

Investigating the effect of social media application on firm capabilities and performance: The Dynamic Capability View

Abstract:

Adopting the Dynamic Capability View, this study investigates the relationships between social media application, firms' capabilities and performance. Highlighting the dynamic and ever-changing environment, and firms with limited resources, this study argues that social media is a strategic resource, and agility and adaptability are critical in measuring firms' dynamic capabilities. The study further evaluates the mediating role of time-based performance on the relationships between these capabilities and firm performance. Drawing upon a sample of 249 firms, the findings validate the positive impact of social media on both capabilities and confirm the mediating effect of time-based performance in the relationship between agility, adaptability and firm performance. Finally, recommendations are provided for senior management teams regarding social media application as a resource that can strengthen firms' agility and adaptability, whilst time-based performance is seen to require special attention where the external business environment is volatile.

Keywords: Adaptability, agility, dynamic capability, firm performance, social media application, time-based performance

Investigating the effect of social media application on firm capabilities and performance: The Dynamic Capability View

1. Introduction

The past two decades have witnessed a rapid increase in ambiguity and volatility in the business environment, a phenomenon which is highlighted by the emergence of substantially disruptive business models, accelerated technological advances, and tense trade relations (Haarhaus & Liening, 2020). Examples can be easily identified from the last five years, such as the US-China trade dispute, Brexit, the Covid-19 pandemic, and even the huge delay of suppliers' goods due to the Suez Canal obstruction.

In view of the ever-changing environment, firms' dynamic capabilities become especially critical to effective competition in the market (Hong, Zhang, & Ding, 2018; Haarhaus & Liening, 2020). Dynamic capabilities refer to the firm's ability to identify opportunities and threats, regulate internal operations such as strategies, reconfigure resources, and acquire the latest information and expertise (Teece et al., 2016). To mitigate the impact of uncertainties in the external environment and be cognizant of market turbulence and the fast-evolving customer demand, two capabilities, i.e., agility and adaptability, are highlighted in this study to reflect the characteristics of the contemporary market environment.

Agility reflects a firm's ability to sense, capture, and respond to market variations at speed, while the firm's adaptability emphasizes re-engineering the firm's business cycles (e.g., the order cycle or lead time from the buyers' perspective), reducing production time, as well as

upgrading products from time to time or designing new products over the longer term (Iyer et al., 2004).

A firm's dynamic capabilities endeavor to maximize the flexibility of management and resource allocation within an increasingly intricate, multi-actor, and multi-stakeholder environment (Haarhaus & Liening, 2020). Standing at the interface of the firm and the external environment, digital media platforms - social media, serving as the connector – have attracted increasing attention and investment by management teams. Most business executives predict that their budget for social media marketing will increase by at least 50% for the next three years as they believe it is the future of business intelligence (Drenik, 2021). Responding to the swift escalation of market demand, social media functions as a strategic resource facilitating the conversion of external resources into internal competencies, providing up-to-date data and insights that businesses can apply to make key business decisions.

However, with all the confidence in firms' social media adoption, evidence showing the impact of social media application on firms' performance remains limited (Oberoi et al., 2017). Instead of examining social media as a performance indicator or marketing tool, this study adopts a view of social media as a resource that can be used by firms to facilitate their dynamic capabilities (Bhimani et al., 2019; Tseng et al., 2019). In contrast to previous studies which mostly evaluated the effect of social media on firm performance from the internal perspective, this study endorses the bridging role of social media against the internal and external backdrop of the firm, laying emphasis on the inseparability of a contemporary firm from the open system in which it operates (Fisher, 1997; Stevenson & Spring, 2007).

Hence, the research questions of this study include a) how a firm's social media application influences the firm's dynamic capabilities (i.e., agility and adaptability); b) whether these capabilities have a significant impact on firm performance. With a view to reflecting the rapid and unprecedented changes in the business environment, this study in particular highlights the importance of exploring how time-based performance plays a role in the relationship between a firm's dynamic capabilities and firm performance. Time-based performance, also known as 'fast response time', is proposed as the performance outcomes in relation to 'time-to-market' (product development and launch speed), 'time-to-product' (also referred to as the product delivery cycle) and responsiveness to customers (Droge et al., 2004, p. 558).

Aiming to answer these research questions, 249 functional questionnaires were collected from firms belonging to two renowned industrial development districts in China. The outcomes of this investigation contribute to the Dynamic Capability View (DCV) domain of research by supporting the role of agility and adaptability as key dynamic capabilities for a volatile environment which predict a firm's capability in both the short- and long-term. This study also contributes to the existing literature by treating social media as a strategic resource for firms (e.g., small- and medium-sized firms) that are usually subject to resource constraints and operate in such an environment. Instead of seeking to argue for the cost efficacy of appropriate social media application, this study highlights its leveraging effect on a firm's agility and adaptability, and emphasizes the speed element for business, such as the speed of new product development, the speed of delivery, the speed of responding to customer

complaints, and the lead time of product manufacturing. Finally, this study puts forward managerial recommendations based on the findings.

2. Theoretical Background and Hypotheses Development

2.1 Dynamic Capability View

In the context of ever-increasing globalization, rapid technological development, ever-changing customer demand, unpredictable political trading relationships, and the occurrence of a pandemic (e.g. Covid-19), the dynamic capability view (DCV), as a performance-focused theory extended from the resource-based view (RBV), is widely used by management scholars to explain and develop firms' competitive advantages and performance in a changing environment (Altay et al., 2018; Cenamor et al., 2019; Chuang, 2020; McAdam et al., 2017). Dynamic capabilities (DC) refer to a firm's ability to constantly adapt, reconfigure and re-create its resources in line with the rapidly changing environment (Haarhaus & Liening, 2020; Li & Liu, 2014; Teece et al., 1997; C. L. Wang & Ahmed, 2007).

A firm's dynamic capabilities are often assessed by measuring whether the organisation has the capabilities of sensing, learning and reconfiguration (Gelhard et al., 2016). Although the process-oriented configuration of dynamic capability is particularly beneficial in capturing the organisation's DC at the strategic level, it is still unclear what types of capabilities can actually be measured as DC. Scholars have argued that different capabilities reflect a firm's DC, such as networking capabilities, interactive capabilities, and integrative capabilities (Li & Liu, 2014; Vrontis et al., 2020). The broad array of capabilities seeking to capture dynamism indicates that various essential capabilities are sought by firms with

different profiles (e.g. small-medium sized, manufacturing industry, different geographic locations). Responding to the contemporary trends of turbulence in the external environment as well as the interactiveness and inseparability of the internal and external stakeholders, this study regards adaptability and agility as two vital DCs for firms to be able to respond quickly, flexibly and spontaneously (Weber & Tarba, 2014; Eckstein, Goellner, Blome & Henke, 2015).

Both adaptability and agility refer to the capability to identify and seize opportunities in the market and reconfigure the firm's resources to respond quickly to opportunities and threats (Nemkova, 2017; Tuominen et al., 2004), but they are different in terms of time window and continuity. Agility focuses on the firm's ability to detect and respond to emerging market opportunities or crises with 'speed and surprise' (Nemkova, 2017, p. 257). With a similar process but a different focus, adaptability emphasizes the firm's systematic readiness for detecting, responding to and capitalizing on such changes over the longer term.

In summary, agility often demonstrates the firm's capability to grasp short-lived opportunities and recognize emerging threats/crises quickly, while adaptability usually reflects a sustained ability to manage internal resources successfully in preparation for and reaction to opportunities and threats from a long-term perspective (Eckstein et al., 2015; Nemkova, 2017). As both agility and adaptability require close interaction with the external environment, digital platforms – and in particular social media platforms – become central to data collection from the external market (Cenamor et al., 2019; Oberoi et al., 2017). The digital nature of such platforms allows firms to quickly generate and analyze customer data at

a low cost and gain unique and abundant knowledge about groups of customers and each individual consumer (Oberoi et al., 2017).

