Technical Efficiency
2nd Decile	1.1129
3rd Decile	1.3438
5th Decile	1.0011
8th Decile	1.0443
10th Decile	1.0889

As described in the measurement of the variable "technological capabilities," inverse technical efficiency is greater than 1 in the deciles presented in Table 3, i.e.,$\mathrm{TEV}_{i,t} < 0$, indicating the low technical efficiency of the companies surveyed. That is to say, these companies lack technology-basedness or at least possess low technologies, and so take the value 0. In contrast, companies located in deciles where $\mathrm{TEV}_{i,t} \geq 0$ with technical efficiency-based technological capability are largely inimitable, and so take the value 1. In a nutshell, the companies listed on the deciles where $\mathrm{TEV}_{i,t} < 0$ take 0, accordingly, suggesting that they lack technology-basedness.

Descriptive Statistics

It is necessary to be acquainted with the descriptive statistics of the variables to study the general characteristics of the variables as well as to estimate the model and analyze them in detail. Table 5 shows the descriptive statistics for the variables tested including some central and dispersion indices.

Table 5. Descriptive Statistics for the Research Variables

Variable	Observations	Mean	Median	Min	Max	SD	Skewness	Kurtosis
TEV	1116	0.455	0.440	0.000	1.000	0.299	0.105	1.723
RND	1116	8.431	8.490	6.260	10.470	1.206	-0.075	1.858
GROW	1116	0.367	0.370	0.100	0.630	0.151	-0.041	1.795
NOA	1116	0.374	0.360	-0.020	0.810	0.230	0.139	1.887
LQD	1116	1.996	1.980	1.000	3.010	0.567	0.092	1.873

According to Table 5, it should be noted that the Mean TEV technical efficiency of the reviewed companies is 0.455 based on descriptive statistics. This means that the technological capability of the companies is 0.455 and $TEV_{i,t} \geq 0$, indicating that the technological capability of the companies reviewed is inimitable. Nonetheless, since it is less than 0.5, it should be stated that the level of knowledge-basedness is very low in this domain, and the efficiency of training on payroll and the number of professional staff have been largely emphasized merely based on the investments made by companies. It also turned out that the logarithm of R&D spending is 8.431, indicating a slight difference between the firms under review with an SD below 1. The expected increased GROWTH as the first control variable is 0.367, indicating increased stock value, as expected by companies is less than 0.5. Likewise, according to net operating assets (NOA), 37.4% of the company's sales are related to NOA. Ultimately, it appeared that the ratio of LQD in the companies under study is 1.996, indicating that companies' liquidity is responsive to current liabilities.

Correlation Coefficient

The results of measuring the coefficient of correlation between research variables are presented in Table (6).

Table 6. Correlation Coefficient

	TEV	RND	ND	GROW	NOA	LQD
TEV	1					
RND	0/185*	1				
AQ	0.393*	0.241*	1			
GROW	0.079	0.013	0.225*	1		
NOA	0.078**	0.012	0.109*	0.062**	1	
LQD	0.238*	0.024	0.081**	0.011	0.016	1

* 1% significance level, ** 5% significance level

As can be seen, there is a significant, positive relationship between technical efficiency as a basis for dynamic capabilities and financial reporting quality (AQ) at a 95% confidence level and a 5% error level. The above results indicate a significant positive correlation between TEV and RND at a 1% error level. There is also a significant positive correlation between TEV and AQ.

Hypothesis Testing Results

For panel data, the F-Limer test is first used to determine whether the data is pooled or panel (Arbab et al, 2017). According to the results presented in Table 6, the significance level of the F-limer statistic is more than 0.05 for all models. Hence, the H0 test is accepted, indicating that the pooled data method should be used to estimate the research models.

