

Intellectual Capital Exploitation in Investment Opportunity Set Through Risk Premium: Strategy to Increase Company Value

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ABSTRACT

This study aims to describe the strategic relationship between intellectual capital and investment decisions of companies. This study attempts to include intellectual capital, supported by risk management in increasing company value. The approach of this study is conducted through describing risk management based on utility theory and risk premium measurement, including estimation of the manager's attitude towards risk. This paper integrates literature review to identify the strategic relationship between intellectual capital and investment decisions. Several basic theories are also employed to establish the relationships, which engage knowledge-based theory, risk management, and knowledge-based risk management theory. Based on those theories and previous studies, this study investigated that intellectual capital served as an intangible capital based on knowledge shifting companies' performance leading to changing company value. However, intellectual capital has been unable to determine company value. Investment policy should be undertaken for shifting company value emphasizing an investment opportunity set as an important mediation between intellectual capital and company value. Meanwhile, based on risk management theory, to undertake investment, a company should consider the risk premium in investment decision making due to moderating effect of risk premium on company's performance, which in turn affects the company value. Therefore, this study determines the risk premium as a moderating variable driving investment opportunity set.

Keywords: *knowledge-based theory, risk management and knowledge-based risk management theory, risk premium*

1. INTRODUCTION

The industrial revolution has inevitably brought a real impact on changes in corporate strategic decisions to increase the company value. All company resources are optimally utilized to provide a "lever" effect on the company's sustainability, one of which is the company's intangible resources commonly recognized as Intellectual Capital (IC). Wang and Chen [1] in their research revealed the fact that the leverage effect shifts from tangible assets owned by companies to intangible assets, such as intellectual capital, which could increase company value by utilizing knowledge and technology within company operations.

Another fundamental issue that needs to be examined in an effort to exploit company resources to optimize the effects of leverage from intellectual capital is closely related to strategic decisions in the area of corporate investment which increase company value. Intellectual capital becomes the dominant choice of companies in creating logical investment opportunities because the existence of IC reduces asymmetric opportunities for information [2,

3]. This fact is considered logical as the research by Bontis et al. [4] explains that IC covers all capital for competent human resources, non-human resources and relationship capital; thus, IC becomes a compatible corporate variable. Efforts to reduce asymmetric information in investment opportunities also include other inseparable approaches to support the company's strategic decisions regarding corporate investment, such as environmental uncertainty. This environmental uncertainty becomes a source of risk related to the company's activities in the investment sector. Asymmetric information and environmental uncertainty become influential aspects of company decisions. In this context, decision making is based on several considerations regarding information as received and analyzed by the company's strategic decision maker (manager). Therefore, the exploitation of IC processes in Knowledge Management (KM) is inseparable from Enterprise Risk Management (ERM) [5]. Bo and Sterken [6] grouped several studies related to the relationship of demand and investment uncertainties, which are: (1) risk attitude of decision makers [6-9]; (2) forms of marginal capital products [10-12]; (3) substitutability of factors of production [13, 14]; (4) irreversible choice and value of waiting options [15]; and (5) financial constraints [16]. Several previous studies

stopped at the exploration of point 2-5, but some failed to explain in terms of quantity measurement about attitudes towards risk of decision making. In contrast, Kweh et al. [17] argued that point 1 is able to reflect the magnitude of the company's ability to survive [17]. The statement was also supported by Ruzic-Dimitrijevic and Dakic [18] in their research pointing out that ERM becomes a "supplement" of the company's activities to optimize the measurement and mitigation role of the risks faced by the company within its activities.

The link between KM and ERM is further referred to as knowledge-based risk management (KBRM). The urgency of KBRM is to address how managers' attitudes in risk measures are pursued by approaching the utility theory in strategic investment decision making. Lauria et al. [5] argued that the size of the risk must reflect the response cycle, described as the manager's attitude towards risk. Aistov and Kuzmicheva [19] examined a measure of premium risk as the price paid by managers to eliminate uncertainty and to reflect managers' attitudes towards risk. This study also engages a thorough literature study on the strategic role of knowledge in corporate investment decision making with a 'supplement' in the form of risk management to increase the company value.