Although existing studies have argued for different benefits of firms' adoption of social media, such as improved customer relationships (Haenlein, 2017), brand promotion (Pentina et al., 2013), marketing channel integration (Chae et al., 2017), and more eWOM (electronic word of mouth) (Ladhari & Michaud, 2015), the influence of social media application on firms' dynamic capabilities remains largely unexplored.

It is also noted that the majority of the existing studies focus on the application of social media and its impact on the other capabilities, such as market and technological knowledge-processing (Cheng & Krumwiede, 2018), customer relationship-management (Trainor et al., 2014; Wang & Kim, 2017), marketing (Tajvidi & Karami, 2017), or sensing (Huang et al., 2020). The lack of studies on the impact of social media on firms' agility, adaptability and business performance calls for research attention. To gain a better insight into the manner in which social media application affects firms' dynamic capabilities and performance, this study proposes a conceptual framework based on DCV (see Figure 1).

INSERT FIGURE 1 ABOUT HERE

2.2 Social Media Application and Dynamic Capabilities

Social media signifies any digital tool that allows users to quickly create and share content online with the public at any given time and place, essentially extending the vast reach of firms across different communities (Dellarocas, 2003). The popularity of social media has induced remarkable variation in the means of communication, collaboration, creation, and

economic activities within human society (Appel et al., 2020). Social media tools facilitate better social connectivity and greater interaction in the virtual world (Burke et al., 2010), and also act as an indicator by which firms can detect opportunities as well as threats in their business framework.

To internalize social media as a value-adding resource, firms first need to use social media platforms in their business practices and then make provision for consistent ongoing investment. Social media application in this study refers to the manner in which firms implement social media as an agent of information acquisition from the external environment with the aim of achieving real-time mutual communication, value co-creation, stakeholder interaction, and competitor monitoring (Foroudi et al., 2019; Parsons & Lepkowska-White, 2018). The application of social media also calls for a considerable investment by firms to effectively support the functions and the smooth operation of this resource. For example, social media maintenance relies heavily on constant financial, technical, or human resources allocated to maintaining its utilization (Rapp et al., 2013). It is apparent that merely setting up a social media account does not serve the purpose, but whether a managerial commitment exists becomes the decisive factor in developing social media as a strategic value-adding resource. Therefore, both *social media use* as well as *social media maintenance* must be regarded as two critically equivalent elements for the social media application undertaken by firms.

A firm's agility is largely defined by whether or not it can proficiently identify major opportunities and threats, as well as the promptness of responses to emerging crises, particularly within a rapidly fluctuating and fragmented market (Sharifi & Zhang, 1999;

Weber & Tarba, 2014). Being a communication platform, social media assists firms with the dissemination, collection, and aggregation of information in real-time (Dellarocas, 2003).

Hence, firms utilizing social media appropriately are more likely to exhibit better agility with respect to capturing up-to-date information and identifying issues and opportunities among different stakeholders (Weber & Tarba, 2014). Therefore, we propose:

H1: *a) Social media use and b) maintenance both play a significant and positive role in defining a firm's agility.*

Adaptability, also known as adaptive capability, was defined by Bourgeois (1980, p.30) as “...*the cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy, as well as to imitate change in strategy with respect to the external environment.*” In accordance with the DCV, adaptability is regarded as a critical factor in addressing the organization–environment relationship. Firms possessing top-notch adaptability strive to find the right fit between the external environment and their internal structure (Freeman et al., 1969). Firms operating within large-scale unstable external environments are required to constantly engage in reallocation of internal resources and structural adjustments, so as to counterbalance the external changes and maintain the viability of the firm (Denison & Mishra, 1995; Miles et al., 1978a). Therefore, firms' adaptability entails various critical capabilities, such as anticipating problems, maintaining pace with the changes, being a fast learner, discovering new ways of executing business, quickly adapting to the changes, and the ability to cope with crises (Angle & Perry, 1981).

Social media – being a large-scale digital platform in the public domain – proves to be highly valuable for firms seeking to scan the market, monitor and interact with customers and competitors, and collect the latest market information (Tejeiro Koller, 2016). Firms’ adoption of social media is a continuous process, which involves designing the social media content, as well as assigning resources to manage, maintain and update the social media interface, which requires a long-term plan and commitment. Hence, we posit that through the application of social media firms are more likely to be armed with the latest information needed for the development of adaptive responses (Seebach et al., 2012).

H2: *a) Social media use and b) maintenance both play a significant and positive role in defining a firm’s adaptability.*

2.3 Agility, Adaptability and Business Performance

A firm’s agility, which used to be regarded as the most relevant capability for innovative organizations, has transpired to be one of the primary determinants of a firm’s success within a volatile environment (Weber & Tarba, 2014). Although the concept of strategic agility has generated extensive interest, this topic has neither been granted consistent treatment nor has the clear articulation of its effect on a firm’s performance been adequately attempted (Weber & Tarba, 2014). To attain agility, firms usually need to consider the amount of resources that are available to respond to unexpected situations. Flexibility in handling changes may require a firm to have a flexible organizational culture that allows employees and the management team to respond rapidly. Contradicting efforts and trade-offs between the existing business routines and contemporary business opportunities may pose considerable challenges for the management (Birkinshaw & Gupta, 2013).

Firms utilizing social media resources tend to exhibit an elevated sensing capability, as social media application throws open the communication channel between the internal and external environment. Firms that adopt social media are more likely to be agile at detecting changes in the external environment, maintaining a high level of flexibility, and providing prompt responses (Tejeiro Koller, 2016). When firms excel in their lead time and at providing quick resolution to issues, they may potentially see an instant effect on performance in terms of success in marketing and sales, product development, and customer satisfaction. Hence, we propose:

H3: *A firm's agility is significantly and positively related to its performance.*

Firms with a high level of adaptability typically exhibit a capability for constant learning and diverse kinds of innovations. They are more likely to reconfigure activities swiftly in order to meet changing demands in the market and generate a new business model in response to such changes (Simsek, 2009). Different studies reveal diverse relationship outcomes between firms' adaptability and performance (e.g. Bourgeois, 1980; Cegarra-Navarro et al., 2016; Gordon & DiTomaso, 1992; Hansen & Wernerfelt, 1989). Certain studies suggest that firms with a superior ability to recognize and adapt to the varying conditions have much better chances of reaping rewards. Hence, they suggest a positive relationship between a firm's adaptive capability and performance (Kotter & Heskett, 1992; Marcoulides & Heck, 1993).

It is worth noting that firms in a stable environment may not need to show strong adaptability to survive successfully, while such a capability is particularly vital for firms in volatile environments (Miles et al., 1978b; Tuominen, Rajala & Moller, 2004). Under the

current scenario, we presume that firms having the adaptive ability to identify and capitalize on opportunities and threats by means of social media implementation are more likely to perform better. Hence, we propose that firms capable of systematic adaptation to market demand, product innovation and market competition exhibit better performance.

H4: *A firm's adaptability is significantly and positively related to business performance.*

2.4 The Mediating Role of Time-based Performance

As the application of social media emphasizes real-time communication between firms and a wide range of external stakeholders, speed is what is expected both internally and externally. Speedy responses to externally stimulated demand and flexible adaptation ultimately facilitate firm competitiveness (Gehani, 1995). Time-based performance (or intermediate performance), which emphasizes a firm's strategy for seeking a time-based advantage, is thought to accelerate the manufacturing cycle, reduce uncertain processing time, be responsive to consumer demands, and be fast in delivery (Gehani, 1995; Droge, Jayaram & Vickery, 2004).

