COVID-19 Pandemic and Research on the Mediating Role of Absorptive Capacity on the Relationship between Business Analytics Capability and Small-to-Medium-Sized Enterprise Performance

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Abstract

This initial study's key purpose was to investigate whether absorptive capacity performed a mediating role on the relationship between business analytics capability and small-to-medium-sized enterprises (SMEs) performance in the United States. The study's findings are more relevant now as the COVID-19 pandemic continues to impact small-to-medium-sized enterprise (SME) businesses in the United States. The study derived from the resource-based view approach, the dynamic capabilities dimension perspective, through the theoretical lens of the reconceptualization of absorptive capacity by Zahra and George (2002). The study empirically tested mediation through a series of regressions based on Baron and Kenny (1996). As recent extensions of the resource-based view theory, absorptive capacity and business analytics embody the dynamic capabilities, business intelligence, and knowledge management for modern business firms to align, modify, and reconfigure during a dynamic and volatile global business environment. Throughout the pandemic, it appears businesses have had to continually regain economic ground. This paper is an effort to apply the findings of research on the importance of absorptive capacity and business analytics capability as it pertains to the reality of the COVID-19 pandemic on SMEs. The study contributed to the theoretical body of knowledge on dynamic capabilities by empirically demonstrating how SMEs may manifest improvement in performance in the twenty-first century by utilizing data in collaboration with business analytics at the realized absorptive capacity dimension. In wake of the ongoing COVID-19 pandemic, exploring the research study's findings may provide insight to help SMEs survive during these difficult times, and even thrive, by increasing their absorptive capacity to utilize data analytics effectively.

Keywords: Resource-Based View, Absorptive Capacity, Business Analytics, Dynamic Capabilities, Information Technology, Small-To-Medium-Sized Enterprise (SME), COVID-19

Introduction

With the catastrophic global health crisis caused by the COVID-19 pandemic, a catastrophic global economic crisis has also occurred, bringing severe repercussions for small-to-medium enterprises (SMEs). Studies have revealed that SMEs struggled through the shut-down due to quarantine restrictions across every business sector with a loss of revenue, loss of workers, and many closing their doors altogether (Adam & Alaifi, 2021). To survive the COVID 19 pandemic, many SMEs have been forced to adapt to digital technologies and move to online platforms to keep their current customer base while seeking to gain new ones (Gudandovskaya & Liniņa, 2021). Understanding how to utilize digital data might be considered the holy grail of business management in the twenty-first century: the digital technology era where everywhere people go, there is a digital trace recorded, stored, and retrievable (English & Hoffman, 2018; Mahmood & Mubarik, 2020). Dramatic technology changes were already taking place with how businesses are conducted with upwards of forty billion Digital data devices connected digitally by 2021 (Tang, 2018). A decline in the SME share in the economy of five percent year-over-year was already occurring before the pandemic, with the reduction amounting to a potential loss of five percent of five trillion dollars in the gross domestic product (GDP) (Kobe & Schwin, 2018). The COVID-19 pandemic brought even more dramatic change with the mandated quarantine on a global scale resulting in a struggle for many SMEs. With people remaining in their homes, earning less, spending less, many SMEs' survival depended on the level of absorptive capacity and the ability to utilize digital technology (Adam & Alaifi, 2021). Absorptive capacity is an SME's ability to identify the value of new information, assimilate it, and apply knowledge from external sources (Ajeeli, 2018). Guo et al. (2020) found that SMEs who can identify and adopt digital technology are more able to survive the pandemic. COVID-19 warrants revisiting research examining the mediating role of absorptive capacity on business analytics to potentially improve performance in SMEs during the pandemic and into the digital future. In presenting the research study, methodology, findings, results, and applications to the current COVID-19 pandemic SME environment, insights may be gleaned to assist SMEs in navigating the tumultuous environment by utilizing business analytics for knowledge and other tools through increasing absorptive capacity.

