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INFORMATION AND NONMARKET STRATEGY:

Conceptualizing the Interrelationship between Big Data and Corporate Political Activity

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Abstract

While extant research acknowledges the importance of information for corporate political activity (CPA), there is limited understanding of how information is actually used to deploy political strategies. This gap reflects a broader problem in the literature whereby Big Data (BD) research is overly focused on the impact of information on market performance but overlooks the impact on nonmarket performance. In this paper, we draw on the resource-based view to conceptualize the interrelationship between BD (i.e. information) and CPA. We argue that CPA motivates BD investments, which, in turn, shape the organization of CPA and spur the development of data-driven political capabilities. Our conceptual model, which unpacks the intricate linkages between CPA success factors, BD and political capabilities, generates important theoretical, practical and further research implications.

Keywords:

Big Data, information, corporate political activity, political capabilities

1. Introduction

Big Data (BD hereafter) is regarded as today's *Digital Oil* (Yi et al., 2014) or the *New Raw Material* of the 21st century (Berners-Lee and Shadbolt, 2011). It is believed to create *Big Value* for firms (Braganza et al., 2017; Sivarajah et al., 2017), and has thus attracted the attention of practitioners and academics alike (George et al., 2014; Wang et al., 2018). Existing BD research, in search of instrumentality, has mainly focused on articulating the benefits of data. Some scholars argue that BD exposes managers to new knowledge and makes them agile in exploiting real-time opportunities or responding to emerging threats and challenges (McAfee and Brynjolfsson, 2012; Sivarajah et al., 2017). BD also enables firms to make informed decisions (Bhimani, 2015; Chen and Zhang, 2014; Janssen et al., 2017), develop business intelligence (Castellanos et al., 2012; Chen, H. et al., 2012), increase innovation (Chen and Zhang, 2014), improve profitability (Akter et al., 2016) and gain competitive advantage (Kubina et al., 2015; Wamba et al., 2017).

Essentially, researchers are increasingly exploring the market value of BD for firms (Barton and Court, 2012; Mazzei and Noble, 2017; Sheng et al., 2017; Wamba et al., 2017). While this trajectory has unquestionable merits, it overlooks other issues. First, despite the ubiquity of BD research, there is relative muteness about its antecedents, thus creating the impression that BD capabilities or strategies are developed or deployed from a vacuum. This is entrenched by a forward-leaning stance whereby researchers treat BD as the starting point of organizational outcomes. For instance, Janssen et al. (2017) present data collection as the beginning of the BD chain. Similarly, George et al. (2016), in their discussion of the challenges BD poses to management scholars, start from data generation and collection. Further, Blazquez and Domenech (2018) propose a BD lifecycle that starts with planning and data collection. The key question emerging from such representations is, what determines whether firms collect BD? In other words, what drives BD collection?

Moreover, extant research conceives BD as an enterprise asset (Braganza et al., 2017; Nguyen et al., 2017) and has been mainly concerned with its impact on firm performance. In this respect, studies have concentrated on market outcomes such as profitability, market share, and customer satisfaction, while relegating the effects of data on nonmarket outcomes. This problem curtails a comprehensive understanding of BD effects on overall firm performance - a function of both market and nonmarket performances. It is worth noting that businesses do not only operate in market environments, but they also operate in nonmarket environments (Baron, 1995a; 1999; 2003)[1]. The importance of nonmarket environments cannot be overemphasized, mainly as they wield significant influences on market attractiveness and potential (Mellahi et al., 2016; Doh et al., 2012). Therefore, understanding the usefulness of BD in nonmarket environments will help to extend our appreciation of data for developing nonmarket strategies, especially corporate political activity (CPA hereafter).

CPA, which refers to firms' actions to influence their political environments (Hillman, A. J. et al., 2004), has strong links with BD. First, CPA relies on information (Lawton et al., 2013a; Brown, 2017). For instance, some CPA scholars have conceptualized information as a political strategy (Hillman and Hitt, 1999). Others have articulated the usefulness of information for orchestrating political strategies (Figueiredo, 2002; Lawton et al., 2014). Importantly, information also happens to be the core motivation for BD investments (Sheng et al., 2017; Sivarajah et al., 2017). Second, CPA often occurs in volatile political environments (Barron et al., 2016) that are similar to the fast-paced contemporary environments that have necessitated BD strategies (Akoka et al., 2017; McAfee and Brynjolfsson, 2012). Despite these potential connections, research has yet to unpack the

[1] There are two types of environments that affect business operations – market and nonmarket. The market environment consists of suppliers, customers, and competitors who directly affect a firm's economic performance. The nonmarket environment consists of social and political stakeholders whose impact is relatively indirect but nonetheless important for firms' overall performance.

linkages between information and CPA. For instance, though we know that information is useful for lobbying, we do not yet know how information influences the way CPA is organized or even the political capabilities that information generates. In this current age of data deluge (Amankwah-Amoah, 2016), we contend that this is an opportune time to explore the interrelationships between data, information and firms' activities in political environments.

In this theory paper, we draw on the resource-based view (Barney, 1991) and capabilities literature (Winter, 2003; Teece et al., 1997) to develop a conceptual model that outlines how the levers of CPA success stimulate BD investments, which subsequently allows us to show how the quest for successful CPA (e.g. policy influence, firm performance) drives BD strategies. In effect, we postulate CPA as an antecedent of BD. We also theorize how BD can be used to develop political capabilities – generally defined as the ability to assess policy risk and manage the policy-making process (Holburn and Zelner, 2010). We hold a view that political strategies are not developed and deployed merely because firms have access to data. Rather, they are consciously developed to influence government policy, a purpose for which data are useful (Brown, 2017).

In this paper we make three contributions to the BD and CPA literatures. First, we articulate that political depth, political multidexterity and political agility are CPA success factors that eventually stimulate BD investments. In doing so, we address the lack of research on the requirements for successful CPA. Though there is a plethora of studies on CPA antecedents (Hillman et al., 2004; Lux et al., 2011; Lawton et al., 2013a; Schuler, 1996), antecedents are merely indicators of political strategy intensity or choice; they are not determinants of CPA success. Effectively, we highlight a difference between doing CPA and doing effective CPA, and we contribute to the latter by proposing the requirements for successful CPA.

Secondly, our conceptualization addresses the lack of research on the antecedents of BD investments. Studies have shown that BD is a cycle encompassing data acquisition, information extraction, data integration, data modelling and data interpretation (George et al., 2016; Janssen et al., 2017). We agree with these studies that BD is a cycle, but we challenge the common characterization of this cycle as one that starts from data collection. From a nonmarket perspective, we theorise a more holistic cycle that tracks BD across a broader spectrum, progressing from drivers to outcomes. Specifically, we show how CPA motivates investments in BD, thus generating new insights into the nonmarket drivers of BD.