2. LITERATURE REVIEW

2.1. Knowledge-Based Theory (KBT)

Knowledge-based theory (KBT) highlights that the company's main strategic resource lies on knowledge. This discussion plays a pivotal role as the scope of knowledge must be perceived in consensus to obtain the relevance of knowledge, required by a company within company management to create corporate value from knowledge. The discussion is explored as follows:

1) Transferability

The view of knowledge recognizes company transferability as a determinant of the importance of capacity in reshaping a sustainable competitive advantage [20]. In the process, both explicit and tacit knowledge are indicated differently. Explicit knowledge is expressed by communication where the tools and property of explicit knowledge transfer play an important role. Tacit knowledge is actualized through its application; thus, the capacities [21] in capturing knowledge are applied by training and knowledge transfer activities [22].

2) Capacity for aggregation

The efficient absorption of knowledge depends on one's capacity in 'clipping' the stemmed and received knowledge. In organizations, this ability depends on the ability of each

individual to process new knowledge within the existing knowledge.

3) Appropriability

Appropriability is measured from returns equal to the value made by knowledge, except for patent rights and knowledge copyrights that are protected by property rights. Tacit knowledge can only be tested only if it is applicable through measured applications, in contrast to explicit knowledge which is easier to transact without losing the knowledge.

4) Specialization in knowledge acquisition

The human brain has a limited capacity to acquire, to store, and to process knowledge. The impact demonstrates that efficiency of the creation of new knowledge, knowledge acquisition, and storage of knowledge would classify individuals to specialize in certain fields of knowledge.

5) The knowledge requirement of production

The production approach explains everything starting from input to final output. Single-factor theory explains that the approach that can be maintained regarding the production of knowledge plays an important input in the production of knowledge where the main source of knowledge is also a mere knowledge, besides machines, systems, and others which are the embodiments of knowledge.

As such, knowledge serves as a resource that is difficult to replicate and is socially complex. The best and superior output in the process of managing an entity according to Alchian and Demsetz in Ngatno [23] is not the result of better resources, but knowledge of those resources. KBT regards companies as organizations that produce, integrate, and distribute knowledge [24].

2.2. Intellectual Capital

Galbraithy proposed "intellectual capital" in 1969 to explain the gap between the market value and the essential value of a company. Intellectual capital becomes a major component of a company's value because intangible assets are often considered more important than tangible assets. Stewart [25] responded the intellectual capital as a composition of knowledge and abilities that are embedded in organizational members which can produce economic benefits. In other words, invisible resources that contribute to net value more than total assets are called intellectual capital. Edvinsson and Malone [26] assumed intellectual capital consists of two components, including (1) human capital (knowledge, skills, and employee experience); and (2) structural capital (embodiment, empowerment, and supporting infrastructure for human capital).

The researchers then distinguish structural capital into organizational capital (systems, processes, and company operating philosophies that accelerate the flow of knowledge through the organization) and customer capital (the relationship that the company has with its customers). Stewart [25] also classified intellectual capital into three categories, which convey:

- (1) Human capital;
- (2) Structural capital; and
- (3) Customer capital

Some researchers replace structural capital with organizational capital since it is more suitable for the task of illuminating the institutionalized knowledge, routines, manuals, processes, or systems in an organization [27, 28]. Initially, Bontis [29] introduced the idea of relational capital, covering all external relations to expand customer capital.

Intellectual Capital (IC) according to the International Federation of Accountants (IFAC) as cited by Widiyaningrum [30] declares that intellectual capital includes several schemes such as intellectual property, intellectual assets, and knowledge assets that can be interpreted as shares or capital based on knowledge. According to Pulic [31]; Bontis et al., [32]; Mouritsen et al., [33]; and Pramestiningrum and Prastiwi [34], intellectual capital is a part of intangible assets in the form of effective knowledge, resources, skills, competencies, and managerial technology that drives performance in the form of strategic and useful decisions to create added value for present and future term for the company.

2.3. Enterprise Risk Management (ERM)

Understanding the risk in line with KBT according to Darwish [35] remains incomplete regardless sufficient results from probability; therefore, the risk is not based on static risk definition, on the contrary, which is seen as unique. The implementation of the company's risk management includes identifying, measuring to mitigate the risk of being in Enterprise Risk Management (ERM). The risk model in ERM, according to Talet and Talet [36] aligns KM process with ERM process. Further development of unique risks from the perspective of KBT and ERM is cited by Lauria et al. [5] who pointed out that risk factors must reflect the 'response' of ERM cycle, where measurement approach is required to explain the 'response' in terms of risk due to its relation with the ability of policy makers to reduce, eliminate, transfer, and accept these risks [37].