Research

In a modern era with data from various modes, it is incumbent upon a modern business to possess varying degrees of capacity for creating value from digitized data (Ajeeli, 2018; Alessandra et al., 2016; Sakhdari, 2016). The purpose of the initial research study was to address the gaps existing in the literature on whether absorptive capacity performed a mediating role on the relationship between business analytics capability and small-to-medium-sized enterprises (SMEs) performance (Qian & Jung, 2017; Turulja et. al., 2017). The theory postulated that in the twenty-first century absorbing new knowledge helps organizations create value; the inference is value creation is restricted if absorptive capacity is low or non-existent (Božič et al., 2016).

Research Significance

By showing the connection through a microlevel process in line with the dimensions presented by Zara and George (2002), the study attempted to unlock the black box on how SME ownership elicited more data transformation into knowledge capability through business analytics and, thereby, enhancing performance. First, it identified the role absorptive capacity among ownership plays in fostering knowledge, revealing critical capability antecedents, and providing new theoretical arguments regarding how such precursors are linked. Second, the research responded to calls for research on capabilities among small-to-medium-sized enterprises (SME) and entrepreneurs from a resource-based view approach (Ajeeli, 2018; Qian & Jung, 2017; Vidgen et al., 2017). Finally, the study contributed to research on SME absorptive capacity apparatuses as essential building blocks for knowledge generation.

Congruent to prior points is the application to the COVID-19 pandemic period. Thus, the contribution of this paper is three-fold. First, it adds to the theoretical literature regarding dynamic capabilities by empirically demonstrating the mediating role absorptive capacity plays on business analytics capabilities among SME members for improving performance. The study's findings exposed the extent to which SMEs collected and processed data and managed knowledge for better decision-making for improving performance. Second, this paper demonstrates how business analytics capabilities and absorptive capacity shape the value creation and value capture processes of businesses. In particular, the study postulates that the ability to exploit opportunities during a crisis is by imitating and innovating using modern technologies to extract knowledge from data. Third, with billions of devices connected digitally, a lifeline for most organizations during the COVID 19 pandemic was in utilizing technology for extracting knowledge from data.

Moreover, by extracting knowledge from digital data through business analytics at the realized absorptive capacity dimension, SMEs can innovate, adjust resources quickly, seize new opportunities, tap into viable new networks, change information technology systems, and reconfigure organizational structures. In times of crisis, lack of preparedness and low level of innovativeness often force companies to close, lay off employees, defer new products, services, or restrict market expansion. Thus, the dynamic capabilities offered through realized absorptive capacity identified in the study confer benefits to SMEs for weathering the COVID-19 pandemic. Therefore, in presenting the research study, methodology, findings, results, and applications to the current COVID-19 pandemic SME environment, insights gleaned could assist SMEs towards the significance of business analytics and absorptive capacity.

Research Objective

The global COVID-19 pandemic brought an economic crisis, along with the catastrophic health crisis, which changed the way people buy and spend, which brings about severe repercussions for SMEs not using technology (Adam & Alaifi, 2021). Indeed, to survive the COVID 19 pandemic, many small-to-medium-sized enterprises (SMEs) companies have had to adopt digital technologies and move to online platforms to keep their current customers while seeking to gain new customers (Gudandovskaya & Liniņa, 2021). Studies reveal an upward trend in SME failures and, correspondingly, a decline in their share of the economy of five percent year-over-year (Kobe & Schwin, 2018). This reduction amounts to a loss of five percent of five trillion dollars overall in

GDP of over two billion dollars and brings into question the future of SMEs. At the same time, large or big businesses have increased their data analytics investment by spending over one hundred billion dollars towards big data in 2016 (Trelewicz, 2017).