Table 7. F-Limer Test Results for Research Models

Model	Dependent Variable	F-statistic	Significance Level	Result
Research Model	Financial Reporting Quality	0/886	0/776	Pooled Data Method

Besides, the likelihood-ratio test (LR) results to consider the assumption of heterogeneity of variance in model disturbance components indicate the heterogeneity of variance. The generalized least squares (GLS) method is used to solve this problem for estimating models. In addition, to ensure the absence of multicollinearity problem between the explanatory variables, the multicollinearity test was run using the variance inflation factor (VIF). Since the values for the explanatory variables are less than 10, there is no multicollinearity between them. Finally, the Durbin-Watson statistic was used to test the correlation between the model error components, the results of which are presented in Table 7. Accordingly, hypothesis testing results are presented in Table 8.

Table 8. Model Estimation Results

Variable	Symbol	(-/+)	Regression Coefficient	t-statistic	Significance Level	VIF
Intercept	C	+	1.070	31.945	0.000	-
Technical Efficiency	TEV	+	0.119	9.216	0.000	1.020
R&D spending logarithm	RND	+	0.153	47.810	0.000	1.016
Expected Growth	GROW	+	0.050	1.971	0.049	1.009
Net Operating Assets	NOA	+	0.037	2.222	0.027	1.030
Liquidity	LQD	+	0.075	11.068	0.000	1.015
R-Square	R^2			0.687		
Adj R-Square	R			0.685		
F-value	F			486/583 (0.000)		
Durbin-Watson	D − W			2/040		

According to the values of F-statistics in this figure, the overall significance of the fitted regression models is at a 5% error level. Moreover, the Durbin-Watson statistic values indicate that there is no self-correlation problem among residual terms. As shown in this figure, the estimated coefficient and t-statistic linked to technical efficiency variable (TVE) are positive and significant at a 5% error level, indicating a positive effect of technical efficiency on financial reporting quality. It was also found that R&D expenses (RNDs) had a significant positive effect on the quality of financial reporting in the firms under study, using the estimated coefficient and t-statistic at a 5% error level.

Conclusion

The purpose of this research was to investigate the impact of dynamic competitive capabilities on the quality of financial reporting by referring to resource-baseness in competitive capability theories. According to the hypothesis testing results, technological capability levels are seen as one of the sources of stagnation in a competitive environment. This helps the company maintain its resilience to environmental changes, respond more quickly, and develop its competitive capability to create new resources or new and innovative products. It also facilitates a more attractive corporate future for stakeholders with higher returns (or efficiency) and control of potential risks. Simply put, companies with technological capabilities are seeking to create value and maintain the necessary dynamics in a competitive setting based on R&D investments. In addition, it can be concluded that since competitive capabilities lead to the creation or absorption of new knowledge in various fields such as technology, they force successful companies in this field to disclose better information in financial statements. The reason for this is that these companies seek to gain the trust and confidence of shareholders and invest to provide the financial resources needed to advance their future investments by disclosing the quality of their financial operations. On the other hand, the existence of competitive capabilities and their disclosure by companies strengthen investment opportunities for the company, because many investment companies that aim to achieve greater returns look for leading companies in specific industries and markets. While providing a company with more market share by information disclosure get dynamic competitiveness. Information disclosure can also reduce financial constraints, because financial institutions and institutions gain more trust in the company. On the other hand, companies will attempt to communicate the news to the stakeholders through timely disclosure of the financial functions and R&D investment to increase the level of trust and confidence in the company to achieve greater returns. By integrating, reconfiguring, reorganizing, and adapting existing resources with desirable resources in response to environmental changes, the companies with this capability will seek to maintain their competitive performance levels and reflect more transparent information to stakeholders, accordingly. This information leads to improved decision-making capabilities, greater information symmetry, and reduced agency costs for the company, facilitating the increased investment attractiveness of the company and enhancing its competitive capabilities. From a different angle, it should be noted that the inimitable and non-transferable technological capabilities of a company will have a significant impact throughout the capital market as a major source of sustained competitive advantage in information disclosure in the form of financial reporting. This is due to the distinctive market and technological characteristics of companies operating throughout the capital market. The reason for this is that a company with such an advantage over competitors pursues two goals. First, it seeks to gain a competitive advantage and a greater share of the capital market through the timely disclosure of information. Second, it seeks greater sustainability by enhancing trust and confidence by developing stakeholder engagement infrastructures. The result of this hypothesis is consistent with those of Dutta et al. (2005), Barney (1991), Reichert and Zawislak (2014), and Fung (2015).