Therefore, a firm's agility, which incorporates responsiveness and flexibility in responding to market demand, product development, innovation opportunities, and competition changes, is often measured in terms of time-based performance (Gehani, 1995; Jayaram, Vickery & Droge, 1999). Unlike the short-term focus of agility, the adaptability of firms, which requires the firms to implement a systematic arrangement of various changes, takes a comparatively long-term perspective. Adaptive firms are capable of embracing fundamental changes in the basic processes of a firm's design and production without

increasing costs or putting into operation unpaid labor (Iñigo & Albareda, 2016). Such firms appear committed to the wise allocation of resources internally as well as externally so as to develop efficient operational processes contributing to the overall value chain (Droge et al., 2004). Time-based performance may be achieved by firms attaining such internalized adaptability. Therefore, we propose:

H5: *Time-based performance has a mediating role between a) agility and firm performance; and b) adaptability and firm performance.*

3. Methodology

To evaluate the proposed hypotheses, a questionnaire was initially developed in English and then translated into Chinese. In order to ensure the accuracy of the survey process, two Chinese academics were approached to provide feedback on the modification of items. The questionnaire was then sent to three managers involved with social media management for different firms. They were asked to work through the questions and further consider each item for ambiguity or other potential problems.

Following this procedure, several modifications were made, especially regarding the measurement of social media application and dynamic capabilities, including agility and adaptability. The dimension of structural flexibility was removed from the questionnaire as the respondents were confused by the dimension. Based on the feedback from these respondents, several items were further eliminated or modified. To verify the questionnaire's linguistic equivalence, it was later back-translated into English by an experienced translator (Wong et al., 2003).

In the summer of 2019, a pilot survey was conducted by testing the questionnaire with 30 respondents. An initial measurement model was performed using SmartPLS 3.2 to explore whether the indicators of variables and the conceptualized relationships were valid (Hair et al., 2017). After the initial statistical check, questionnaires were distributed to various companies in two business development districts in Beijing and Zhejiang, China. These two business development districts include various industries, such as manufacturers, IT development and services, and financial services. Companies in these business development districts are usually less established with fewer years of operation and are mainly small- and medium-sized in scale. Consequently, these companies often operate with limited resources and need to be very cautious of the changing environment. A sudden change in the environment may create a life-death situation for them rather than an increase-decrease in performance, which may occur for firms with abundant resources.

The staff from the firms responsible for customer relationship and social media management were asked to fill in a hard copy of the questionnaire. Participants were assured of their anonymity and confidentiality, achieved for example through the de-identification of the data, as a means to encourage honest disclosure of their opinions (Podsakoff et al., 2003). Several items were reverse coded in order to ensure that respondents delivered consistent answers. Altogether 780 questionnaires were distributed, but only 350 were returned, among which only 249 were found to be usable. This set the respondent rate at 32%.

INSERT TABLE 1 HERE

3.1 Measures

The measurement items utilized for social media application included two constructs, i.e., social media usage and social media maintenance. The measurement scales were adapted from Rapp et al.'s (2013) study on social media application. The original construct was split into two variables to capture different aspects of social media application. Each question reflecting on the application of social media was operationalized using a seven-point Likert scale, ranging from “strongly disagree” to “strongly agree”.

Dynamic capabilities in this study were measured by two constructs, i.e., agility and adaptability. The items were adapted from Eckstein et al.'s (2015) study. Agility was measured by three sub-dimensions – dynamic sensing, dynamic flexibility, and dynamic speed – which signify how firms sense changes, and how fast and flexible they are at responding to changes over the short-term. Adaptability was measured by two sub-dimensions: structural sensing and structural innovation. Items measuring adaptability primarily focused on capturing whether the firms possessed a structured system that could detect changes in the market and respond accordingly through innovation over the long-term. Items for these constructs were measured using a seven-point scale ranging from “strongly disagree” to “strongly agree”.

The measures of time-based performance, capturing the time-related firm performance, were adapted from Jayaram, Vickery, and Droge's (1999) work. It is associated with the speed of a firm's new product development, manufacturing lead-time, delivery, and response to customer needs. Firm performance was operationalized using five items adapted from Yu et al.'s (2019) study, namely sales growth, market share growth, profitability, new market development, and new product development. Each respondent was asked to compare their

firm's performance against their objectives for the measurement items. A summary of the construct measurements can be found in Table 2 and the definitions of the constructs can be found in the Appendix.

INSERT TABLE 2 HERE

4. Analysis and Model Testing

SmartPLS 3.2 graphical user-interface software was employed to conduct partial least squares structural equation modeling (PLS-SEM) to test the model. PLS-SEM is considered particularly suitable for a complex model with several indicators and with small sample sizes (Hair, Jr. et al., 2017). As this research had an overall sample size of 249 and two second-order constructs with several indicators, PLS-SEM was considered to be suitable, since it avoids the constraints of LISREL and AMOS, and hence emerges as a better alternative for this study than covariance-based SEM (Hair Jr. et al., 2011). The analysis involves separate assessments of the measurement and structural models.

4.1 Measurement Model

SmartPLS software was utilized to examine the reliability and validity of the construct measures. Multi-item measures were used to assess the reliability and validity of the constructs. Firstly, all the first-order constructs were treated as reflective measures.

Cronbach's α and composite reliability were calculated to measure the internal consistency and indicator reliabilities. All items had an α and CR above 0.60 (Nunnally & Bernstein, 1994). The average variance extracted (AVE) was utilized to evaluate convergent validity.

All AVEs for the constructs were found to be around 0.50 or above, denoting that each construct explained at least 50% of the variance of its indicators (see Table 2).

Further, the Fornell-Lacker criterion was applied to check discriminant validity for each construct, so as to assess whether or not each construct was unique. Table-3 demonstrates that discriminant validity was achieved as the square root of each construct's AVE was greater than the construct's highest correlation with any other construct (Hair, Jr. et al., 2017). The data confirms that the measurement scales accurately reflect the constructs that they were intended to measure.

INSERT TABLE 3 HERE

4.2 Structural Model Assessment

After confirming the construct measurements, the collinearity among the constructs was analyzed before carrying out the path coefficient estimation. Each set of predictors in the structural model was evaluated for collinearity and each predictor had a VIF value lower than 5. Following this step, we then assessed the significance of the path coefficients to investigate the hypothesized relationships. The significance of all the path coefficients was tested using 5,000 bootstraps to produce the t-statistics (see Table 4). The statistics revealed that the influence of social media application and maintenance on firm agility and adaptability appeared to be significant and positive, respectively (H1a: $\beta=0.409$, $p<0.001$; H1b $\beta=0.416$, $p<0.001$; H2a: $\beta=0.315$, $p<0.001$; H2b $\beta=0.439$, $p<0.001$). Therefore, H1 and H2 are supported. The path coefficient from firm agility to performance does not seem significant ($\beta=0.162$, $p>0.01$), while the relationship between the firm's adaptability and performance

was found to be significant and positive with $\beta=0.551$ ($p<0.001$). Hence, the statistics illustrate that H3 is not supported whilst H4 is supported.

INSERT TABLE 4 HERE

We also obtained an R² value, the coefficient of determination, in order to evaluate the structural model and reflect its predictive accuracy (see Table 5). A significant R² value should be between 0 and 1, while higher levels indicate more predictive accuracy. In this case, the predictive accuracy of social media application leading to agility and adaptability was represented by R² values of 0.189 and 0.210, respectively. This indicates a good degree of effect of social media application – including use and maintenance – on the firm’s dynamic capabilities ($R^2 > 0.2$) (Hair, Jr. et al., 2017). Furthermore, a firm’s dynamic capabilities, including agility and adaptability, offer excellent predictive accuracy ($R^2 = 0.45$) for firm performance and time-based performance ($R^2 = 0.486$).