Measurement of risk involving 'response' is an uneasy task to calculate. In the research of Aistov and Kuzmicheva [19], the measurement of managers' attitudes towards risk is obtained from the mechanism of calculating premium risk based on the utility theory of Fisher and Hall (1969) and Arrow (1977) in Aistov and Kuzmicheva [19]. Premium risk is considered as the amount of risk mitigation undertaken by managers to eliminate uncertain choices, in which there is a measure of the manager's 'response' to risk [19]. Measurement of the risk premium must be performed by extracting the value in stochastic form over the expected

utility [19]. Furthermore, Bo and Sterken (2007) in Weidel [38] state that if premium risk is the difference between realized profit and profit adjusted risk, then determining profit-adjusted profit can only be obtained from the linearity of the profit, achieved by the second and third moment of the distribution of earnings. Thus, the measurement of premium risk proves to be proportional to the square of the risk.

2.4. Knowledge-Based Risk Management (KBRM)

Knowledge-Based Risk Management (KBRM) is believed to explain the conceptual relationship between KBT and RM, which is an emerging field of academic inquiry. KBRM cuts two previously separate fields of Risk Management (RM) and Knowledge Management (KM). Researchers argue that knowledge is necessary to understand and to manage the risk. Previous KBRM research has two main themes, in which (1) Zoysa and Russell [39], who examine how knowledge could identify risks, quantify risks, and risk responses, are concerned researchers who evaluate how knowledge can reduce risk which leads to better risk management; and lastly (2) Verhaegen (2005) and Otterson (2005) in Neves et al. [40] who consider how knowledge informs decision makers. This first theme is more inclined to the company's strategic decisions that can be embodied by knowledge management effectively because of the effectiveness of RM [36]. Meanwhile, in the second theme, the researchers examine how the process of knowledge management can improve risk management. The examples of this study include Marshall et al. (1996) in Neves et al. [40] who identified a series of KM 'levers', such as transferring knowledge to decision makers, increasing the accessibility of knowledge, embedding knowledge in controls and systems, as a way of avoiding financial disasters caused by poor RM. Some researchers attempted to explain the similarities between RM and KM, such as the need for employee insight, the importance of actions and the value of lessons learned, concluding that risk management is pure knowledge management [41].

3. METHOD

This study engages literature studies from a variety of previous written documentation to obtain the scope of theory application and theoretical references that underlie the phenomena of company activities.

4. RESULT

Intellectual Capital-Company Value

Previous research has indicated that intellectual capital had a positive effect on company value as measured by share prices [42-44]. The results of this study postulate that the management of intellectual capital carried out effectively

and efficiently will increase the company value. The existence of intellectual capital in the company supports that the company has the potential for maximum management of human resources and knowledge as a good corporate system accommodating company's relationship with other parties to achieve the company's competitive advantage [45-47]. The increase in company value will also add value to the company's endurance and sustainable competitive advantage [47]. Thus, the management of intellectual capital will increase the company value, which leads to an indirect impact on the survival of the company. Similar results were obtained in the research by Berzkalne and Zelgalve [48] who examine the relationship between intellectual capital as the independent variable and company value as the dependent variable. The study was conducted on 64 companies (Estonian 29, Latvian 11, & Lithuanian 24) registered in the Baltic with a duration of 7 years (2005 to 2011). Purposive sampling techniques were performed for data collection from financial statements. The analysis was employed to test the relationship. Tobin's Q was applied to measure the company value. In addition, Value Added Intellectual Capital was employed to measure intellectual capital value. A positive and significant relationship was obtained for the relationship between intellectual capital and corporate value in Lithuanian and Latvian companies, whereas such a relationship was not depicted in Estonian companies.