Before the pandemic, research had already exposed the high failure rate of SMEs compared to large businesses. At the same time, the research highlighted the fact that larger businesses embraced business analytics technologies at a greater than many SMEs. Thus, the researchers aimed to focus on applying the study's findings to assist SMEs' performance during the crisis and into the future. In this regard, it seemed applicable to revisit as a result of the COVID-19 pandemic (Kobe & Schwin, 2018; U.S. Small Business Administration, 2020). The research considered business analytics as a range of technological tools, applications, and abilities for transforming data into insightful knowledge. In the research literature, business analytics was widely accepted as an essential resource for businesses of all sizes (English & Hoffmann, 2018; Bayrak, 2015). Two areas for further inquiry were discovered: the low level of adoption of technology in the form of business analytics and the lack of absorptive capacity among SMEs.

Literature Review

Before delving into the main focus of the research study, it is important to mention that since the outbreak of COVID-19 and the Delta variant, there have been many instances of human suffering, historically pinned as one of the most significant global health crises in modern times (Lu, Wu, Peng, & Lu, 2020). Furthermore, it is established that along with this human suffering, the coronavirus has also brought significant severe or devastating effects on all businesses, especially SMEs. This is witnessed in the fluctuating business environment in terms of market volatility, supply chain restraints, and drastic fluctuations in demand, respectively (Gong, Hassink, Tan, & Huang, 2020). Hence, it is the focus of this paper and the applicability of the research to understand the various ways SMEs can adapt to sustaining their business operations and enhancing their business performance during the COVID-19 pandemic.

Addressing the Gap

It can be duly stated that any crisis, irrespective of its origin, i.e., human-made or natural causes, carries the potential for damage on any business in terms of survival (Donthu & Gustafsson, 2020). Research cites the failure rate of SMEs remains significantly high compared to larger businesses that often embrace business analytics (Kobe & Schwin, 2018; U.S. Small Business Administration, 2020). COVID-19, the Delta variant, or any crisis serves as a nefarious purpose for exerting pressure on a business restricting their capability to change in a short period to crisis appropriately. In congruence with such points, reduction in both sales along with economic difficulties of the times, SMEs can face issues in cash flow, inventory supply, operations, human resources, and strategy that levy the type of stress to their potential demise (Omar et al., 2020). In times of general crisis, and the current COVID-19 pandemic, many SMEs are in danger of closing their doors (Guo et al., 2020). Examining the research study's findings may provide further insights and tools to contribute to lowering the current failure rate of SMEs.

Hypothesis of the Research

In times of crisis, a SME's survival can depend on the level of absorptive capacity and the ability to utilize digital technology (Adam & Alaifi, 2021, Guo et al., 2020). The research questions examine if potential and realized absorptive capacity mediates the relationship between business analytics capability and SMEs performance. Examining the findings can potentially provide insight into increasing absorptive capacity and improving SME performance. Based on the literature review conducted for the initial study, the following research questions and hypotheses were constructed:

RQ1: Does potential absorptive capacity mediate the relationship between business analytics capability and SME performance in the United States?

- H1o: Potential absorptive capacity does not mediate the relationship between business analytics capability and SME performance in the United States.
- H1a: Potential absorptive capacity does mediate the relationship between business analytics capability and SME performance in the United States.

RQ2: Does realized absorptive capacity mediate the relationship between business analytics capability and SMEs performance in the United States?

- H2o: Realized absorptive capacity does not mediate the relationship between business analytics capability and SME performance in the United States.
- H2a: Realized absorptive capacity does mediate the relationship between business analytics capability and SME performance in the United States.

Theoretical Framework

The purpose of the initial research study was to address the gaps existing in the literature on whether absorptive capacity performed a mediating role on the relationship between business analytics capability and small-to-medium-sized enterprises (SMEs) performance (Qian & Jung, 2017; Turulja & Bajgorić, 2018; Vidgen et Al., 2017). Several theories identified conditions, behaviors, resources, and capabilities leading to competitiveness or competitive advantage (English & Hoffman, 2018; Fillingim, 2018; Ghasemaghaei, 2019; Garg & Khullar, 2020). Among them was the absorptive capacity theory (Djerdjouri, 2020; Duan et al., 2020; Vidgen et al., 2017). Using the absorptive capacity framework, SMEs were able to display their business analytics capabilities—how information was processed and efficiently used (Qian & Jung, 2017; Turulja & Bajgorić, 2018; Vidgen et al., 2017; Zahra & George, 2002).