Apart from testing the magnitude of the R² values for predictive accuracy, Gtöne-Geisser’s Q² value can also be applied in order to assess the model’s predictive relevance (see Table 5). By using the blindfolding procedure for an omission distance of $D = 7$ (Chin, 1998), the model is assumed to show predictive relevance ($Q^2 > 0$). For this structural model, all the endogenous variables have a Q² greater than 0, which provides support for the model’s predictive relevance (Hair, Jr. et al., 2017).

INSERT TABLE 5 HERE

4.3 Mediating Effects

Preacher and Hayes's (2008) approach was applied to test the mediating effects, and it offers a higher degree of statistical power as compared to the earlier Sobel test (Hair, Jr. et al., 2017). The direct effect between the exogenous and endogenous variable was assessed first, and then the mediator test was used to evaluate the significance of the indirect effect. By running consistent PLS bootstrapping with samples of 3000 at a 95% confidence level, we examined the indirect effect of time-based performance on the relationships between a) agility and firm performance (H5a); and b) adaptability and firm performance (H5b) (see Table 6). The results show that the indirect effect of H5a = 0.130, 95% bias-corrected, CI [0.057, 0.254], t-value = 2.696, $p < 0.001$, and H5b = 0.131, 95% bias-corrected, CI [0.046, 0.254], t-value = 2.511, $p < 0.01$ were statistically significant respectively (Hair et al., 2017). The statistics revealed that time-based performance had an indirect-only mediating effect on the relationship between agility and firm performance, which is consistent with the hypothesis (H5a). A complementary mediating effect of time-based performance on the relationship between adaptability and firm performance (H5b) indicates the potential of other omitted mediators (Zhao et al., 2010).

INSERT TABLE 6 HERE

5. Discussion and Conclusion

The environmental dynamism in business requires firms to seek new practices, activities, routines, structural designs, technology system upgrades, and reward system redesigns, to support the attainment of strategic goals. The application of social media has significantly extended the ways in which organizations relate to the marketplace and society (Gu & Ye, 2014). The evaluation of the relationships between social media application, firm dynamic

capabilities (i.e., agility and adaptability) and firm performance is crucial for responding to the current market volatility. The results demonstrate a significant positive influence of social media application on firm agility and adaptability, which in turn affect firm performance. This study also investigated the indirect effect of time-based performance as a mediator between firm dynamic capabilities and performance, and the results indicate that time-based performance is an important indicator for a firm's overall market performance.

5.1 Implications for Research

Theoretically, this study contributes to the existing knowledge in the domain of DBV by providing an integrated conceptual framework, since the existing research in strategic management has not fully explored the critical role of social media application as a strategic resource to enhance firms' dynamic capabilities. Hence, this study is the first to integrate the resource-based view and the DCV, highlighting the close relationship between resources and capabilities.

The findings of this study confirm the important communication role that social media plays in connecting with external stakeholders, especially members of the value chain. Firms' investment in social media resources must include two major aspects, i.e., use and maintenance. With more and more firms setting up social media accounts, it is necessary to point out that social media application goes beyond the initial set up, design of social media content and allocation of personnel to operate the accounts. The maintenance of social media is more instrumental, emphasizing the need for constant review and ongoing investment (Muninger et al., 2019). Social media use may require a short-term focus which involves decisions about which platform to use, the themes, the tone and major content of the firm's

account, ways/language of communication, and the expected time/style of response to customers' comments. However, the maintenance of social media requires firms to engage in the ongoing collection of data (e.g. concerning the latest innovations in technology, uncertainties in market demand, or changes in policies and regulations) and information or trends from customer interactions, as well as requiring responses to such changes in the market (Brivot et al., 2017; Demek et al., 2018).

This study has also argued for the importance of examining agility and adaptability as two critical capabilities that capture firms' dynamisms. These two capabilities are particularly crucial areas for investigation and investment by firms operating in a volatile market environment and under resource constraints. Unlike in other studies, the present findings do not present the direct impact of agility on business performance, an approach which we believe to be more reasonable as the short-term focus of agility may mean its direct effect on business measurements is not reflected immediately. The indirect only mediating effect of firms' time-based performance presents the significant contribution of agility for firms, enabling them to cope with demands and variations with a combination of speed, accuracy, cost-efficiency, and flexibility from a short-term perspective (Akhtar et al., 2018).

This study also validates the findings of previous research about the positive relationship between firm adaptability and performance – in particular, financial performance, production performance, and market share growth (e.g. Swamidass & Newell, 1987; Vickery et al., 2010). However, firm adaptability requires a long-term mechanism for systematic re-engineering, re-structuring and resource re-allocation based on changes in the environment. The findings confirm that firms with an advanced level of adaptability are more likely to be

successful as they have the ability to modify strategies, operations, technologies, products or services to accommodate structural shifts in markets and external demands (Lee, 2004; Endres, 2017). However, some studies imply a non-linear relationship between adaptability and performance, which suggests that indiscriminate over-adaptation to every change may generate issues rather than improvements (e.g. Bourgeois, 1980; McKee, Varadarajan & Pride, 1989). By being flexible, firms may be overwhelmed with information and busy responding to all the changes taking place (Snow & Hrebiniak, 1980; Stoica et al., 2003).

In addition, this study has highlighted the importance of re-investigating ‘time’ as a crucial capability and performance indicator for small and medium-sized firms in the current market environment. ‘Time’ within this context also means ‘speed’ and is reflected in many ways, such as new product development speed, delivery speed, response speed, and manufacturing lead time (Droge et al., 2004).

5.2 Implications for Practice

Based on the research findings, we propose managerial recommendations for firms facing a volatile or ever-changing environment. Firms that have ignored the importance of social media may need to reconsider their approach to investing in social media application. For example, we advise firms to investigate the latest technologies and invest in upgrading hardware, recruiting specialists for social media management, data mining, analysis, and allocation of resources in a timely manner (Chan et al., 2016). Managers should also be aware that social media could be “both a blessing and a curse” for companies (Scott & Orlikowski, 2012, p.38), which means that the power and the effects of social media platforms have created threats as well as opportunities for organizations (Jones et al., 2009). Extensive social

media engagement may result in an overwhelming amount of information, which creates unnecessary noise, such as widespread negative information from customers and fake or misleading information generated by competitors. Such disturbances may have negative consequences for the business under the current scenario (Brivot et al., 2017; Demek et al., 2018). Hence, firms should consider setting up a social media department or outsourcing social media maintenance.

Secondly, we strongly recommend that firms consider a strategic focus upon monitoring agility and adaptability. Firms with such capabilities are better equipped to detect technical and market changes, which offers them secured access to desired technologies, improved product quality, customer relationships, and performance (Beckman et al., 2004). It is noteworthy that firms which intend to increase their adaptability need a far more transparent, objective and professional organizational culture (Tejeiro Koller, 2016). The management team that strives to cultivate such a capability needs to show its commitment to the development of a robust internal system and structure which allows – and facilitates – functional departments and individuals to sense, capture, and respond flexibly to forthcoming changes (Lee, 2004).

Since both adaptive and agile capabilities are highly relevant to market volatility, the management also needs to be very aware of the increased cost associated with the reconfigurations and whether responding quickly to the volatile market will pay-off. Besides, long-established firms or those in traditional industries may find it hard to enhance such capabilities. Hence, we suggest that they consider exploring opportunities for systematic solutions, such as restructuring the organization so that functional departments or individuals

are able to respond quickly, allowing resources to be re-allocated to cope with emerging market changes, constantly searching for available resources and reducing costs wherever possible.

In conclusion, this study highlights the legitimacy of considering social media as a resource that can be internalized to increase firms' agility and adaptability in a dynamic and turbulent environment. Firms in such an environment benefit from these capabilities as they can better sense, capture, and respond to the changes swiftly and flexibly, with both short-term and long-term focuses. However, this study is not without limitations.