Thirdly, our conceptual model offers a proximate definition and unpacking of political capabilities and shows how BD can be used to develop and deploy unique abilities for policy influence and competitive advantage. This contribution is significant as it marks a point where our paper departs from previous research. The CPA literature defines political capabilities as bundled, aggregated or sets of activities, processes and abilities to network with politicians or influence government policy (e.g. Brown, 2016c; e.g. Kotabe et al., 2017; Holburn and Zelner, 2010). As such, other than showing that these capabilities are internally or externally derived (see Lawton et al., 2013b), CPA scholars have made few attempts to unbundle, structure and classify political capabilities. We address this problem by identifying three specific political capabilities that are leveraged on BD, and hence contribute to distilling and fracturing the political capability construct into more meaningful and distinct components. Additionally, by articulating how BD influences the approaches to and levels of CPA, we highlight the role of information in political strategy development (see Hillman and Hitt, 1999; Barron, 2010; 2011).

The rest of the paper is organized as follows. In the next section, we briefly discuss CPA and political capabilities. We then define Big Data and develop our conceptual model.

We conclude by outlining the model's implications for theory and practice, whilst mapping out future research directions.

2. Corporate Political Activity and Political Capabilities

CPA refers to efforts exerted by firms to influence government policy (Hillman et al., 2004). It occurs in political markets where competing interest groups engage governments for preferential policies and treatment (Baumgartner and Leech, 2001; Grasse et al., 2016; Gray and Lowery, 1988; McKay and Yackee, 2007). CPA entails various strategies, including lobbying, recruitment of ex-politicians, personal ties to politicians, campaign contributions and donations, press conferences, and advocacy advertising (see Hillman and Hitt, 1999; Keim and Zeithaml, 1986; Peng and Luo, 2000). CPA has gained in importance due to the expanding effect that government actions and inactions have on firms (Liedong et al., 2015). Instead of being spectators in the policy making process, firms are increasingly contributing to public governance to create conducive business environments (Liedong et al., 2017).

In the search for instrumentality, a plethora of CPA research focuses on how political strategies affect firms and interest groups, with a particular emphasis placed on operating and stock performances (Sun et al., 2015; Zheng et al., 2015) as well as policy change (Nelson and Yackee, 2012; Rajwani and Liedong, 2015). Empirical evidence suggests an overwhelmingly positive impact of CPA on firm performance (Rajwani and Liedong, 2015), but with pockets of negative effects on corporate governance (Chaney et al., 2011; Hadani and Schuler, 2013; e.g. Liedong and Rajwani, 2018; Sun et al., 2016), risk exposure (Liedong et al., 2017) and financing (Bliss and Gul, 2012).

Though we have come to accept and even actively promote corporate participation in politics and public policy, not all firms are politically engaged. There is heterogeneity in firms' ability to influence their political environments (Capron and Chatain, 2008). Studies of

the antecedents of CPA have shed light on various firm-level, industry-level and institutional characteristics that determine the level of political activity among firms and interest groups (e.g. Barron, 2011; Blumentritt, 2003; Hillman and Keim, 1995; Schuler et al., 2002). However, firm level variables such as sales (Hansen and Mitchell, 2000), assets (Meznar and Nigh, 1995) and market share (Schuler, 1996), which collectively represent resource endowment (Wan and Hillman, 2006), seem to be the foremost determinants of CPA (Hillman et al., 2004; Liedong and Frynas, 2018). Consequently, large firms are more politically active due to their ability to use vast resources to develop and implement political strategies to defend their market positions (Boddewyn and Brewer, 1994; Masters and Keim, 1985).

The focus on resources as a major determinant of political activity has spurred the popularity of RBV (Barney, 1991) in CPA research (Lawton and Rajwani, 2011; Lawton et al., 2013a, 2013b), not only to explore the antecedents of political activity, but also for theorizing how political activity can be used to gain competitive advantage (e.g. Capron and Chatain, 2008; McWilliams et al., 2002). RBV explains competitive heterogeneity as a function of the differences in firms' resource endowments arising from resource market imperfections and managerial discretions (Amit and Schoemaker, 1993; Peteraf, 1993; Wernerfelt, 1984). It argues that firms gain competitive advantage by owning and using valuable, rare, inimitable and non-substitutable resources to extract rent or isolate themselves from value capture (Barney, 1991). This perspective has traditionally been applied to market resources but is equally valid for nonmarket resources which include, most importantly, information.

However, resources alone do not create competitive advantage. The presence of assets does not necessarily lead to superior performance. Instead, value creation is based on the capabilities that firms are able to develop and deploy from resource bundles. In this respect,

the RBV proposes that value is derived from two complementary mechanisms – resource picking and capability building (Makadok, 2001). Firms gain advantage by assembling resources that allow them to develop capabilities (Sirmon et al., 2007). Therefore, capabilities are a "firm's capacity to deploy resources" (Amit and Schoemaker, 1993: 35). The capabilities literature further differentiates between ordinary capabilities and dynamic capabilities (Teece et al., 1997; Bowman and Ambrosini, 2003; Winter, 2003). The former "enable a firm to make a living in the present" while the latter "enables a firm to alter how it currently makes a living" (Helfat and Winter, 2011: 1244).

Both ordinary and dynamic capabilities have been noted in CPA research. Scholars have recognized that firms need political capabilities to successfully conduct CPA (Kotabe et al., 2017; Holburn and Zelner, 2010; Brown, 2016b; Yasuda and Mitsuhashi, 2017). Political capabilities are defined as "dynamic processes by which a firm influences or complies with its political environment for the purpose of generating future value or protecting the current value of the firm from future loss or erosion" (Oliver and Holzinger, 2008: 497). In a broader sense, they refer to "non-ad hoc activities and processes oriented toward value creation or maintenance of the firm's political environment" (Brown, 2016c: 267). These capabilities are leveraged on firms' political resources such as money, time, information, lobbyists, political connections, public affairs departments, and membership in trade associations (Boddewyn and Brewer, 1994; Dahan, 2005; Lawton and Rajwani, 2011; Frynas et al., 2006). Due to the often turbulent nature of political environments (Barron et al., 2016), political capabilities must be dynamic to enable firms to respond to external changes in their nonmarket environments (Lawton et al., 2013b).

A review of the literature shows relatively sparse research on political capabilities; only a few studies have explicitly investigated or made references to the construct (Brown, 2016b; 2017; Lawton and Rajwani, 2011; Lawton, et al., 2013b). This paucity of research

could be due to two reasons. First, CPA scholars seem to treat political resources and political capabilities homogeneously, in defiance of the dichotomy articulated by previous scholars (Makadok, 2001). For instance, there is an implicit assumption that firms with political connections can influence government or shape policy. This may be true only if the connections (social capital) are turned into political capabilities. For example, the ability to collect timely and accurate political information to lobby governments. Second, the lack of mediation in CPA studies has made it difficult to find or articulate empirical evidence of the mechanisms that translate political connections or activity into positive or negative outcomes in political markets (Rajwani & Liedong, 2015). Mechanisms may indicate capabilities. For instance, Guo et al.'s (2014) study of CPA mediation suggests that the ability to recognize business opportunities and build support from government are political capabilities.

A more important shortcoming in the literature is that studies often treat political capabilities as a bundle. As a result, there have been limited attempts to disaggregate, unwrap or unbundle what "capabilities" are in political markets. While some scholars have advanced that political capabilities could be internal or external to the firm (Lawton et al., 2013b; Lawton and Rajwani, 2011) and others have shown how firms develop political capabilities (Brown, 2016a; 2016c; Elsahn and Benson-Rea, 2018), there is still a poor understanding of the specific capabilities that firms deploy.