Published research identified two areas for further inquiry, the low level of adoption of technology in the form of business analytics and the absence of absorptive capacity by SMEs (Ajeeli, 2018). With digitization such as radio frequency identification (RFID), wireless sensor networks (WSN), the internet, cloud computing, and internet of things application software with electromagnetic fields spurring major technological breakthroughs, the need for knowledge generation from business analytics for SMEs seem paramount (Bayrak, 2015; English & Hoffmann, 2018; Lee & Lee, 2015; Tang et al., 2018). The resource-based view (RBV) approach is among the approaches

used to investigate business phenomena and frequently cited in the literature (Ajeeli, 2018; Islami et al., 2020).

Recent extensions of RBV include dynamic capabilities, business intelligence, and knowledge management perspectives, which attempt to address the need for a firm to align, modify, and reconfigure in a dynamic and volatile global business environment (Solesvik, 2018). The theory supports the importance of business analytics capability and promotes the idea of unique resources that contribute to competitive advantage (Wójcik, 2015). Current thought puts forth that such special resources have certain fundamental qualities: valuable by providing opportunities or neutralizing threats, rare, imperfectly imitable, and non-substitutable no strategic equivalent substitute for, neither rare nor imperfectly imitable (Solesvik, 2018). Emphasis on rare emerges because it is a key element of the meaning of valuable within digitized data; valuable and rare resources afford a significant competitive advantage.

Business Analytics Defined

Business analytics refers to the scientific process, including technologies and practices, to collect and translate data into knowledge for strategic decision-making (Mahmood & Mubarik, 2020; Tang et al., 2018). Large companies use business analytics for improving performance: improve decision-making, enable the creation of innovative and valuable products and services, reduce costs, increase sales, or expand into new markets (Fillingim, 2018; Ghasemaghaei, 2019; Garg & Khullar, 2020). For business intelligence or knowledge, it is widely accepted as crucial and considered a key factor in large business domination over smaller ones as many smaller SMEs lack the resources or capability to use business analytics successfully (English & Hoffman, 2018; Fillingim, 2018; Ghasemaghaei, 2019; Garg & Khullar, 2020). A limited number of studies had focused on the paradigm involving SMEs' performance and the association with a deficiency in knowledge due to deficiency in business analytics capability and the lack of absorptive capacity (Ajeeli, 2018). As such, this study examined the mediating role of absorptive capacity on the relationship between business analytics capability and small-to-medium-sized enterprises (SMEs) performance (Qian & Jung, 2017; Turulja & Bajgorić, 2018; Vidgen et al., 2017).

Business analytics encompasses methodologies, databases, machine architectures, analytical algorithms, skills, and processes to facilitate analyzing data for making pragmatic and strategic business decisions. It is more of a process rather than a product encompassing a range of tools and applications for transforming data into insightful knowledge (English & Hoffmann, 2018). Business analytic technologies and software platforms include metadata collection, business reporting, spreadsheets, search tools, online analytical processing (OLAP), data mining, modeling, predicting, or forecasting, performance management, customer relationship management (CRM), management information systems (MIS), and data extraction, transformation and loading (ETL) (Bayrak, 2015).

The Cost of Low Absorptive Capacity

The term, absorptive capacity, is credited to Cohen and Levinthal (1990) based on positing research and development (R&D) activity creates new knowledge and innovation and that

absorptive capacity improves an organization's ability to identify, assimilate, and exploit knowledge from external sources (Ajeeli, 2018; Cohen & Levinthal, 1989; Daspit et al., 2016; Sakhdari, 2016). The theory postulates that absorbing new knowledge helps organizations create value, then, the inverse is value is not created when absorptive capacity is restricted (Božič & Dimovski, 2019; Sakhdari, 2016). The problem identified in the literature supports the need for the study to address challenges with SMEs ability to process not only information but also the ability to recognize and create value (Ghasemaghaei, 2019; Sjödin et al., 2019; Turulja & Bajgorić, 2018; Vidgen et al., 2017; Yang & Tsai, 2019).