Firstly, the samples were collected from two industrial development districts in China, and most of the companies were small and medium-sized firms with an innovation focus. This sample profile limits the findings to firms that are more familiar with social media application and are already comparatively flexible regarding the changing environment. Future studies may consider including different sizes of firms from a wider range of industries to have a diverse overall sample.

Secondly, the respondents from each firm only represent their personal viewpoint on how the firm is performing, and the data may run the risk of self-report bias. Therefore, future researchers may consider collecting data from different sources within a firm, to avoid encountering such bias. Finally, researchers may also consider employing a longitudinal case study approach in order to attain a more in-depth understanding of how different firms utilize social media to connect the internal and external environment and the manner in which they establish their systems to quickly respond to the rapid changes in the short-term as well as the long-term.

References:

- Akhtar, P., Khan, Z., Frynas, J. G., Tse, Y. K., & Rao-Nicholson, R. (2018). Essential Micro-foundations for Contemporary Business Operations: Top Management Tangible Competencies, Relationship-based Business Networks and Environmental Sustainability. *British Journal of Management*, 29(1), 43–62.
<https://doi.org/10.1111/1467-8551.12233>
- Altay, N., Gunasekaran, A., Dubey, R., & Childe, S. J. (2018). Agility and resilience as antecedents of supply chain performance under moderating effects of organizational culture within the humanitarian setting: a dynamic capability view. *Production Planning & Control*, 29(14), 1158–1174. <https://doi.org/10.1080/09537287.2018.1542174>
- Angle, H. L., & Perry, J. L. (1981). An empirical assessment of organizational commitment and organizational effectiveness. *Administrative Science Quarterly*, 26(1), 1.
<https://doi.org/10.2307/2392596>
- Appel, G., Grewal, L., Hadi, R., & Stephen, A. T. (2020). The future of social media in marketing. *Journal of the Academy of Marketing Science*, 48(1), 79–95.
<https://doi.org/10.1007/s11747-019-00695-1>
- Beckman, C. M., Haunschild, P. R., & Phillips, D. J. (2004). Friends or strangers? Firm-specific uncertainty, market uncertainty, and network partner selection. *Organization Science*, 15(3). <https://doi.org/10.1287/orsc.1040.0065>
- Bhimani, H., Mention, A. L., & Barlatier, P. J. (2019). Social media and innovation: A systematic literature review and future research directions. *Technological Forecasting and Social Change*, 144, 251–269. <https://doi.org/10.1016/j.techfore.2018.10.007>

- Birkinshaw, J., & Gupta, K. (2013). Clarifying the distinctive contribution of ambidexterity to the field of organization studies. *Academy of Management Perspectives*, 27(4), 287–298. <https://doi.org/10.5465/amp.2012.0167>
- Bourgeois, L. J. (1980). Strategy and Environment: A Conceptual Integration. *The Academy of Management Review*, 5(1), 25. <https://doi.org/10.2307/257802>
- Brivot, M., Gendron, Y., & Guénin, H. (2017). Reinventing organizational control: Meaning contest surrounding reputational risk controllability in the social media arena. *Accounting, Auditing and Accountability Journal*, 30(4), 795–820. <https://doi.org/10.1108/AAAJ-06-2015-2111>
- Burke, M., Marlow, C., & Lento, T. (2010). Social network activity and social well-being. *Conference on Human Factors in Computing Systems - Proceedings*, 3, 1909–1912. <https://doi.org/10.1145/1753326.1753613>
- Cegarra-Navarro, J. G., Soto-Acosta, P., & Wensley, A. K. P. (2016). Structured knowledge processes and firm performance: The role of organizational agility. *Journal of Business Research*, 69(5), 1544–1549. <https://doi.org/10.1016/j.jbusres.2015.10.014>
- Cenamor, J., Parida, V., & Wincent, J. (2019). How entrepreneurial SMEs compete through digital platforms: The roles of digital platform capability, network capability and ambidexterity. *Journal of Business Research*, 100, 196–206. <https://doi.org/10.1016/j.jbusres.2019.03.035>
- Chae, I., Stephen, A. T., Bart, Y., & Yao, D. (2017). Spillover effects in seeded word-of-mouth marketing campaigns. *Marketing Science*, 36(1), 89–104. <https://doi.org/10.1287/mksc.2016.1001>

- Chan, H. K., Wang, X., Lacka, E., & Zhang, M. (2016). A Mixed-Method Approach to Extracting the Value of Social Media Data. *Production and Operations Management*, 25(3), 568–583. <https://doi.org/10.1111/poms.12390>
- Cheng, C. C. J., & Krumwiede, D. (2018). Enhancing the performance of supplier involvement in new product development: the enabling roles of social media and firm capabilities. *Supply Chain Management*, 23(3), 171–187. <https://doi.org/10.1108/SCM-07-2017-0230>
- Chin, W. W. (1998). The Partial Least Squares Approach for Structural Equation Modeling. In Marcoulides & G.A. (Eds.), *Modern Methods for Business Research* (pp. 295–336). Lawrence Erlbaum Associates. <https://psycnet.apa.org/record/1998-07269-010>
- Chuang, S. H. (2020). Co-creating social media agility to build strong customer-firm relationships. *Industrial Marketing Management*, 84, 202–211. <https://doi.org/10.1016/j.indmarman.2019.06.012>
- Dellarocas, C. N. (2003). The Digitization of Word-of-Mouth: Promise and Challenges of Online Feedback Mechanisms. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.393042>
- Demek, K. C., Raschke, R. L., Janvrin, D. J., & Dilla, W. N. (2018). Do organizations use a formalized risk management process to address social media risk? *International Journal of Accounting Information Systems*, 28, 31–44. <https://doi.org/10.1016/j.accinf.2017.12.004>
- Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. *Organization Science*, 6(2), 204–223. <https://doi.org/10.1287/orsc.6.2.204>

- Drenik, G. (2021). Businesses Are Increasing Their Investments In Social Media As Consumers Use Social Media More Than Ever Before – Here’s Why. *Forbes*.
<https://www.forbes.com/sites/garydrenik/2021/04/22/businesses-are-increasing-their-investments-in-social-media-as-consumers-use-social-media-more-than-ever-before--heres-why/?sh=fdc6ae77156f>
- Droge, C., Jayaram, J., & Vickery, S. K. (2004). The effects of internal versus external integration practices on time-based performance and overall firm performance. *Journal of Operations Management*, 22(6), 557–573. <https://doi.org/10.1016/j.jom.2004.08.001>
- Eckstein, D., Goellner, M., Blome, C., & Henke, M. (2015). The performance impact of supply chain agility and supply chain adaptability: The moderating effect of product complexity. *International Journal of Production Research*, 53(10), 3028–3046.
<https://doi.org/10.1080/00207543.2014.970707>
- Endres, H. (2017). *Adaptability Through Dynamic Capabilities: How Management Can Recognize Opportunities and Threats*. Springer Fachmedien Wiesbaden.
<https://doi.org/10.1007/978-3-658-20157-9>
- Fisher, M. L. (1997). What Is the Right Supply Chain for Your Product? *Harvard Business Review*, March, 105–116.
- Foroudi, P., Yu, Q., Gupta, S., & Foroudi, M. M. (2019). Enhancing university brand image and reputation through customer value co-creation behaviour. *Technological Forecasting and Social Change*, 138, 218–227.
<https://doi.org/10.1016/j.techfore.2018.09.006>
- Freeman, C., Burns, T., & Stalker, G. M. (1969). The Management of Innovation. *The*

Economic Journal, 79(314), 403. <https://doi.org/10.2307/2230196>

Gehani, R. R. (1995). Time-based management of technology: A taxonomic integration of tactical and strategic roles. *International Journal of Operations and Production*

Management, 15(2), 19–35. <https://doi.org/10.1108/01443579510080391>

Gelhard, C., von Delft, S., & Gudergan, S. P. (2016). Heterogeneity in dynamic capability configurations: Equifinality and strategic performance. *Journal of Business Research*,

69(11), 5272–5279. <https://doi.org/10.1016/j.jbusres.2016.04.124>

Gordon, G. G., & DiTomaso, N. (1992). Predicting corporate performance from organizational culture. *Journal of Management Studies*, 29(6), 783–798.