Suggestions and Limitations

Based on the results obtained, it is recommended to exploit all the knowledge resource capabilities of R&D teams to strengthen competitive capabilities in the form of technological capabilities. The reason is that these teams, as boundary-spanning teams, can provide reliable information to the company and help identify the changing environment and market potential. Consequently, the company might move to develop the technological and knowledge infrastructure to advance its competitive goals. On the other hand, they seek to communicate future investment approaches and the attractiveness of future returns to the market through interaction based on financial reporting quality, as well as winning the trust of stakeholders, including shareholders, investors, financial analysts, etc. Therefore, there will be a remarkable increase in the competitive capabilities of the companies. In addition, technological capabilities can help identify companies' investment opportunities and cause to select plans and projects. Despite the need for technology, this can lead to more financial returns and bring more market share to the company.

One of the limitations of this research was the lack of widespread disclosure of research and development at the capital market level as a measure of the sustainability and ranking of the companies, institutions, and relevant organizations. The disclosure of this variable can be asked from the stock exchange companies in the form of a mandatory requirement.

Moreover, considering the existence of research capacities on competitive capabilities it is recommended to interested researchers to examine the level of managerial capabilities in the form of qualitative analyses such as content analysis and grand theory to examine its impact on financial reporting quality. In addition, by dividing companies based on political relationships, technology capabilities can be developed based on LSD and Bonferoni test analyses to examine the differences in political influence as a moderator variable.

References

Akbari, M., Esmaeelzade, M. (2013). The role of dynamic capabilities in creating competitive advantage. *Business Management Perspective. 15*(3), 127-144. (In Persian).

Amit, R., & Schoemaker, P. J. (1993). Strategic assets and organizational rent. *Strategic Management Journal. 14*(1), 33–46

Arbab, H., Emami Meibodi, A., & Rajabi Ghadi, S. (2017). The relationship between renewable energy use and economic growth in OPEC countries. *Iranian Energy Economics, 6*(23), 29-56

Aruldoss, M., Travis, M. L., & Venkatesan, P. (2015). A reference model for business intelligence to predict bankruptcy. *Journal of Enterprise Information Management, 28*(2), 186- 217.

Attaran, J., Divandari, A., & Adinov, H. (2012). A resource based view to identifying the influential factors in sustainable competitive advantage of banking service in Bank Mellat. *Journal of Business Management, 4*(2), 91-112

Banker, R., Charnes, A., & Cooper, W. W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. Management Science, 30(9): 1078–1092

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Managemen, 17*(1), 99-120. https://doi.org/10.1016/S0742-3322(00)17018-4

Barton, J., & Simko, P. J. (2002). The balance sheet as an earnings management constraint. *The Accounting Review, 77*(4), 1–27. https://doi.org/10.2308/accr-10037

Bolton, P., Scheinkman, J., & Xiong, W. (2006). Executive compensation and short-termist behavior in speculative markets. *Review of Economic Studies, 73*(5), 577–610. https://doi.org/10.1111/j.1467-937X.2006.00388.x

Chang, T.-C., & Chuang, S.-H. (2011). Performance implications of knowledge management processes: Examining the roles of infrastructure capability and business strategy. *Expert Systems with Applications, 38*(5), 6170-6178.

Coombs, J. E., & Bierly, P. E. (2006). Measuring technological capability and performance. *R&D Management, 36*(4), 421–438

Cruz, A, M., Haugan, G, L. (2019). Determinants of maintenance performance: A resource-based view and agency theory approach. *Journal of Engineering and Technology Management, 51*(10), 33-47. https://doi.org/10.1016/j.jengtecman.2019.03.001

Dechow, P. M., Ge, W., Larson, C. R., & Sloan, R. G. (2011). Predicting material accounting misstatements. *Contemporary Accounting Research*, *28*(1), 17–82.

Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science, 35*(3), 1504–1511.

Dutta, S., Narasimhan, O., & Rajiv, S. (1999). Success in high technology markets: Is marketing capability critical? *Marketing Science, 18*(4), 547–568.

Dutta, S., Narasimhan, O., & Rajiv, S. (2005). Conceptualizing and measuring capabilities: Methodology and empirical application. *Strategic Management Journal, 26*(12), 277–285. https://doi.org/10.1002/smj.442

Eisenhardt, K., (1989). Building theories from case study research. *The Academy of Management Review*, *14*(4), 532-550.

Farrell, M, J. (1957). The measurement of productive efficiency. *Journal of the Royal Statistical Society Series A, 4*(3), 253-290

Fung, M. K. (2015). Cumulative prospect theory and managerial incentives for fraudulent financial reporting. *Contemporary Accounting Research*, *32*(1), 55–75. https://doi.org/10.1111/1911-3846.12074

Fung, M. K. (2018). Fraudulent financial reporting and technological capability in the information technology sector: A resource-based perspective. 4(2): 11-32. *Journal Business Ethics*, https://doi.org/10.1007/s10551-017-3605-4

Grant, R. (2002). *Contemporary strategy analysis: Concepts, techniques, applications* (4th ed.). Blackwell

Griliches, Z. (1984). *R&D, patents, and productivity*. University of Chicago Press.

Hall, B., Mairesse, J., Brastetter, L., & Crepon, B. (1998). Does cash flow cause investment and R&D: An exploration using panel data for French, Japanese, and United States scientific firms. In D.

Audretch & A. Thurik (Eds.), *Innovation, industry evolution and employment*. Cambridge University Press

Han, H.-S., Lee, J.-N., & Seo, Y.-W. (2008). Analyzing the impact of a firm's capability on outsourcing success: A process perspective. *Information & Management, 45*(1), 31-42.

Helfat, C. E., & Winter, S. G. (2011). Untangling dynamic and operational capabilities: Strategy for the (N) ever changing world. *Strategic Management Journal*, *32*(11), 1243–1250.

Helfat, C., & Raubitschek, R. (2007). Product sequencing: Coevolution of knowledge, capabilities and products. *Strategic Management Journal, 21*(10/11), 961–979

Horngren, Ch., Datar, S. and Rajan, M. (2012). *Cost Accounting: A Managerial Emphasis*, 14th Edition, Upper Saddle River, NJ: Pearson. Greene, W. (2006). *Econometric Analysis*, Upper Saddle River, NJ: Prentice Hall, Inc.

Hoseinzadeh Shahri, M., Shahini, S. (2018). The impact of Dynamic Capability and Innovation Capability on Competitive Advantage. Journal of Business Administration Researches, 10(19): 123-141.

Hunt, S. D. (2000). *A general theory of competition: Resources, competences, productivity, economic growth*. Sage Publications.

Iqbal, A., Rao, Z., Tauni, M. Z., & Jebran, K. (2017). Modeling product market competition and reporting quality: The transitional economy of China . *Managerial Finance, 43*(2), 12-36.

Li, S., Shang, J., & Slaughter, S. A. (2010). Why do software firms fail? Capabilities, competitive actions, and firm survival in the software industry from 1995 to 2007. *Information Systems Research*, *21*(3), 631–654. https://doi.org/10.1287/isre.1100.0281

Li, S., Shang, J., & Slaughter, S. A. (2010). Why do software firms fail? Capabilities, competitive actions, and firm survival in the software industry from 1995 to 2007. Information Systems Research, 21(3): 631–654.

Madhavaram, S., & Hunt, S. (2008). The service-dominant logic and a hierarchy of operant resources: Developing masterful operant resources and implications for marketing strategy. *Journal of the Academy of Marketing Science, 36*(1), 67-82.

Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal, 22*(5), 387-401

Mendelson, H., & Kraemer, K. L. (1998). The information industries: Introduction to the special issue. *Information Systems Research, 9*(4), 298-312.