Studies have established, when absorptive capacity is low, the ability to acquire, assimilate, transform, and exploit knowledge is restricted (Diaz-Molina, 2019; Jiménez-Barrionuevo et al., 2019). Hence, the problem was two-fold. First, the issue involved implementing business analytics capability to extract valuable information from data. Second, the problem consisted of having the absorptive capacity needed to recognize the value in new information and create useful products and services, spur operational savings, or spearhead market expansion and, thereby, enhance small-to-medium-sized enterprises' (SMEs') performance. Thus, added to the challenge of collecting and utilizing technology in the form of business analytics is, once adopting such techniques, having the ability to recognize the value of information extracted from the data (Cenamor et al., 2019).

Crucial Connections to Data

In the current business environment, it is critical for SMEs to leveraging technology to analyze data and possessing a level of absorptive capacity for improving performance and surviving (Jiménez-Barrionuevo, García-Morales, and Molina, 2019). As Pape (2016) explains, the problem is exacerbated by the difficulties with processing vast volumes of data simultaneously at the high velocity at which data arises in different forms (e.g., text, video, numerical, images) in the digital age, along with the need to filter out irrelevant information (Tang et al., 2018). There were 2.5×10^6 terabytes of data in 2016 created or generated every day with an estimation of data generation doubling every forty months (Coleman et al., 2016). By the end of 2021, estimates project upwards of forty billion devices will be connected digitally (Tang et al., 2018). That is hardware connecting devices to networks and servers, software applications providing access and control of connected systems. Practically everything that could be connected will be connected (Tang et al., 2018).

Conceptual model

The model can be hypothesized as follows: the independent construct was business analytics capability, whereas the dependent constructs was performance of small-to-medium-sized enterprises (SMEs) with the mediating variables of potential and realized absorptive capacity. Measurement of data use, technology, and people impacting operations, innovation, competitive advantage, and organizational performance were considered.

Methodology Materials and Methods

The research methodology encompasses approaches, philosophies, and designs to address the research aim and objectives. Creswell and Creswell (2019) present methodology as the roadmap for answering research questions with several options available in dealing with the research philosophy. The study took on the post-positivist worldview, which rejects the notion truth is absolute, and what is known about reality can be challenged through specific observations and measurements with identification of causes that influence effects and testing. The quantitative approach supports the post-positivist traditional scientific research method through the chosen deductive process.

Framework and Research Design

From the dynamic capability's perspective, knowledge through business analytics capability merges to combustible effect at the realized absorptive capacity dimension and, thereby changes, as Cohen and Levinthal (1990) and Zahra and George (2002) mention, the trajectory of knowledge into new ways. Hence, the absorptive capacity framework shed light on contextual factors, external and internal to an organization (Ajeeli, 2018; Djerdjouri, 2020; Coleman et al., 2016; Turulja & Bajgorić, 2018). The framework captured the contextual factor of realized absorptive capacity's role in seeing real results from data. In other words, if SMEs instituted or empowered data transformation through realized absorptive capacity— transformation and exploitation, it could indirectly affect performance in remarkable ways (See Figure 6).

The study advanced small business research by conceptually identifying and empirically examining tangible and non-tangible aspects of SMEs that function as precursors of organizational capability. The researcher employed a quantitative non-experimental correlational survey design approach to gather numerical data to find patterns, trends, averages, make predictions, and test the causal relationships between the independent and dependent variables. The population was limited to a minimum sample size of eighty-five respondents of SMEs, classified by the NAIC, owners or core knowledge workers, personnel with specialized technological knowledge and owner-level management impact or authority, that were based in the United States (Creswell & Creswell, 2019; Jenkins & Quintana-Ascencio, 2020; Paltridge & Phakiti, 2018).