<https://doi.org/10.1111/j.1467-6486.1992.tb00689.x>

Gu, B., & Ye, Q. (2014). First step in social media: Measuring the influence of online management responses on customer satisfaction. *Production and Operations*

Management, 23(4), 570–582. <https://doi.org/10.1111/poms.12043>

Haarhaus, T., & Lienen, A. (2020). Building dynamic capabilities to cope with environmental uncertainty: The role of strategic foresight. *Technological Forecasting*

and Social Change, 155, 120033. <https://doi.org/10.1016/j.techfore.2020.120033>

Haenlein, M. (2017). How to date your clients in the 21st century: Challenges in managing customer relationships in today's world. In *Business Horizons* (Vol. 60, Issue 5, pp.

577–586). Elsevier Ltd. <https://doi.org/10.1016/j.bushor.2017.06.002>

Hair, Jr., J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). SAGE Publications, Inc.

Hair Jr., J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet.

Journal of Marketing Theory and Practice, 19(2), 139–152.

Hansen, G. S., & Wernerfelt, B. (1989). Determinants of firm performance: The relative importance of economic and organizational factors. *Strategic Management Journal*, 10(5), 399–411. <https://doi.org/10.1002/smj.4250100502>

Huang, S., Potter, A., & Evers, D. (2020). Social media in operations and supply chain management: State-of-the-Art and research directions. In *International Journal of Production Research* (Vol. 58, Issue 6, pp. 1893–1925). Taylor and Francis Ltd. <https://doi.org/10.1080/00207543.2019.1702228>

Iñigo, E. A., & Albareda, L. (2016). Understanding sustainable innovation as a complex adaptive system: A systemic approach to the firm. *Journal of Cleaner Production*, 126, 1–20. <https://doi.org/10.1016/j.jclepro.2016.03.036>

Iyer, K. N. S., Germain, R., & Frankwick, G. L. (2004). Supply chain B2B e-commerce and time-based delivery performance. *International Journal of Physical Distribution and Logistics Management*, 34(8), 645–661. <https://doi.org/10.1108/09600030410557776>

Jayaram, J., Vickery, S. K., & Droge, C. (1999). An empirical study of time-based competition in the North American automotive supplier industry. *International Journal of Operations and Production Management*, 19(10), 1010–1034. <https://doi.org/10.1108/01443579910287055>

Jones, B., Temperley, J., & Lima, A. (2009). Corporate reputation in the era of Web 2.0: The case of Primark. *Journal of Marketing Management*, 25(9–10), 927–939. <https://doi.org/10.1362/026725709X479309>

Kotter, J. P., & Heskett, J. L. (1992). *Corporate Culture and Performance*. Free Press.

- Ladhari, R., & Michaud, M. (2015). eWOM effects on hotel booking intentions, attitudes, trust, and website perceptions. *International Journal of Hospitality Management*, 46, 36–45. <https://doi.org/10.1016/j.ijhm.2015.01.010>
- Lee, H. L. (2004). The triple-a supply chain. *Harvard Business Review*, 82(10), 102.
- Li, D. yuan, & Liu, J. (2014). Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. *Journal of Business Research*, 67(1), 2793–2799. <https://doi.org/10.1016/j.jbusres.2012.08.007>
- Marcoulides, G. A., & Heck, R. H. (1993). Organizational culture and performance: Proposing and testing a model. *Organization Science*, 4(2), 209–225. <https://doi.org/10.1287/orsc.4.2.209>
- McAdam, R., Humphreys, P., Galbraith, B., & Miller, K. (2017). Developing management capability within a horizontal supply chain in performance measurement deployment and evolution: a Dynamic Capabilities and Goal Theory perspective. *Production Planning & Control*, 28(6–8), 610–628. <https://doi.org/10.1080/09537287.2017.1309706>
- McKee, D. O., Varadarajan, P. R., & Pride, W. M. (1989). Strategic adaptability and firm performance: A market-contingent perspective. *Journal of Marketing*, 53(3), 21. <https://doi.org/10.2307/1251340>
- Miles, R. E., Snow, C. C., Meyer, A. D., & Coleman, H. J. (1978a). Organizational strategy, structure, and process. *The Academy of Management Review*, 3(3), 546–562.
- Miles, R. E., Snow, C. C., Meyer, A. D., & Coleman, H. J. (1978b). Organizational Strategy, Structure, and Process. *The Academy of Management Review*, 3(3), 546.

<https://doi.org/10.2307/257544>

Muninger, M. I., Hammedi, W., & Mahr, D. (2019). The value of social media for innovation: A capability perspective. *Journal of Business Research*, *95*, 116–127.

<https://doi.org/10.1016/j.jbusres.2018.10.012>

Nemkova, E. (2017). The impact of agility on the market performance of born-global firms:

An exploratory study of the ‘Tech City’ innovation cluster. *Journal of Business Research*, *80*, 257–265. <https://doi.org/10.1016/j.jbusres.2017.04.017>

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* (3rd ed.). McGraw-Hill.

Oberoi, P., Patel, C., & Haon, C. (2017). Technology sourcing for website personalization and social media marketing: A study of e-retailing industry. *Journal of Business Research*, *80*, 10–23. <https://doi.org/10.1016/j.jbusres.2017.06.005>

Parsons, A. L., & Lepkowska-White, E. (2018). Social media marketing management: A conceptual framework. *Journal of Internet Commerce*, *17*(2), 81–95.

<https://doi.org/10.1080/15332861.2018.1433910>

Pentina, I., Zhang, L., & Basmanova, O. (2013). Antecedents and consequences of trust in a social media brand: A cross-cultural study of Twitter. *Computers in Human Behavior*,

29(4), 1546–1555. <https://doi.org/10.1016/j.chb.2013.01.045>

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology*, *88*(5), 879–903.

<https://doi.org/10.1037/0021-9010.88.5.879>

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing

- and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891.
- Rapp, A., Beitelspacher, L. S., Grewal, D., Hughes, D. E., Rapp, A., Beitelspacher, L. S., Grewal, D., & Hughes, D. E. (2013). Understanding social media effects across seller, retailer, and consumer interactions. *J. of the Acad. Mark. Sci*, 41(5), 547–566.
<https://doi.org/10.1007/s11747-013-0326-9>
- Scott, S. V., & Orlikowski, W. J. (2012). Reconfiguring relations of accountability: Materialization of social media in the travel sector. *Accounting, Organizations and Society*, 37(1), 26–40. <https://doi.org/10.1016/j.aos.2011.11.005>
- Seebach, C., Beck, R., & Denisova, O. (2012). Sensing social media for corporate reputation management: A business agility perspective. *ECIS 2012 Proceedings*.
<https://aisel.aisnet.org/ecis2012/140>
- Sharifi, H., & Zhang, Z. (1999). Methodology for achieving agility in manufacturing organisations: an introduction. *International Journal of Production Economics*, 62(1), 7–22. [https://doi.org/10.1016/S0925-5273\(98\)00217-5](https://doi.org/10.1016/S0925-5273(98)00217-5)
- Simsek, Z. (2009). Organizational ambidexterity: Towards a multilevel understanding. *Journal of Management Studies*, 46(4), 597–624. <https://doi.org/10.1111/j.1467-6486.2009.00828.x>
- Snow, C. C., & Hrebiniak, L. G. (1980). Strategy, Distinctive Competence, and Organizational Performance. *Administrative Science Quarterly*, 25(2), 317.
<https://doi.org/10.2307/2392457>
- Stevenson, M., & Spring, M. (2007). Flexibility from a supply chain perspective: Definition