Of particular relevance to this paper is the paucity of specific information-based political capabilities, despite the literature identifying and acknowledging information as a capability lever. Capabilities are information-based, in the sense that they are developed through information creation and sharing (Amit and Schoemaker, 1993). Although the CPA literature has appreciated the importance of information in political influence (Hillman and Hitt, 1999; Lawton et al., 2014), it has surprisingly not articulated proximate political capabilities that firms can nurture and deploy from data.

3. Big Data

BD has several definitions and interpretations (Sheng et al., 2017), as it is still emerging (Wamba, F. S. et al., 2015), quite nascent (Gandomi and Haider, 2015) and evolving (McKinsey Global Institute, 2011). For example, Janssen et al. (2017: 338) describe it as "datasets that are both big and high in variety and velocity, which makes them difficult to handle using traditional tools and techniques" while Mazzei and Noble (2017: 406) define it as "large, diverse, complex, and/or longitudinal data sets generated from a variety of instruments, sensors, and/or computer-based transactions." More succinctly, Gartner Inc. describe BD as "high volume, high velocity and/or high variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation." Table 1 summarizes some of the important definitions of BD.

Insert Table 1 here

Despite the inconsistencies, various definitions touch on some common tenets that distinguish BD from ordinary data (Kubina et al., 2015), thus leading to a consensus regarding BD's core dimensions. These dimensions include *Volume, Variety*, and *Velocity*, which are collectively called the "3Vs". They have been used by an increasing number of scholars to describe and delineate the scope of BD (Chen, H. et al., 2012; Davenport et al., 2012; Erevelles et al., 2016; Hofacker et al., 2016; McAfee and Brynjolfsson, 2012; Russom, 2011; Sheng et al., 2017). Though additional characteristics have been propounded to further enrich the conceptualization of BD, such as *Value, Variability, Visualization,* and *Veracity* (Gandomi and Haider, 2015; Malthouse and Li, 2017; Sivarajah et al., 2017), they are, at best, extensions of the "3Vs". Therefore, our conceptual model uses the "3Vs" which we describe below:

Volume: this refers to the magnitude of the data. There is no minimum threshold for the size of data that qualifies to be called BD (McKinsey Global Institute, 2011; Sheng et al., 2017), partly as "big" varies with industry type and with technological advancements over time (Gandomi and Haider, 2015; Lee, 2017). Nevertheless, it is widely believed that BD entails large and rich datasets spanning terabytes, petabytes, zettabytes or even more (McAfee and Brynjolfsson, 2012; Sivarajah et al., 2017).

Variety: this dimension captures the heterogeneity of BD. Datasets could be structured, semi-structured or unstructured (Sheng et al., 2017). Structured data are organized in tabular form (such as spread sheets), but this represents a very small proportion of data worldwide (Gandomi and Haider, 2015). Much of the data generated is unstructured, such as text, images, audio and videos generated by social media, surveillance cameras, GPS signals, electronic devices, etc. (Lee, 2017; Sivarajah et al., 2017).

Velocity: this refers to the speed at which data are generated. With significant technological advancements recorded over the past years, the frequency of data creation has increased. Digital devices such as sensors and smart phones have spurred the rate at which data are transmitted (Lee, 2017).

Drawing insights from previous studies, we define BD as large amounts of heterogeneous data persistently generated in real time from multiple and diversified sources, which can enhance insight and decision-making when processed with advanced technology and analytical capabilities. Our definition is underpinned by the "3Vs" and will serve as the basis for our conceptual model (Figure 1).

Insert Figure 1 here
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4. Corporate Political Activity and Big Data

CPA comprises various strategies, including constituency-building, financial and information strategies (see Hillman, A. J. and Hitt, 1999). Among these, information strategy is the closest to Big Data. It entails "efforts by political professionals or company executives to establish communication channels with regulatory bodies, regulators and their staffs" (Keim and Zeithaml, 1986: 830) for lobbying or petitioning policy issues (Lenway and Rehbein, 1991; Lord, 1995). In this strategy, "the good provided is information" (Hillman, A. J. and Hitt, 1999: 834). Therefore, our conceptualization of CPA is predominantly based on information strategy. However, we note that other strategies also utilize information. For instance, firms use information to influence and build constituencies and coalitions (Bonardi and Keim, 2005; Lord, 2003). They also use information to make other political decisions, such as "which lobbyists to hire or which politicians to financially support" (Brown, 2016a: 64). According to Ken Cohen at Exxon Mobil's Political Action Committee (PAC), "when making contributions, we seek out candidates who have a history of supporting open markets, understand business, and have demonstrated a willingness to hear the facts involved in a particular debate" (Richter, 2014: 136). Firms do not only examine historical data, but they also monitor new information and review their decisions when necessary, sometimes cutting ties with previously supported candidates. Consequently, we assert that most political strategies draw on information, which makes data an important requirement for orchestrating CPA. We acknowledge that some firms may outsource their CPA to third parties and organizations (Keim and Zeithaml, 1986; Lord, 1995; Lawton and Rajwani, 2011), hence our theorization (Figure 1) is based on firms that internalize their CPA.

4.1 CPA Success Factors

There are certain Critical Success Factors (CSFs) that must exist to facilitate strategic success. CSFs are defined as "the limited number of areas in which results, if they are satisfactory, will insure successful competitive performance for the organization…they are the few areas where 'things must go right' for the business to flourish" (Rockart, 1979: 85). They are also defined as the "characteristics, conditions, or variables that when properly sustained, maintained, or managed can have a significant impact on the success of a firm competing in a particular industry" (Leidecker and Bruno, 1984: 24).

CSFs have received considerable attention in management research (Cummings and Holmberg, 2012; Hietschold et al., 2014; Kumar et al., 2018; Jenster, 1987). However, scholars have yet to explore the specific CSFs for CPA. Drawing on Rajwani and Liedong (2015), we define successful CPA as the favorable outcomes of political strategies. These comprise positive operating and stock performance as well as policy influence. For successful CPA, firms need accurate and insightful political information (Figueiredo, 2002; Lawton et al., 2014). They also need to collect political information from diverse sources to develop informed positions. Further, they must be able to monitor and respond to changes in the political environment. These requirements lead us to propose three CSFs for successful CPA, namely *political depth, political multidexterity* and *political agility*. In the next section, we discuss these CSFs in detail.

4.2 Political Depth and CPA Success

The ability to exploit external information plays an important role in CPA. However, not all firms are equally able to process information. While some have higher thresholds, others easily become inundated with new information, to a point where they suffer from information overload (Hemp, 2009; Ayyagari et al., 2011). Coen and Levinthal (Cohen and Levinthal, 1990: 128) explain that the "ability of a firm to recognize the value of new, external

information, assimilate it, and apply it to commercial ends" is vital for success. This ability captures firms' capacity to absorb information, which has been widely applied in general management research (Zahra and George, 2002; Lane et al., 2006; Song et al., 2018) but has seen minimal use in CPA studies. We leverage this understanding to introduce *political depth,* which we define as the ability of a firm to absorb, process and utilize large volumes of information for the purpose of managing its political environment. Political depth is a requirement for successful CPA.