Nejati and Pirayesh [49] also examined the effect of intellectual capital on company value with a different method by applying the systematic elimination method. This research was conducted on 132 companies on the Tehran stock exchange of which the data was collected by the Tehran stock exchange organization covering a period of 6 years starting from 2008 to 2013. The results of this study were the existence of a positive correlation concluded between intellectual capital and company value. It was also concluded that there was a significant relationship between applied capital, structural capital, and efficiency of human capital and company intellectual capital. Li and Zhao [50] investigated the dynamic relationship between intellectual capital and company value registered in China. Organization and human resources are involved in measuring VAIC; while, ROA, ROE, growth, and returns are engaged as proxies for company value. The GMM and IV estimation models are applied for data analysis purposes, concluding that organizational capital positively influences company value, while no relationship is found between human capital and company value. According to the resource-based theory [51], companies engage in available resources to gain a competitive advantage in the market. Previous relevant results obtained in intellectual capital research indicated a significant relationship with company value [48; 52; 53; 49; 54].

The results of another study by Mehralian et al. [55] on pharmaceutical companies listed on the Iranian stock exchange investigated the relationship of two variables as intellectual capital and company value. Nineteen companies were selected for the study, which covered in a period of six years (2004-2009). Based on the data analysis, there was no impact result on the company value despite having the

efficiently intellectual capital. For some business fields that require knowledge and have been standardized, the efficiency of intellectual capital has been acted as the key shaper of company value from the beginning; thus, a small change in the efficiency of intellectual capital occurs if factors that are not too dominant will not affect the company's value. This finding was in accordance with the research of Iranmahd et al. [56] who also studied the impact of intellectual capital on company value and financial costs. The study population included all companies registered in Tehran from 2005 to 2012. Intellectual capital was measured by VAIC method, and the stock market value was considered as the company value. By applying correlation analysis and regression, the researcher concludes that both intellectual capital and its components do not have a statistically significant relationship with the company value. Knowledge-based economics according to Shaban and Kavida [57] is analogized as a tree where innovation can be called as a branch of the tree while intellectual capital is considered as the root that provides support for the innovation process. In addition, to company value, Shaban and Kavida [57] also examined the relationship between capital intellection and company performance. VAIC is mostly applied for the calculation of the final sample from the intellectual capital of 22 IT companies (after the elimination of 11 companies that have differences in data sets) as listed on the Bombay 500 Stock Exchange. The data were collected for nine years from 2003 to 2011. The result indicated that there is no statistically significant relationship between the independent and the dependent variables. However, the three VAIC components were applied in this study, marking only CEE had a positive relationship with the M/B ratio. Unfortunately, no significant results were obtained in the study [55, 57].

Intellectual capital - investment opportunity - company value

A study by Belkaoui [58] investigated the role of IC in a sample of U.S. multinational companies; this notion was justified by involving trademarks and patents to measure IC, which depicted a positive and significant effect of IC on the company's strategic interest (IOS) in company performance. Sequiera et al. [59] emphasized a more important role in companies operating in a new economic environment. Specifically, Sequiera et al. [59] proposed that IC is more important in sophisticated technology companies which include those whose main businesses include aerospace and defense, pharmaceutical, and biotechnology. Czarnitzki and Thorwarth [60] found out that advanced technology companies tend to invest in intellectual capital, far more than in low-tech companies. Advanced technology companies require large investments in IC or particular R&D because their employees need to be consistently updated along with the most advanced technology to enable them to turn their creativity and innovation into new products and services. Therefore, intellectual capital has been more effective in creating investment opportunities in developed countries than in countries with low technology companies. Low-tech companies are those that run

traditional businesses, such as drinks, food producers, forestry and paper, and recreational goods. Jafaridehkordi et al. [2] emphasized that recognition of intellectual capital was marked through its ability to create an Investment Opportunity Set (IOS). Investment Opportunity Set (IOS) becomes one of many important company policies. Therefore, when everything is arranged in such a way, humans become expensive resources; thus, structural capital can be more efficient in generating investment opportunities and company value. This statement is supported by the research, which demonstrates that intellectual capital in companies with more advanced technology creates a greater Investment Opportunity Set (IOS). This finding is also in accordance with the research conducted by Sudarsanam et al. (2005) and Tayles et al. [61], where they argued that intellectual capital contributed to competitive advantage and value creation through the identification of investment opportunities. However, according to Fathur and Putri [62], the lack of information on intellectual capital owned by a company would cause intellectual capital to bring no effect for the company value. IOS in the study by Gao et al. [63] was classified in two types of investments, which are acquisitions and capital expenditures. Acquisitions relate to investments to control, buy, or acquire other companies into the company. Meanwhile, capital expenditures relate to investments to purchase new assets, build factories, office equipment, vehicles, research and development, advertising, and others. IOS according to Myers [64] was defined as an investment in decision consisting of a combination of assets owned and future investment options. IOS measurements involve five combined proxies in the form of Market to Book Value of Assets (MBVA), Market to Book Value of Equity (MBVE), Price Earnings Ratio (PER), Capital Expenditures to Book Value of Assets (CEBVA), and Capital Expenditures to Market Value of Asset (CEMVA). In research with different objectives, Randa and Solon [65] proved that intellectual capital brought a significantly positive effect on company value. Additionally, in relevant researches conducted by Jafaridehkordi and Rahim [66], Jafaridehkordi et al. [2], and Utami [67], it was proved that intellectual capital demonstrated a positive effect on Investment Opportunity Set (IOS).