- and review. In *International Journal of Operations and Production Management* (Vol. 27, Issue 7, pp. 685–713). Emerald Group Publishing Limited.
<https://doi.org/10.1108/01443570710756956>
- Stoica, M., Tansuhaj, P., McCullough, J., & Rose, J. (2003). Adaptability and firm performance: The case of American and Romanian companies. *Journal of East-West Business*, 9(1), 5–27. https://doi.org/10.1300/J097v09n01_02
- Swamidass, P. M., & Newell, W. T. (1987). Manufacturing strategy, environmental uncertainty and performance: A path analytic model. *Management Science*, 33(4), 509–524. <https://doi.org/10.1287/mnsc.33.4.509>
- Tajvidi, R., & Karami, A. (2017). The effect of social media on firm performance. *Computers in Human Behavior*, 105174. <https://doi.org/10.1016/j.chb.2017.09.026>
- Teece, D. J., Peteraf, M., & Leih, S. (2016). Dynamic Capabilities and Organizational Agility: Risk, Uncertainty, and Strategy in the Innovation Economy. *California Management Review*, 58(4), 13–35. <https://doi.org/10.1525/cm.2016.58.4.13>
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
[https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
- Tejeiro Koller, M. R. (2016). Exploring adaptability in organizations: Where adaptive advantage comes from and what it is based upon. *Journal of Organizational Change Management*, 29(6), 837–854. <https://doi.org/10.1108/JOCM-01-2016-0008>
- Trainor, K. J., Andzulis, J., Rapp, A., & Agnihotri, R. (2014). Social media technology usage and customer relationship performance: A capabilities-based examination of social

CRM. *Journal of Business Research*, 67(6), 1201–1208.

<https://doi.org/10.1016/j.jbusres.2013.05.002>

Tseng, M. L., Lim, M. K., Wu, K. J., & Peng, W. W. (2019). Improving sustainable supply chain capabilities using social media in a decision-making model. *Journal of Cleaner Production*, 227, 700–711. <https://doi.org/10.1016/j.jclepro.2019.04.202>

Tuominen, M., Rajala, A., & Möller, K. (2004). How does adaptability drive firm innovativeness? *Journal of Business Research*, 57(5), 495–506.

[https://doi.org/10.1016/S0148-2963\(02\)00316-8](https://doi.org/10.1016/S0148-2963(02)00316-8)

Vickery, S. K., Droge, C., Setia, P., & Sambamurthy, V. (2010). Supply chain information technologies and organisational initiatives: Complementary versus independent effects on agility and firm performance. *International Journal of Production Research*, 48(23), 7025–7042. <https://doi.org/10.1080/00207540903348353>

Vrontis, D., Basile, G., Simona Andreano, M., Mazzitelli, A., & Papasolomou, I. (2020). The profile of innovation driven Italian SMEs and the relationship between the firms' networking abilities and dynamic capabilities. *Journal of Business Research*, 114, 313–324. <https://doi.org/10.1016/j.jbusres.2020.04.009>

Wang, Z., & Kim, H. G. (2017). Can social media marketing improve customer relationship capabilities and firm performance? Dynamic capability perspective. *Journal of Interactive Marketing*, 39, 15–26. <https://doi.org/10.1016/j.intmar.2017.02.004>

Weber, Y., & Tarba, S. Y. (2014). Strategic Agility: A State of the Art Introduction to the Special Section on Strategic Agility. *California Management Review*, 56(3), 5–12.

<https://doi.org/10.1525/cm.2014.56.3.5>

- Wong, Y. T., Ngo, H. Y., & Wong, C. S. (2003). Antecedents and outcomes of employees' trust in Chinese joint ventures. *Asia Pacific Journal of Management*, 20(4), 481–499.
- Yu, Q., Yen, D. A., Barnes, B. R., & Huang, Y.-A. (2019). Enhancing firm performance through internal market orientation and employee organizational commitment. *The International Journal of Human Resource Management*, 30(6), 964–987.
- Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2), 197–206.
- <https://doi.org/10.1086/651257>

Figure 1. Conceptual Framework

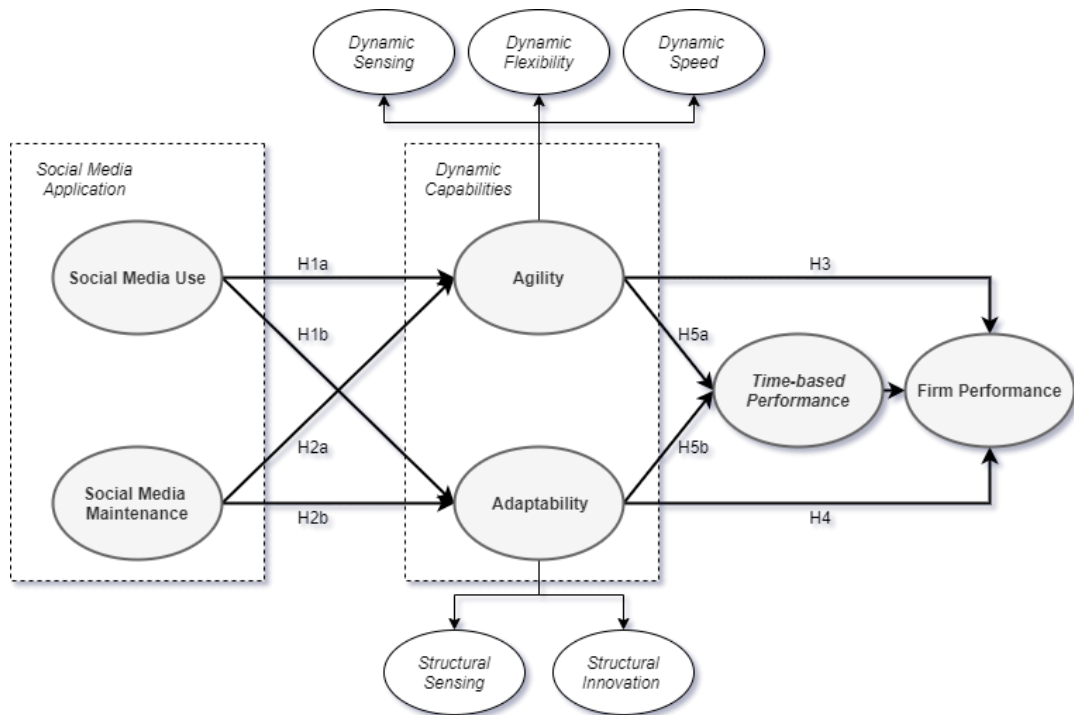


Table 1: Sample Profile

Demographic variables	N	%
Industry types		
R&D	201	81
Non-R&D	48	19
Company size (by number of employees)		
< 50 people	38	15
51-200	83	34
201-500	63	25
> 500	65	26
Years of being established (years)		
<3 years	18	7
3-10	59	24
11-20	139	56
> 21	33	13