There is opportunity for firms to influence national policy-making (Holburn and Zelner, 2010), but the firms that are able to exploit this opportunity usually have the capacity to collect and process volumes of information (Hillman and Hitt, 1999). CPA occurs within political markets (Bonardi et al., 2005) that are characterized by demanders and supplies (Kingsley et al., 2012). On the demand side are firms, interest groups, political parties, trade associations and organized voters who advocate for their respective policy preferences, and on the supply side are politicians and government agencies who determine what preferences to consider or address (Bonardi et al., 2005; Hillman and Keim, 1995). In these markets, just as in economic markets, there is exchange and interaction between demanders and suppliers. However, the media of exchange in political markets goes beyond money or goods and services (in the case of barter trade or quid pro quo) to include information on policy issues (Hillman and Hitt, 1999).

Regulators need a high degree of information to formulate policy (Bonardi et al., 2006), and they often engage stakeholders, including firms, in the consultation process (Rajwani and Liedong, 2015; McKay and Yackee, 2007). To influence the outcomes of this process, firms supply regulators with information (Lagerlof, 1997) which they collect by commissioning research on policy issues (Hillman and Hitt, 1999) or by scanning the environment for policy developments (Lawton et al., 2014). Hence, firms that have the ability

to collect and assimilate more information are more likely to produce quality evidence, make compelling cases and have higher chances of success (Lenway et al., 1990; Lenway and Rehbein, 1991).

The multiplicity of policy issues confronting firms at any point in time suggests that politically active firms must be research-oriented and have data collection expertise embedded in their organizational structures (Coen, 1999). For example, Symantec Corporation, a global security firm, faces broad issues which cover many aspects of consumer privacy, online safety, data security, and intellectual property protection. These issues are addressed by its Government Affairs Department using data to shape conversations and outcomes. Many other firms, such as Microsoft, AT&T and JP Morgan, proactively monitor and gather information about regulations and emergent issues in order to visualize potential threats and opportunities (Lawton et al., 2014; Brown, 2016a).

Essentially, successful CPA requires firms to formally structure their information collection processes using government, corporate, or public affairs departments (Liedong et al., 2017; Wartick and Rude, 1986). Doing so gives them the capacity to collect, process and share quality information in ways that advance their interests (Baron, 1995a; Lawton et al., 2013), such as altering public perceptions on policy issues (Bonardi and Keim, 2005) or shaping regulatory outcomes (Ban and You, 2019; Bonardi et al., 2006; McKay and Yackee, 2007). Recognizing the value of information in CPA, Lawton et al. (2014) developed an information value pack which, among other things, articulates the importance of building information networks (De Fouloy, 2001) and using robust data (Caulkin and Collins, 2003). The foregoing arguments show that CPA thrives on firms' ability to absorb large volumes of political information. We therefore propose that:

Proposition 1: As firms collect and absorb large volumes of data, they are more likely to increase political depth and ensure CPA success

4.3 Political Multidexterity and CPA Success

Successful organizations can manage evolutionary and revolutionary change by being able to "simultaneously pursue both incremental and discontinuous innovation" (Tushman and O'Reilly, 1996: 24) or "dynamically balance exploration and exploitation" (Luger et al., 2018: 449). This ability is widely known as ambidexterity (O'Reilly and Tushman, 2013; Birkinshaw and Gupta, 2013; Turner et al., 2013). Ambidextrous organizations can simultaneously refine existing knowledge (exploitation) while developing new knowledge (exploration) (Levinthal and March, 1993; Gupta et al., 2006). This is instrumental for gaining competitive advantage (Aoki and Wilhelm, 2017; Raisch et al., 2009; Prieto and Pilar, 2012). Ambidexterity is a capability that is significantly influenced by information (Filippini et al., 2012).

In political arenas, ambidexterity would entail managing current political issues whilst learning to avoid or deal with future ones. This seems quite simplistic, considering that managing the political environment consists of many agendas. For instance, firms need to scan the environment, identify policy issues and key stakeholders, develop and implement strategies, and monitor progress. Hence, we use the term *multidexterity* to capture the multitude agenda of CPA. Taking a cue from previous studies (e.g. Ritter and Geersbro, 2018), we introduce and define *political multidexterity* as the ability of a firm to collect, analyze and interpret information existing in various formats and from various sources for the purpose of managing its political environment. Political multidexterity is a CSF for CPA. It is a capability that underlies *strategic issues management* (SIM), which refers to the method or process by which firms identify, evaluate and respond to social and political issues that affect

them (Ansoff, 1980; Crable and Vibbert, 1985; Dutton and Ottensmeyer, 1987; Mahon and Waddock, 1992). SIM aims to minimize shocks arising from political changes. These changes can be identified through "scanning and tracking of publications, public opinion polls and management opinion surveys" (Wartick and Rude, 1986: 132). Clearly, surveillance and information gathering from diverse sources are crucial in SIM and importantly, these activities are supported by political multidexterity.

The multi-faceted nature of politics requires politically active firms to gather a variety of data and information from a multitude of sources. Political environments are made up of many stakeholders and interest groups including politicians, regulators, organizations, the media, organized voters, communities and non-governmental organizations (Liedong et al., 2015). These stakeholders may have different policy interests, and hence trade in political markets to promote their respective positions and preferences (Baumgartner et al., 2009; Bonardi et al., 2006; Bonardi et al., 2005; Kingsley et al., 2012). Their activity in political markets affect other actors in various ways. First, success in political markets does not depend only on the strength of a firm's arguments, but also on the strength of other interest groups' arguments (Baron, 1995b). Second, in political markets, politicians' discretion to grant favors to firms is limited when other stakeholders show interest in policy issues (Bonardi et al., 2005). Third, politicians are not always the source of regulations; there are instances when pressure group advocacy may draw attention to issues that have implications for firms (Liedong et al., 2017). As such, to succeed in CPA, firms must collate and assess data from a variety of stakeholders and competing interest groups (Darendeli and Hill, 2016; Becker, 1983).

Successful CPA also requires firms to collect and disseminate information on social and political issues via various sources, including "face-to-face meetings, communication networks, electronic document exchange and telephone conversations" (Lawton, et al., 2014:

p. 138). The role of social media in CPA is particularly crucial. Across developing and developed countries, social media participation is strongly related to political activism (Bekkers et al., 2011; Valenzuela et al., 2012). Twitter and Facebook shape citizens' protest behavior, mainly serving as sources of information, platforms for expressing political opinion, and fora for joining political groups (Bennett and Segerberg, 2011; Valenzuela, 2013). They allow stakeholders to expand their contact bases, build strong constituencies and scale up social movements for political causes (Lovejoy and Saxton, 2012). They are also a source of political learning and engagement (Shah et al., 2007), as they allow people to grapple with ideas and reflect on information (Valenzuela, 2013). The Arab Spring and Occupy Wall Street movement attest to the power of social media in mobilizing grassroots. In the U.S., which arguably records the highest level of CPA in the world, Twitter has become a major platform for learning about government policy since Donald Trump became President. Politically successful firms should therefore be able to use social media to scan the nonmarket environment, gauge policy movements, and wield influence. For example, Bryan Miller who was Senior Vice-President of Public Policy at Sunrun, a residential solar company in the U.S, found social media useful for referencing congressional or senate discussions and for timely interventions in renewable energy legislation (Kokalitcheva, 2016). As social media content ranges from text, video and audio to photographs, we postulate that firms must be able to handle these various data formats to succeed in CPA.