Population

SMEs comprise over sixty percent of businesses in the U.S. (Kobe & Schwin, 2018). The current study was limited to small-to-medium-sized enterprises (SMEs) as defined by and in accordance with NAICS, owners or core knowledge workers, personnel with specialized technological knowledge and owner-level management impact or authority, based in the United States. From a pool of owners or core knowledge workers, a representative sample was selected utilizing a random selection method. The population sample consisted of only data according to the following three factors in determining sample size: (a) margin of error, (b) effect size, and (c) statistical power. Of the 1048 questionnaires sent, 52 questionnaires were received from SMEs owner, owner-level management, or core knowledge workers. The percentage of industry sectors include

the most frequently observed Industry(s) as Non-traditional and Real Estate, each with an observed frequency of (20%). Other industries include energy (4.0%), food and beverage (8.0 %), healthcare (12.0%), government (4.0%), education (8.0%), media (8.0%), information technology (IT) systems (8.0%), and professional services (8.0).

Methods of Analysis

The underlying assumptions driving the research were data, evidence, and rational thought shaping knowledge, and evidence leading to the null hypothesis's acceptance or rejection. The study collected data using a published assessment and a validated tool that applied multilevel mediation to account for top-down (i.e., owner, individuals, etc.) organizational capability interactions (Ajeeli, 2018; Brannen, 2017; Jenkins & Quintana-Ascencio, 2020). A Pearson correlation analysis was conducted among Business Analytics (BA), Performance (PF), Potential Absorptive Capacity (PAC), and Realized Absorptive Capacity (RAC). Cohen's standard was used to evaluate the strength of the relationships, where coefficients between .10 and .29 represent a small effect size, coefficients between .30 and .49 represent a moderate effect size, and coefficients above .50 indicate a large effect size (Cohen, 1988). The alternative method of bootstrapping was incorporated for the smaller sample size a statistical procedure that resamples through simulation (Peeters, 2016). Table 1 presents the results of the correlations.

Table 1

Pearson Correlation Results Among BA, PF, PAC, and RAC

Combination	r_p	95% CI	p
BA-PF	0.75	[0.51, 0.89]	< .001
BA-PAC	0.79	[0.57, 0.90]	< .001
BA-RAC	0.86	[0.70, 0.94]	< .001
PF-PAC	0.57	[0.22, 0.79]	.003
PF-RAC	0.79	[0.57, 0.90]	< .001
PAC-RAC	0.83	[0.65, 0.92]	< .001

Note. n = 25. Holm corrections used to adjust p-values.

The observations for BA had an average of 4.93 (SD = 1.36, SEM = 0.27, Min = 1.75, Max = 7.00, Mdn = 5.14, Skewness = -0.81, Kurtosis = -0.08). The observations for PF had an average of 4.28 (SD = 1.43, SEM = 0.29, Min = 1.00, Max = 6.00, Mdn = 4.60, Skewness = -0.70, Kurtosis = -0.55). The observations for PAC had an average of 4.72 (SD = 1.74, SEM = 0.35, Min = 1.00, Max = 7.00, Mdn = 5.30, Skewness = -0.98, Kurtosis = -0.32). The observations for RAC had an average of 4.70 (SD = 1.62, SEM = 0.32, Min = 1.00, Max = 7.00, Mdn = 5.00, Skewness = -0.90, Kurtosis = -0.10).

Table 2 presents the observed correlations with the bootstrapped results for the standard error and the 98% confidence interval of each correlation. The observed correlations with the bootstrapped results for the standard error and the 98% confidence interval of each correlation include a

correlation coefficient between PF and PAC of 0.57, indicating a large effect size. This correlation indicates that as PF increases, PAC tends to increase. A significant positive correlation was observed between PF and RAC (rp = 0.79, p < .001, 95% CI [0.57, 0.90]). The correlation coefficient between PF and RAC was 0.79, indicating a large effect size. This correlation indicates that as PF increases, RAC tends to increase. A significant positive correlation was observed between PAC and RAC (rp = 0.83, p < .001, 95% CI [0.65, 0.92]). The correlation coefficient between PAC and RAC was 0.83, indicating a large effect size. This correlation indicates that as PAC increases, RAC tends to increase.