Intellectual capital-enterprise risk management

The relationship between intellectual capital and enterprise management has been through a long process initiated by defining risk and uncertainty. The risk mitigation model, according to Athearn et al. [68], later refined by Darwish [35], which included an element of knowledge in the risk mitigation process as presented below:



Figure 1. Risk Mitigation Model

5. DISCUSSION

Intellectual capital was initially defined by Tom Stewart in 1991 when he wrote an article for "Fortune Magazine" entitled "Brainpower: How intellectual capital became the most valuable asset in America" [69]. Stewart [70] stated that if intangible assets such as employee experience, information, knowledge, intellectual material, and intellectual property used to produce wealth were labelled as intellectual capital. The real outputs include copyright, patent, trademark, etc. In addition, the three basic components of intellectual capital include human capital, structural capital, and customers/external capital [71-74]. Human resources serve as the main source of intangible assets for companies [69]; therefore, companies are currently willing to spend a large amount of costs merely to build knowledge infrastructure and to find knowledgeable employees with special abilities for companies to achieve their financial goals and create corporate value [75]. In addition, to human resources, there is non-human capital which provides support for human capital referred as structural capital [69]. Supporting infrastructure to improve employee performance is regarded as structural capital [76]. When employees leave the office after work, the instruments left in the office are referred as structural capital [77]. Other capital contained in intellectual capital also involves customer/relationship capital. Customer capital becomes the third and final part of intellectual capital which is also referred as relational or external capital [75]. In a broader context of company's relationship with its stakeholders also lies the customer's capital [75, 69, 74]. According to Nuryaman [74], customer capital is oriented in maintaining good relationships with both the external and internal stakeholders which include customers, government, employees, creditors, suppliers, and other concerned parties. The impact, does not only increase the level of stakeholder satisfaction but also results in high loyalty from

stakeholders with the company [69]. In addition, investors prefer companies with better intellectual capital efficiency [52]. Intellectual Capital is similar to a toll road for companies to accelerate faster to business success with fast duration and costs to provide optimal points and achieve targeted goals [55].

Resource-based theory is related to management and utilization of the company's available strategic resources. Hakiki and Ferdianti [78] pointed out that with the help of strategic resource utilization, a company can even obtain an abnormally high return and is more competitive; yet, the decision making is very complicated because the company must decide whether certain investments for certain assets are critical. Based on a resource-based view, intellectual capital must create value for the company. However, the literature does not support this view all the time due to other various factors that contribute to positive or negative company value. Intellectual capital is considered as an intangible asset in the form of competencies consisting of company knowledge, skills, and attitudes that will shape the ability to perform management functions (planning, organizing, mobilizing, and controlling) that can drive company performance. Good company performance becomes an indicator that the company has good prospects in the future, which responds positively to the market and maintains the increasing company value [62]. This finding is in accordance with the research by Khalique et al. [79], which reveals that intellectual capital becomes the most important asset in advancing organizations. Real financial assets with similar quality and quantity usually produce similar outcomes, but intellectual capital especially the human component with similar quality and quantity can produce different outputs, as knowledge and skills are possible to be empowered through value-added R&D activities that promote creativity and innovation. Thus, from the perspective of KBT, the linkage of IC-IO is a reality, especially if it is balanced for the purpose of increasing the company value.