> *Proposition 2: As firms collect, analyze and interpret political information from various sources, they are more likely to increase political multidexterity and ensure CPA success.*

4.4 Political Agility and CPA Success

To gain or sustain competitive advantage in today's hypercompetitive business environment, organizations must continuously adapt to changing and uncertain environments (Junni et al., 2015; Nemkova, 2017). This is called strategic agility, defined as "the ability to remain flexible in facing new developments, to continuously adjust the company's strategic direction, and to develop innovative ways to create value" (Weber and Tarba, 2014: 5). Strategic agility is a dynamic capability (Fourne et al., 2014; Teece et al., 2016) founded on strategic sensitivity, leadership unity and resource fluidity (Doz and Kosonen, 2008). Some scholars have argued that political capabilities are dynamic processes (e.g. Oliver and Holzinger, 2008). Building on their work, we introduce the notion of *political agility*, which we define as the ability of a firm to manage high-velocity information, reconfigure resources and orchestrate timely political strategies in response to changes in the political environment. We advance that political agility is a requirement for successful CPA.

The frequency of data collection is very important for CPA (Barron et al., 2016; Lawton et al., 2014). This is because political environments are often volatile and susceptible to changes. Firms are not only exposed to political instability and regime changes (Decker, 2011), but also to the pressures of powerful social movements which are able to reach critical mass through the dynamics of technology and social media (Lovejoy and Saxton, 2012). Government policy risk - the risk that government will change policies to directly or indirectly affect firms' operations and performance (Holburn and Zelner, 2010; Liedong et al., 2017; Miller, 1992) – is a threat that affects firms. This risk is shaped by different interest groups competing for influence in volatile and dynamic political markets (Bonardi et al., 2005; Kingsley et al., 2012; McKay and Yackee, 2007).

Consequently, politically active firms operate in fast-paced political environments where success requires a timely and proactive approach to issues (see Hillman and Hitt, 1999; Baysinger et al., 1985; Meznar and Nigh, 1995). In other words, firms need a high degree of political agility to succeed. The frequency of information gathering and exchange is thus crucial for political influence (Bouwen, 2002; Coen, 1999) and can determine performance outcomes (Lawton and Rajwani, 2011). Therefore, we propose that:

> *Proposition 3: As firms collect, analyze and interpret fast-paced political information, they are more likely to increase political agility and ensure CPA success.*

4.5 CPA Success Factors and Big Data

We argued in previous sections that political depth, political multidexterity and political agility are requirements, capabilities or CSFs that firms need to be successful in political markets. In this section, the three CPA CSFs are aligned with the three dimensions of BD (the 3Vs - volume, variety, and velocity). Political depth is linked to data volume, political multidexterity is linked to data variety and political agility is linked to data velocity. We argue that these linkages between the CPA CSFs and BD make the former serve as antecedents of the latter. Two perspectives inform our argument.

First, firms that want to do successful CPA must develop capabilities around the success factors. Having developed these capabilities, they are more likely to find it easier to manage BD, which will subsequently impact their decision to invest in BD. This perspective positions the success factors as *facilitators* of BD investments. Second, firms that want to pursue successful CPA will need data and information to gain political depth and be politically agile and multidextrous. Considering the close alignment between the success factors and BD, this need will make BD investments necessary. Similarly, successful CPA will require political agility which, in turn, will require collecting and responding to fast-

paced information. Contrary to the first, this second perspective positions the CPA CSFs as outcomes that *necessitate* BD investments. Combining the two perspectives, we argue that political agility, political multidexterity and political agility facilitate and necessitate BD strategies. We advance that it is imperative for politically active firms to collect high volume, fast-paced and varied data to succeed in political markets. This imperative gives rise to BD investments.

> *Proposition 4: Political depth, political multidexterity and political agility facilitate and necessitate Big Data investments and serve as antecedents of Big Data*

5. The Impact of Big Data on Corporate Political Activity

5.1 Big Data and the Approach to CPA

Hillman and Hitt (1999) noted that the first decision a firm must make when developing a political strategy is its general approach. Firms have two options. The first is to do CPA in response to specific policy or political issues (Buchholz, 1992). This is the transactional approach whereby firms conduct reactive CPA on an issue-by-issues (*ad hoc*) basis. The second option is to do CPA by building and leveraging political relationships to influence political and policy issues on an on-going basis. A major difference between the relational and transactional approaches is that while the former utilizes a long-term orientation, the latter is short-term (Barron, 2011; Hillman and Hitt, 1999). Relational approaches are increasingly demonstrated by the creation and use of government/public affairs or relations departments, units and functions for managing external issues (Johnson, 1996; Wartick and Rude, 1986).

Research has argued that the choice of approach depends on the extent of a firm's dependency on government, its level of product diversification, and the degree of corporatism/pluralism in its operating environment (Hillman, 2003; Hillman and Keim,

1995). Other studies have used diverse national cultural dimensions to explain CPA approaches (e.g. Barron, 2010; 2011). However, the role of information in this important decision has been overlooked. Consequently, we argue that BD influences whether a firm uses a relational or transactional approach.

Specifically, we advance that BD makes a relational approach more likely and perhaps even stronger in terms of intensity. This is because a relational approach requires exchange relationships that are built on trust between firms and policy makers/politicians (Hillman and Hitt, 1999). This requirement is relatively weaker in a transactional approach. For policy makers to trust a firm, they must be convinced that the firm is a supplier of accurate and reliable policy-related information. Such information also increases the chances of successful CPA (Figueiredo, 2002; Lenway and Rehbein, 1991). We thus argue that BD investments enable firms to gather rich and real-time information that can be used to convincingly articulate policy preferences and implications. In this sense, BD serves as a resource for quality information and a lever for trust building in political markets and may also be useful for the development of social capital between firms and the polity. As trust is built, cooperative exchange between both parties becomes possible, leading to a reduction in the transaction costs of policy making and policy influence.

Moreover, firms that invest in BD are also likely to invest in structures and functions to help generate value from the data. Such functions would include government relations and public affairs departments or offices. As Hillman and Hitt (1999) noted, these offices imply a firm's regular interest in government relations and signify a relational approach to CPA. Furthermore, BD provides a resource for the effective performance of government relations departments, which reinforces a relational approach. Thus, we assert that:

Proposition 5: Big Data can make politically active firms more likely to use a relational approach than a transactional approach in their political activity.

5.2 Big Data and the Level of CPA

According to Olson (1965), there are two levels of participation in political issues, namely collective and individual actions. The former entails collaboration between two or more firms. This level of activity is representative in the lobbying activities of trade associations (Hillman and Hitt, 1999; Rajwani et al., 2015). The latter refers to the solitary efforts of organizations to influence government policy. The choice between individual and collective levels of participation is contingent on firms' financial endowment, the nature of the political issues and the culture of the business environment (Chong, 1991; Hillman and Hitt, 1999; Murtha and Lenway, 1994). Again, the impact of data or information in this choice has been overlooked.