Table 2: Measurement Model Evaluation for First-order Constructs

Item	Construct	Loadings	α	CR	AVE
	Social Media Use		.829	.872	.495
	We use social media to:				
SMA1	Enhance the relationship with our customers.	0.806			
SMA2	Provide our customers with information about our products/service.	0.703			
SMA3	Monitor product/service market visibility and performance.	0.716			
SMA4	Monitor competitors.	0.661			
SMA5	Co-promote with our customers.	0.658			
SMA6	Keep our customers updated about our latest products and sales promotions.	0.723			
SMA7	Keep up with current trends of similar products/services.	0.646			
	Social Media Maintenance		.812	.864	.515
SMM1	We take what is posted on our customers' social media seriously.	0.638			
SMM2	We allocate a budget to social media application.	0.710			
SMM3	We appoint special staff (or outsource) to look after the operation of the firm's social media.	0.729			
SMM4	We appoint staff (or outsource) to be responsible for the technical support of the firm's social media.	0.734			
SMM5	We have a training scheme for social media application.	0.737			
SMM6	We regularly evaluate the firm's social media application.	0.753			
	Agility		.904	.918	.412
	<i>Dynamic Sensing</i>		.714	.823	.539
	We can sense short-term, temporary changes in:				
SCAgs1	Technology (e.g., revisions of existing technologies).	.727			
SCAgs2	Competition (e.g., fluctuations in competitors' product pricing).	.716			
SCAgs3	Customer demand (e.g., retailers' demand fluctuations)	.723			
SCAgs4	End-user demand (e.g., market demand fluctuations).	.768			
	<i>Dynamic Flexibility</i>		.849	.882	.484
	We are flexible in responding to short-term, temporary changes with customers' demands in terms of:				
SCAgf1	Reducing manufacturing throughput times.	.709			
SCAgf2	Adjusting delivery capacities.	.745			
SCAgf3	Reducing delivery times.	.742			
SCAgf4	Enhancing delivery reliability.	.667			
SCAgf5	Reducing replacement times of purchases.	.659			
SCAgf6	Adjusting the order of goods and services.	.682			
SCAgf7	Adjusting production processes.	.643			
SCAgf8	Adjusting inventory turnover.	.710			
	<i>Dynamic Speed</i>		.771	.854	.595
	We can rapidly respond to short-term, temporary changes in the customers' demands in terms of:				
SCAgs1	Manufacturing throughput times.	.840			
SCAgs2	Customer delivery times.	.794			
SCAgs3	Replacement times of purchases.	.747			
SCAgs4	Product/service development time.	.698			
	Adaptability		.821	.865	.445
	<i>Structural Sensing</i>		.749	.856	.665
	We can sense long-term, fundamental changes				
SCAdsl	In technology (e.g., fundamental technological advances).	.834			

SCAds2	In competition (e.g., fundamental changes in the competitive landscape).	.767			
SCAds3	In demand (e.g., fundamental changes in consumer preferences).	.845			
	<i>Structural Innovation</i>		.783	.852	.535
SCAdi1	We introduce a greater number of new products and services to markets in comparison with our competitors in response to long-term, fundamental changes.	.752			
SCAdi2	The period from product development to final customer delivery is considerably shorter in comparison with our competitors.	.705			
SCAdi3	We demonstrate a higher degree of product innovativeness in comparison with our competitors.	.734			
SCAdi4	We change production methods at a greater speed in comparison with our competitors.	.703			
SCAdi5	We are constantly improving our supply chain processes.	.762			
	Business Performance		.840	.886	.610
BP1	Sales growth rate	.751			
BP2	Market share	.801			
BP3	Company profitability	.776			
BP4	Product/Service quality	.795			
BP5	Customer satisfaction	.780			
	Time-based Performance		.781	.859	.604
TP1	We minimize the time of new product/service development.	.795			
TP2	We minimize the manufacturing lead time (from when the order was released to the shop floor to the time of its completion).	.763			
TP3	We minimize the time for delivery to as close to zero as possible (between receipt of customer order and final delivery).	.800			
TP4	We cater to customer needs by expeditiously processing and solving customer complaints, by rapid confirmation of orders, and by minimizing customer information lead time.	.749			

Table 3: Correlation matrix (Discriminant validity)

	Adaptability	Agility	Application	Flexibility	Innovation	Maintenance	Performance	Sensing	Speed	Structural sensing
Adaptability	0.667									
Agility	0.674	0.642								
Application	0.559	0.64	0.704							
Flexibility	0.584	0.948	0.562	0.696						
Innovation	0.922	0.614	0.505	0.559	0.732					
Maintenance	0.614	0.644	0.557	0.595	0.579	0.718				
Performance	0.66	0.533	0.478	0.501	0.676	0.6	0.781			
Sensing	0.572	0.776	0.521	0.622	0.441	0.553	0.362	0.734		
Speed	0.638	0.876	0.615	0.754	0.601	0.544	0.51	0.545	0.772	
Structural sensing	0.805	0.553	0.463	0.439	0.512	0.474	0.427	0.592	0.493	0.816

Table 4. Path coefficients with no mediating effect

Paths	H	Expected sign	Path coeff.	SE	Absolute t-value	Supported
SMA →Agility	H1a	+	0.409***	0.082	4.987	Yes
SMA →Adaptability	H1b	+	0.315***	0.089	3.520	Yes
SMM →Agility	H2a	+	0.416***	0.067	6.210	Yes
SMM →Adaptability	H2b	+	0.439***	0.073	6.006	Yes
Agility → Performance	H3	+	0.162	0.119	1.354	No
Adaptability → Performance	H4	+	0.551***	0.104	5.327	Yes

***p < 0.001, ** p < 0.05, * p < 0.01.

Table 5. Results of R² and Q² values

Endogenous latent variable	R ² Value	Q ² Value
Adaptability	0.446	0.189
Agility	0.529	0.210
Performance	0.512	0.301
Time-based performance	0.486	0.283

Table 6. Mediating effect of time-based performance

		Coeff.	SE	t-value	p-value	Type of Mediation
H5a	Agility->Time-based performance	0.380	0.097	3.903	0.000	Indirect-only mediation
	Time-based performance -> Firm performance	0.343	0.097	3.536	0.000	
	Agility -> Firm performance	0.036	0.111	0.328	0.743	
	Total indirect effects of agility on firm performance through time-based performance as mediator	0.130	0.048	2.696	0.007	
H5b	Adaptability ->Time-based performance	0.383	0.090	4.270	0.000	Complementary partial mediation
	Time-based performance -> Firm performance	0.343	0.097	3.536	0.343	
	Adaptability -> Firm performance	0.417	0.100	4.152	0.000	
	Total indirect effects of adaptability on firm performance through time-based performance as mediator	0.131	0.052	2.511	0.012	

Appendix: Definitions and references for constructs

Construct	Definition
<i>Social Media Application</i>	The manner in which firms implement social media as an agent by which to acquire information from the external environment with the aim of achieving improved mutual communication, customer relationships, value co-creation, interaction, and competitor monitoring (Foroudi et al., 2019; Parsons & Lepkowska-White, 2018). In this study, <i>social media use</i> refers to the purposes and functions of social media applied by the firm, while <i>social media maintenance</i> refers to the longer-term investment in terms of providing continuous support, staffing, training and evaluation.
<i>Dynamic Capability</i>	Dynamic capabilities refer to a firm's ability to constantly adapt, reconfigure and re-create their resources in line with the rapidly changing environment (Teece, Pisano and Shuen, 1997; Wang and Ahmed, 2007; Haarhaus and Liening, 2020).
<i>Agility</i>	Agility in this study refers to whether a firm has the ability to proficiently identify and respond with speed to major opportunities and threats (Weber & Tarba, 2014; Nemkova, 2017). It is short-term focused.
<i>Adaptability</i>	Adaptability, also known as adaptive capability, refers to whether a firm has the ability to adapt successfully detect, respond and capitalize upon changes in the external environment (Bourgeois, 1980; Eckstein et al., 2015). It is long-term focused.
<i>Time-based Performance</i>	Time-based performance (or intermediate performance) emphasizes a firm's strategy for seeking a time-based advantage, such as time-to-product development, manufacturing lead time, delivery speed and customer responsiveness (Gehani, 1995; Droge, Jayaram and Vickery, 2004).
<i>Firm Performance</i>	Firm performance was operationalized by including the firm's market and financial performance, its product/service quality delivery and customer satisfaction (Droge et al., 2004, Yu et al. 2019).