KRM serves as a field that suggests solutions to problems connected with conventional risk management methods. The problem of environmental complexity is manifested by individuals with less sufficient knowledge about risks to anticipate their possibilities and consequences. To improve RM process, the researchers in this study intend to examine the relationship between KM process and RM process, aiming to introduce the Knowledge-Based Risk Management (KBRM) process to improve the efficiency of RM process by performing several KM processes. The KM processes include the sequence of risk identification, risk analysis, planning of the specified actions, and executing actions. Based on the conducted research, an effective RM process model was unachievable without an established KM process. Other research results stated that KM as a discipline can positively add RM implementation in reference to data and management information, share risk knowledge and consolidate analysis, and reporting [80]. Risk management becomes a key factor in the organization because it can minimize the probability and impact of the project.

KM process has also been turned into a strategic resource for the organization. KM can have a large influence on organizational risk reduction [81]. Companies cannot manage their risks effectively if they cannot manage their knowledge without KM as a tool to communicate risk among project team members; RM may suffer from ineffectiveness and inefficiency [82]. KM framework is developed to take advantage when carrying out tasks based on KM approach, assuming if knowledge is created, transferred, and reused because an individual performs a specific task [83].

The application of KM process to support RM process has the potential to iteratively mitigate possible risks, thereby increasing the likelihood of successful project execution [84]. As a consequence, it is important to note that organizations also prioritize the infusion of RM knowledge (creation, capture, and sharing of knowledge related to potential risks to main assets). The key to the proactive RM process lies in the company's ability to mobilize the knowledge and expertise of its employees regarding risk mitigation to provide accurate organizational decision makers and timely information about potential risks.

One of the initial discussions about the relationship between risk management and knowledge was carried out by Knight [85] who discussed the main factors that humans always regard knowledge as a source of their survival and existence. Knowledge always appears as a light and hope for human beings in terms of uncertainty, ambiguity, and feeling of threat in everyday life. Meanwhile, risks exist in almost every part of human life, and there are different types of risks for different people, but knowledge management has been expected to help people in eliminating the unexpected risk. Gharehbiglo et al., [86] expressed the concern about knowledge management claiming that knowledge is a combination of capturing wisdom, experience, and implementation of knowledge itself within the decision-making process. Inappropriate evaluation and implementation mechanisms of knowledge management cause failures in organizations. The relationship between RM and KM is very complex. Some industry observers claim that without KM, RM cannot succeed and in fact, "RM is KM" [41]. However, there is uncertainty in determining the way in which KM and RM overlap [87]. It is unfortunately difficult for stakeholders to fully evaluate how KM affects RM, or how investing in KM can lead to increased RM effectiveness, including identifying risk measures that reflect responses to risk. Experts also regard the utility theory that produces risk measurement in which there is a form of risk response as in the research of Aistov and Kuzmicheva [19].

The measure of risk is considered as a risk premium, developed on the basis of demand uncertainty, response to risk, and level of investment in a company [88]. Based on KM and RM process, there will be a logical reason for stakeholders as the company's strategic decision makers to consider new information, to reduce risk with the knowledge they have, and to decide the required attitudes towards decisions that are inseparable from the risks of those decisions. This analogy has served as a reality for major companies in the 70s who chose to avoid risk, in

which the impact on the strategic investment opportunities was also incorporated to minimize the possibility of uncertainty that would be accepted by the company [89]. Further research focusing on the relationship of uncertainty and risk was initiated in 1971 by Sandmo and was then continued by subsequent researchers [19], which provide a conclusion if the impact of uncertainty on investment is positive unless the coefficient of risk aversion is relatively lower than one that allows a response to risk, also known as avoidance action. Based on the decision to avoid the risk according to KM processes, attempt is referred to KM stages that are passed. The better the KM stage, the ERM efficiency is more likely to occur in optimizing the company's strategic investment decisions. Lastly, such effort indirectly encourages the role of intellectual capital to support company value perfectly.

6. CONCLUSION

This study analyzes all available references and concludes that the role of knowledge (in this case is intellectual capital) in a company provides the key to generate a 'leverage' effect for the company value if associated with corporate decisions (in terms of investment and risk management support). Lastly, to point out, RM process remains uneasy to unveil the relevant risk measures in accordance with KBRM. Therefore, integrating risk response factors into risk measures has been viewed as a rare rule to demonstrate successful exploitation of intellectual capital in leveraging company value.

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