Building on previous studies, we assert that BD affects CPA participation levels, and particularly makes individual action more likely. We agree with Hillman and Hitt (1999) that financial resources affect the choice of individual versus collective action, but we observe that their focus on only financial resources is narrow because information is an equally valuable resource in political markets (Kingsley et al., 2012; Lawton et al., 2014). Regulators depend on it to make optimal decisions while firms use it to develop their political strategies. Therefore, firms that have accurate and reliable information wield significant influence on policy making. In this sense, a firm with BD will likely pursue individual action because it has a valuable resource at its disposal, just as a firm with financial resources will. With BD, firms can make informed decisions and reach satisfactory agreements with other actors in political markets. By this argument, we also advance that collective action is more likely to be pursued when individual firms lack information or the ability to collect information.

Previous studies have also argued that the choice of individual or collective action may be dependent on firms' negotiation preferences and managerial cultural socialization (Barron, 2010; 2011). Managers in individualistic countries tend to adopt a competitive view of negotiation and may thus pursue individual action. The reverse is true for managers in collectivist countries (Cai et al., 2000; Drake, 2001). While we agree with these cultural effects on distributive and integrative bargaining preferences - competitive and collaborative negotiation respectively - we also assert that information affects such preferences. Firms that possess more information may have lower levels of dependency on other actors and may thus have a stronger inclination to pursue individual political action. Moreover, possession of valuable information may reduce the likelihood of collaboration and instead invoke competitive tendencies aimed at benefiting idiosyncratic gains in political markets. Overall, we argue that BD increases the pursuit of individual political action.

Proposition 6: Big Data can make politically active firms more likely to pursue individual action instead of collective action in political markets.

5.3 Big Data and Political Capabilities

There is a plethora of research about the value of BD in the market environment (e.g. Barton and Court, 2012; Erevelles et al., 2016; Hofacker et al., 2016; McAfee and Brynjolfsson, 2012; Malthouse and Li, 2017), but less in the nonmarket environment. We assert that BD creates value in political markets too. While previous studies have acknowledged the importance of information as a resource for political influence (Keim and Zeithaml, 1986; Lawton et al., 2014), they have fallen short of specifying the exact capabilities that are developed from data or information.

BD is a valuable resource in CPA, mainly as it provides the basis for developing, enhancing and deploying nuanced data-driven political capabilities. Here, we disaggregate

political capabilities into two types – internal and external. Internal political capabilities refer to the processes through which departments, business units or subsidiaries influence final decisions within large and diversified firms (e.g. Shaffer and Hillman, 2000). External political capabilities refer to the processes through which firms, as whole units, influence external politics. Our focus is on how BD affects the latter through three capabilities – *political intelligence, political clout* and *data politicization.*

In today's knowledge economy, business intelligence is a source of sustainable competitive advantage (Schoemaker and Tetlock, 2017). While business intelligence could span across market and nonmarket environments, the term has mainly been used in reference to market processes. We advance that BD enables firms to develop *political intelligence*, which we define as the ability to collect and transform data into information, knowledge and strategies for influencing political processes and political environments. The quality of political intelligence is contingent on the volume and frequency of data collected, and the organizational structures and technologies used to process data.

Firms that invest in BD can learn more about their political environments. For instance, social media data enables firms to monitor and learn about opinions, trends and sentiments regarding policy issues. This knowledge can be used to develop political strategies to exploit political markets or to take positions that satisfy majority groups in order to avoid backlash. In this sense, BD may enable firms to gauge stakeholders' reactions to their CPA, which will help them to be timely, punctilious and systematic in their political strategizing.

Besides political intelligence, we also note that politically active firms sometimes resort to coalitions and grassroots mobilization to influence policy issues (see Baysinger et al., 1985; Hillman and Hitt, 1999). For firms to build coalitions, they need *political clout*, which we define as the ability to gain stakeholder support and develop powerful collective or

mass movements for policy influence. We argue that in this era of data deluge and technology explosion, BD makes it easier to build political coalitions. Political and advocacy advertising (Keim and Zeithaml, 1986) can reach a lot of people via social media, and firms can conveniently organize social movements and influence public opinions for or against policy decisions. Social media, a large source of BD, promotes political learning and engagement among citizens (Shah et al., 2007; Shah et al., 2005) and provides a convenient platform for people to join political causes (Bennett and Segerberg, 2011). Firms may thus harvest BD to develop political clout for building strong constituencies of people to shape government policy. Essentially, BD facilitates grassroots lobbying by mobilizing the public for political action.

Further, BD can be used to deploy *data politicization* – i.e. the ability to share or sell data collected from individuals and organizations to politicians or political parties in return for political favors or preferential treatment. With this capability, firms are able to achieve their political goals by allowing the polity to use their data for targeted political messaging or marketing. The scandal involving Cambridge Analytica, a British political consulting firm which illegally mined Facebook data to influence electoral outcomes, noticeably brought this capability to the fore. Consistent with the notion of exchange relations between demanders and suppliers in political markets (Bonardi et al., 2005; Capron and Chatain, 2008), politicians may offer resource or policy favors to BD firms in return for access to electorate information for various purposes, including targeted advertising.

Though there are rules and ethics regarding the collection, use and sharing of subscriber or customer information (Moore et al., 2015; Charters, 2002), there are also exceptions. For instance, in the U.K, local councils monetize data by selling individuals' information to political parties, lobbyists, estate agents and other organizations (Dutta, 2013). In developing countries where privacy and data rules are not strictly enforced (Hossain and

Dwivedi, 2014) and where political stakes are usually high, firms can share customer data with politicians. In this context, phone numbers (for mass texting) and emails are valuable assets firms can trade to politicians in exchange for rent or policy favors. Based on the foregoing, we assert that BD may lead to the development of unique data-driven political capabilities.

Proposition 7a: Firms that invest in Big Data are more likely to have superior political intelligence capabilities.

Proposition 7b: Firms that invest in Big Data are more likely to have superior political clout capabilities.

Proposition 7c: Firms that invest in Big Data are more likely to have superior data politicization capabilities.

6. Discussion

This paper demonstrates the need to understand the relationship between big data and CPA. We presented three factors - political depth, political multidexterity and political agility - that are critical to the success of CPA. We then argued that these factors will drive BD investments. We also advanced that CPA may serve as an antecedent of BD. Our stance resonates with the fact that information is a valuable asset for political influence (Figueiredo, 2002; Hillman and Hitt, 1999; Lawton et al., 2014). It also connects with the reality that politically active firms need to collect and manage high-volume information on a multitude of issues in their political environments (requiring political depth), make sense of varied data from various interest groups in political markets (requiring political multidexterity), and cope with real-time political and social movements in volatile and dynamic political markets (requiring political agility). These requirements are aligned with the most popular and widely articulated BD tenets – *Volume, Variety and Velocity* (Davenport et al., 2012; McAfee and

Brynjolfsson, 2012), which caused us to postulate that CPA facilitates and necessitates BD investments. We also argued that BD provides a valuable resource for developing data-driven political capabilities that enable firms to learn about political issues and gauge public opinion (i.e. political intelligence), build constituencies and exploit social and political movements (i.e. political clout), and use information resources for leverage in political dealings (i.e. data politicization). These capabilities reinforce CPA success.