Table 2

Observed Correlations with Bootstrapped Results for the Standard Error and the Confidence Interval

Combination	r_p	SE	98% CI
BA-PF	0.75	0.10	[0.18, 0.93]
BA-PAC	0.79	0.11	[0.20, 0.91]
BA-RAC	0.86	0.11	[0.40, 0.97]
PF-PAC	0.57	0.17	[-0.24, 0.88]
PF-RAC	0.79	0.08	[0.33, 0.91]
PAC-RAC	0.83	0.11	[0.30, 0.96]

Results and Interpretation

The following results and interpretations of the study were based on 1048 questionnaires sent with 52 questionnaires of owners, owner-level management, and core knowledge workers accepted. The variables for business analytic capability were data use, technology, and people (Vidgen et al., 2017). The absorptive capacity variables used were potential and realized absorptive capacity based on Zahra and George's (2002) acquisition, assimilation, transformation, and exploitation (Ajeeli, 2018; Vidgen et al., 2019). The variables for performance were both financial and non-financial measurements—market share, sales, profit, and human resource growth (Ajeeli, 2018; Wood et al., 2015). The following results determined whether the research questions and hypothesis were rejected or failed to reject the null hypothesis.

For research question (RQ1), does potential absorptive capacity mediate the relationship between business analytics capability and SMEs performance in the United States, the null hypothesis (H1o) was not rejected. A Baron and Kenny mediation analysis was conducted to assess if PAC mediated the relationship between BA and PF (Baron & Kenny, 1986). Four steps and three regressions were conducted. The results indicated potential absorptive capacity did not mediate the relationship between business analytics capability and SMEs performance in the United States. Based on an alpha of 0.05, the first regression with BA predicting PF results was significant, $F(1, 23) = 30.21$, $p < .001$ and showing that BA was a significant predictor of PF, B = 0.79, satisfied the first criterion.

Table 3

Unstandardized Loadings (Standard Errors), Standardized Loadings, and Significance Levels for Each Parameter in the path analysis Model (N = 25)

Parameter Estimate	Unstandardized	Standardized	p
Regressions			
BA → PF	0.85(0.22)	0.81	< .001
BA → PAC	1.01(0.16)	0.79	< .001
PAC → PF	-0.06(0.17)	-0.07	.749
Indirect Effect of PF on BA by PAC	-0.06(0.18)	-0.05	.750
Total Effect of PF on BA	0.79(0.14)	0.75	< .001
Errors			
Error in PAC	1.11(0.31)	0.38	< .001
Error in PF	0.84(0.24)	0.43	< .001
Error in BA	1.77(0.00)	1.00	--

Note. χ^2 could not be calculated; -- indicates the test was not conducted as the observed variance/covariance values were used.

The second regression of BA predicting PAC was significant, $F(1, 23) = 37.57$, $p < .001$, showing BA was a significant predictor of PAC, $B = 1.01$, which satisfied the second criterion for mediation. The third regression with BA and PAC predicting PF was not a significant predictor of PF when BA was included in the model, $B = -0.06$, did not satisfy the third criterion for mediation. The fourth result showed that BA was a significant predictor of PF when PAC was included in the model, $B = 0.85$, which did not satisfy the fourth criterion for mediation. Since item 3 and item 4 were not met, mediation was not supported. Hence, the null hypothesis was not rejected.