Mobini Dehkori, A., Vahabi, M., & Baghestani, B. (2016). Investigating the effect of internal resource re-configuration of dynamic capabilities on the businesses performance. *Human Resource Management in Oil Industry, 7*(28), 4-27. (In Persian).

Mulligan, P. (2002). Specification of a capability-based IT classification framework. *Information & Management, 39*(8), 647-658.

Namazi, M., Moghimi, F. (2018). Effects of Innovations and Moderating Role of Corporate Social Responsibility on the Financial Performance of the Firms Listed on the Tehran Stock Exchange in Different Industries. Accounting and Auditing Review, 25(2): 289-310

O'cass, A., & Ngo, L. V. (2007). Balancing external adaptation and internal effectiveness: Achieving better brand performance. *Journal of Business Research, 60*(2), 11-20.

O'Cass, A., & Weerawardena, J. (2009). The effects of perceived industry competitive intensity and marketing-related capabilities: Drivers of superior brand performance. *Industrial Marketing Management*, 12(2): 13-26.

Piotr, W. (2015). Exploring links between dynamic capabilities perspective and resource-based view: A literature overview. *International Journal of Management and Economics, 45*(1), 83-107. https://doi.org/10.1515/ijme-2015-0017

Reichert, F., M., & Zawislak, P., A. (2014). Technological capability and firm performance. *Journal of Technology Management & Innovation*, *9*(4), 20-35. https://doi.org/10.4067/S0718-27242014000400002

Ross, J. W., Beath, C. M., & Goodhue, D. L. (1996). Develop long-term competitiveness through IT assets. *Sloan Management Review, 38*(1), 31-42.

Ruggiero, J. (1996). On the measurement of technical efficiency in the public sector. European Journal of Operational Research, 90, 553–565.

Salunke, S. Weerawardena, J., & McColl-Kennedy, J. R. (2011). Towards a model of dynamic capabilities in innovation-based competitive strategy: Insights from project-oriented service firms. *Industrial Marketing Management*, *40*, 1251–1263.

Sher, P. J., & Lee, V. C. (2004). Information technology as a facilitator for enhancing dynamic capabilities through knowledge management. *Information & Management, 41*(8), 933-945.

Slater S. F., & Narver, J. C. (1995). Market orientation and the learning organization. *Journal of Marketing*, *59,* 63-74.

Teece, D. J, Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509-533.

Tyler, B. B. (2001). The complementarity of cooperative and technological competencies: A resource-based perspective. *Journal of Engineering and Technology Management*, *18*(1), 1-27.

Valiyan, H., Kooshki Jahromi, A., & bolaei, H. (2017). Designing an organizational capabilities approach models based on strategic reference points theory, Strategic Management Researches, *23*(65): 131-151.

Wang, Y. Sh., & Hsu, T. H. (2018). Dynamic capabilities of biologics firms in the emerging business market: Perspective of dynamic capabilities evident. *Industrial Marketing Management, 71*(2), 5-18. https://doi.org/10.1016/j.indmarman.2018.04.009

Weerawardena, J., O'cass, A., & Julian, C. (2006). Does industry matter? Examining the role of industry structure and organizational learning in innovation and brand performance. *Journal of Business Research*, *59,* 37-45

Wernerfelt, B. (1984). A resource-based view of the firm. Strategic Management Journal, 5(2): 171-180.

Wu, J., & Vahlne, J. (2020). Dynamic capabilities of emerging market multinational enterprises and the Uppsala model. *Asian Business and Management*, 3(1): 122-143. https://doi.org/10.1057/s41291-020-00111-5

Wu, J., Ma, Zh., & Liu, Zh. (2019). The moderated mediating effect of international diversification, technological capability, and market orientation on emerging market firms' new product performance. *Journal of Business Research, 99*(2), 524-533. https://doi.org/10.1016/j.jbusres.2018.03.025

Zhang, M. J. (2005). Information systems, strategic flexibility and firm performance: An empirical investigation. *Journal of Engineering and Technology Management, 22*(3), 163-184. https://doi.org/10.1016/j.jengtecman.2005.06.003