Our paper contributes to BD and CPA literatures by using a theoretical framework that accounts for the different aspects of political capabilities and several critical success factors. First, we extend the treatise of BD beyond its current narrow trajectory by advancing how CPA drives BD investments, as well as how BD shapes the organization of CPA and provides a launch pad for developing data-driven political capabilities. As such, this paper provides new insights that add to the CPA and BD literatures through positing the linkages between data and political activity. Second, from the capabilities literature (Teece et al., 1997), we extend Oliver and Holzinger's (2008) connotation of political capabilities as "dynamic processes" by showing that these capabilities are not necessarily dynamic in the sense that political ties or connections can become liabilities as political environments change (e.g. Siegel, 2007; Sun et al., 2010). Our model posits that political capabilities can be described as "dynamic" only if firms can successfully respond to political changes, which is highly unlikely without information or data (Brown, 2017). Hence, we suggest that BD or information underpins the dynamism of political capabilities.

Since Oliver and Holzinger's (2008) seminal political management paper, there have been inconsistencies and vagueness about what political capabilities really are. Notable is how some studies do not differentiate between political capabilities and political strategies, despite the nuance. We acknowledge that some scholars have identified scanning, prediction, political relationship management, and institutional influence as capabilities that affect the

effectiveness of CPA (Oliver and Holzinger, 2008; Holburn and Zelner, 2010; Kotabe et al., 2017), but we note that they do not show how these capabilities are developed. We also acknowledge that other scholars have identified information as an important resource for political capabilities (Lawton et al., 2013b), but again, we observe that they are less clear about how information is transformed into a political capability. In a more recent study, Brown (2016c) described the process of building political capability using four factors inherent in CPA, namely corporate structure (e.g. a Washington D.C. office), firm-government linkages (e.g. political directorships), political access (political action committees, or PACs) and policy pressures (e.g. lobbying). However, these factors rely on informed decision-making which, as we have asserted, constitutes the core of political capabilities. For instance, a firm's decision to develop political networking capabilities in emerging markets is a function of the information it collects about institutional voids (Kotabe et al., 2017). Therefore, through theorizing the use of data to gain political intelligence, build political clout and execute data politicization, our paper contributes to a more proximate unpacking of political capabilities.

In terms of practical relevance, our paper suggests that BD can be valuable for CPA. BD could be used to sharpen political capabilities in nonmarket environments, leading to successful CPA, such as policy influence. As prior research also shows that BD enhances market performance (e.g. Akter et al., 2016; Erevelles et al., 2016; McAfee and Brynjolfsson, 2012; Wamba et al., 2017), we advance that firms can achieve both market and nonmarket outcomes through BD. Essentially, BD could be used to orchestrate an integrated market and nonmarket strategy for superior performance and sustainable competitive advantage (Baron, 1995a).

Insert Tables 2 and 3 here

6.1 Future Research

We caution readers about over-generalizing our conceptual model, as there might be exceptions to the propositions. For instance, not every politically active firm invests in BD. Similarly, financially endowed firms may pursue collective action if the benefits of CPA will accrue to other non-participating firms. However, such exceptions should provide the basis for further and more finely tuned research on CPA and BD, which we hope this paper will motivate. In Table 2, we map the overarching Big Data research gaps and in Table 3, we summarize our propositions and link them to future research themes and specific research questions that could increase knowledge and understanding of the interlinkages between BD and CPA.

First, we encourage future studies to empirically test the validity and strength of our conceptual model. Research could examine the relationships between the CSFs and CPA success, with attention paid to the boundary conditions or moderators of these relationships. For instance, as we focus on firms that internalize their own CPA, future works could probe whether our model will hold for different types of firms in terms of size, structures and industries, including political consulting and lobbying firms. We believe that understanding the moderators of our propositions will be useful.

Second, the antecedents of BD initiatives and investments are the least studied, with many studies focusing on the definition, analytical and post-implementation capabilities, economic value, and management challenges related to BD (Akter et al., 2016; McAfee and Brynjolfsson, 2012). Therefore, we believe that there could be other nonmarket drivers of BD initiatives besides CPA, such as corporate social responsibility (CSR), which should be investigated to increase our understanding of the topic. Even more finely grained analyses

could be done by disaggregating CSR into its types and investigating the differential impacts of philanthropic, environmental, economic, ethical and diversity CSR activities on BD investments. Moreover, further research on the complementary effects of CSR and CPA on BD strategies could be a significant extension of the bourgeoning literature on the combinative impact of these two main strands of nonmarket strategy (e.g. Hond et al., 2014; Liedong et al., 2015; Liedong et al., 2017)

Third, there are three main components of CPA development, namely: (1) the levels of political activity; (2) the approaches to political engagement; and (3) the specific political strategies (Hillman and Hitt, 1999). Our model proposes the effects of BD on the first two but does not account for the third component. Hence, it will be useful for future research to investigate how BD affects firms' choice of political strategies and the intensity of firms' political embeddedness.

Fourth, it would be insightful to identify and test other data-driven political capabilities and their moderators. Considering the potential for data abuse, researchers could also explore the ethicality of using BD to enhance political capabilities. This could lead to the development of normative guidelines for responsible use of data in CPA. Further, having proposed the value of BD in political markets, we encourage future research to examine how BD might be useful for developing integrated market and nonmarket strategies. This will help to generate useful knowledge of BD's overall strategic value.

In conclusion, our study not only contributes to a better understanding of BD in the nonmarket context, but it also challenges scholars to broaden the scope of research on the topic. We believe that an appreciation of the value of BD in nonmarket environments in general, and political markets in particular, holds significant promise for theory and practice.

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Table 1: Panel A – Big Data Definitions

Study	Definition
Akoka et al. (2017)	"Large data sets almost impossible to manage and process using traditional data management tools. It refers to various forms of large information sets requiring complex computational platforms in order to be analyzed" (p.106)
Davenport et al. (2012)	"Expanding sea of data that is either too voluminous or too unstructured to be managed and analyzed through traditional means" (p. 43)
Boyd & Crawford (2012)	"A cultural, technological, and scholarly phenomenon that rests on the interplay of technology, analysis, and mythology that provokes extensive utopian and dystopian rhetoric" (p. 662)
George et al. (2016)	"Large and varied data that can be collected and managed" (p. 1493)
Malthouse & Li (2017)	"Data so large and complex that traditional computing environments and data-processing methods are inadequate for dealing with them" (p. 227)
Hoffman (2017)	"The big data approach, in general, stands for quickly collecting and analyzing large amounts of data from numerous different sources in order to improve business decision-making and overall performance" (p 5110)
George et al. (2014)	"Big data is generated from an increasing plurality of sources, including Internet clicks, mobile transactions, user-generated content, and social media as well as purposefully generated content through sensor networks or business transactions such as sales queries and purchase transactions." (p. 321)
Sheng et al. (2017)	"Extremely large amount of structured, semi structured or unstructured data continuously generated from diversified sources, which inundates business operations in real time and impacts on decision-making through mining insightful information from rambling data" (p. 98)

Panel B – Big Data Dimensions

Dimension	Example
Volume	"A participant in a Formula 1 car race generates 20 gigabytes of data from the 150 sensors on the car that can help analyze the technical performance of its components, but also the driver reactions, pit stop delays, and communication between crew and driver that contribute to overall performance" (George et al., 2014: 321). Walmart collects more than 2.5 petabytes of data every hour from its customer transactions (McAfee and Brynjolfsson, 2012; McKinsey Global Institute, 2011)
Variety	"Through careful application of analytics, Coca-Cola is able to use data from satellite imaging, orange growth historical records, and climate indications to standardize the taste of its juices" (Mazzei and Noble, 2017: 408)
Velocity	Amazon's business is modelled on managing a constant flow of new products, suppliers, customers and promotions without compromising on delivery, which the company executes very well (Davenport, 2006) "Progressive Insurance is using real-time analytics from in-vehicle telecommunications devices to monitor driving activity, creating a competitive advantage by identifying risky behaviors" (Mazzei and Noble, 2017: 408)

Table 2: Mapping Big Data Research

		Business Environment	
		Market	Nonmarket
Big Data Themes	Antecedents	✗	✗
	Outcomes	✓	✗
	Moderation	✗	✗

✗ = Limited / No research; ✓ = Significant research

Table 3: Mapping the Future Research Directions

Propositions	Future Research Themes/Topics	Some Future Research Questions
• Proposition 1**:** As firms collect and absorb large volumes of data, they are more likely to increase political depth and ensure CPA success	• The critical success factors of CPA	• What are the boundary conditions (if any) for the relationship between political depth and CPA success? • What other factors are required for successful CPA and how are these factors dependent on information or data?
• Proposition 2**:** As firms collect, analyze and interpret political information from various sources, they are more likely to increase political multidexterity and ensure CPA success	• The critical success factors of CPA	• What are the boundary conditions (if any) for the relationship between political multidexterity and CPA success? • What other factors are required for successful CPA and how are these factors dependent on information or data?
• Proposition 3**:** As firms collect, analyze and interpret fast-paced political information, they are more likely to increase political agility and ensure CPA success.	• The critical success factors of CPA	• What are the boundary conditions (if any) for the relationship between political agility and CPA success? • What other factors are required for successful CPA and how are these factors dependent on information or data?
• Proposition 4**:** Political depth, political multidexterity and political agility facilitate and necessitate Big Data investments and serve as antecedents of Big Data	• The nonmarket drivers or antecedents of Big Data strategies	• How does corporate social responsibility (and its different types) affect Big Data strategies? • What is the complementary impact of CPA and CSR on Big Data investments?
• Proposition 5: Big Data can make politically active firms more likely to use a relational approach than a transactional approach in their political activity	• Big Data and political strategy development	• How can Big Data influence the choice and intensity of political strategies and tactics?
• Proposition 6: Big Data can make politically active firms more likely to pursue individual action instead of collective action in political markets	• Big Data and political strategy development	• How can Big Data influence the choice and intensity of political strategies and tactics?
• Proposition 7a: Firms that invest in Big Data are more likely to have superior political intelligence capabilities. • Proposition 7b: Firms that invest in Big Data are more likely to have superior political clout capabilities. • Proposition 7c: Firms that invest in Big Data are more likely to have superior data politicization capabilities.	• Big Data and political capabilities • The ethicality of political capabilities	• What other political capabilities can be developed or enhanced using Big Data? • What is the ethicality of using Big Data to develop political capabilities? • How can Big Data be used to develop integrated market and nonmarket strategies? • What firm- and/or institutional-level moderators affect data-driven political capabilities?

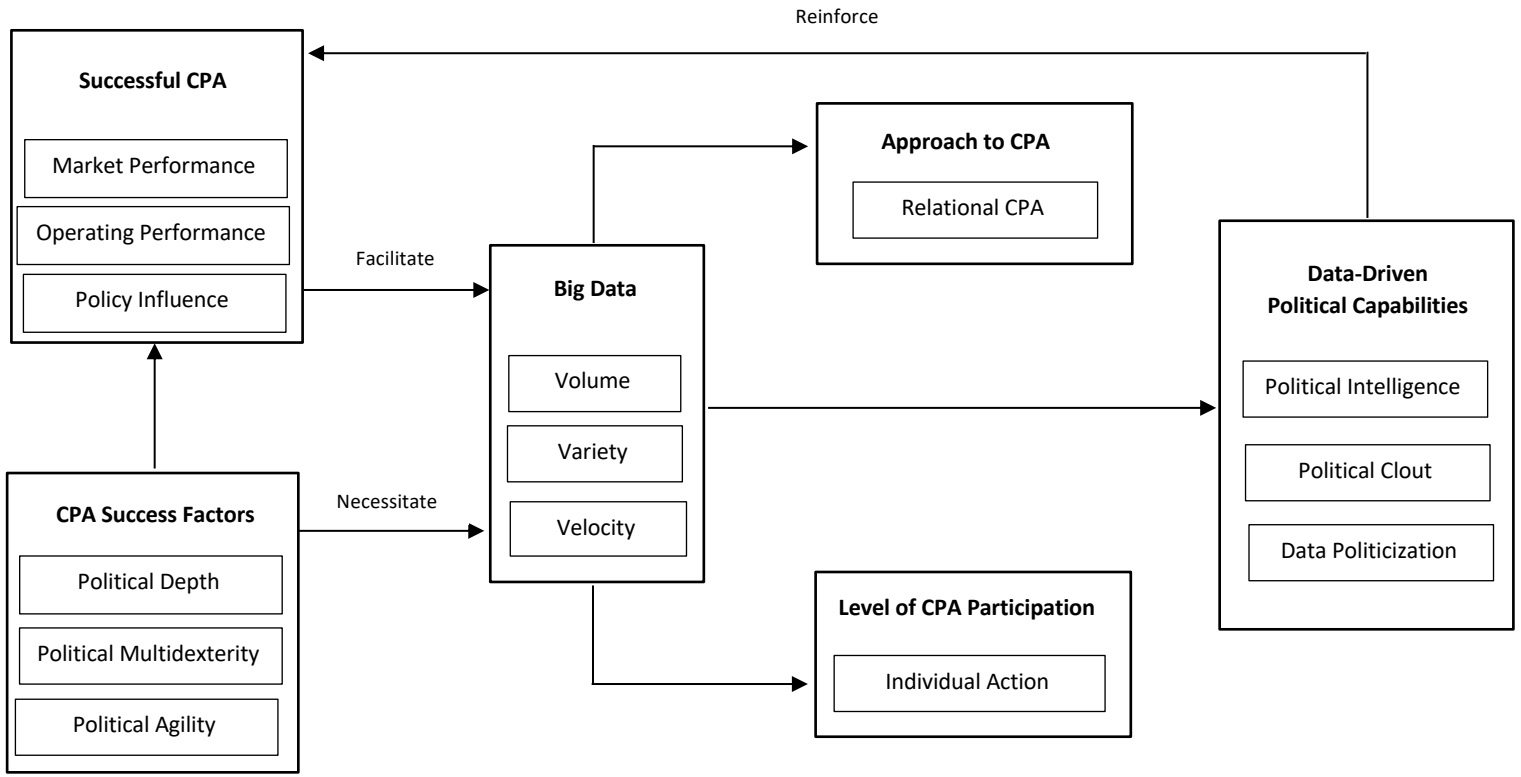

Figure 1: The Interrelationship Between Big Data and CPA