Table 4

Unstandardized Loadings (Standard Errors), Standardized Loadings, and Significance Levels for Each Parameter in the path analysis Model (N = 25)

Parameter Estimate	Unstandardized	Standardized	p
Regressions			
BA → PF	0.31(0.25)	0.30	.207
BA → RAC	1.03(0.12)	0.86	< .001
RAC → PF	0.47(0.21)	0.53	.023
Indirect Effect of PF on BA by RAC	0.48(0.22)	0.46	.029
Total Effect of PF on BA	0.79(0.14)	0.75	< .001
Errors			
Error in RAC	0.66(0.19)	0.26	< .001
Error in PF	0.70(0.20)	0.36	< .001
Error in BA	1.77(0.00)	1.00	--

Note. χ^2 could not be calculated; -- indicates the test was not conducted as the observed variance/covariance values were used.

For research question (RQ2), does realized absorptive capacity mediate the relationship between business analytics capability and SMEs performance in the United States, the null hypothesis (H2o) was rejected. A Baron and Kenny mediation analysis was conducted to assess if RAC mediated the relationship between BA and PF (Baron & Kenny, 1986). Three regressions were conducted. The results indicate realized absorptive capacity does mediate the relationship between business analytics capability and SMEs performance in the United States. Based on an alpha of 0.05, the first regression with BA predicting PF was significant, $F(1, 23) = 30.21$, $p < .001$ showing that BA was a significant predictor of PF, $B = 0.79$, which satisfied the first criterion for mediation.

The second regression with BA predicting RAC with the regression of RAC on BA as significant, $F(1, 23) = 65.37$, $p < .001$ and results showed that BA was a significant predictor of RAC, $B = 1.03$, which satisfied the second criterion for mediation. The third regression with BA and RAC predicting PF with results showing that RAC was a significant predictor of PF when BA was included in the model, $B = 0.47$, which satisfied the third criterion for mediation. The fourth test showed that BA was not a significant predictor of PF when RAC was included in the model, $B = 0.31$, which satisfied the fourth criterion for mediation was satisfied. All four criteria were satisfied indicating complete mediation was supported. Hence, the null hypothesis was rejected.

Summary of hypotheses

No.		Hypothesis	Status
1	H_1	Potential absorptive capacity does not mediate the relationship between business analytics capability and SME performance in the United States	Accepted
2	H_{1a}	Potential absorptive capacity does mediate the relationship between business analytics capability and SME performance in the United States.	Rejected
3	H_2	Realized absorptive capacity does not mediate the relationship between business analytics capability and SME performance in the United States .	Rejected
4	H_{2a}	Realized absorptive capacity does mediate the relationship between business analytics capability and SME performance in the United States.	Accepted

Discussion of Initial Research Findings

Realized absorptive capacity was accepted as a SME's ability to transform newly acquired knowledge and exploit it for commercial ends through knowledge transformation and knowledge exploitation (Zahra and George, 2002). The null hypothesis (H2o) was realized absorptive capacity does not mediate the relationship between business analytics capability and SME performance in the United States. The alternative hypothesis (H2a) was realized absorptive capacity does mediate the relationship between business analytics capability and SME performance in the United States. The results showed realized absorptive capacity does mediate the relationship between business

analytics capability and SME performance in the United States. Theoretically, the study has significant implications for SMEs in strategic management, knowledge management, entrepreneurship, or information technology during the COVID-19 pandemic. In line with recent theoretical extensions of dynamic capabilities, business intelligence, and knowledge management, indeed, the study's findings point to SMEs better able to align, modify and reconfigure in a dynamic and volatile business environment by using data effectively through business analytics and realized absorptive capacity (Ajeeli, 2018; Jiménez-Barrionuevo et al., 2019; Solesvik, 2018). The study incorporated three theories: Duan et al., 2020; Jiménez-Barrionuevo et al., 2019; Vidgen et al., 2017; Solesvik, 2018; Yang & Tsai, 2019.

First, the primary theory was the absorptive capacity theoretical framework, which focused on SMEs' mechanics for capturing and exploiting knowledge. Secondarily and thirdly, it incorporates the principles of the resource-based view and dynamic capability within the structural capital (S.C.) dimension of intellectual capital, which includes business analytics capability (Ajeeli, 2018; Daspit et al., 2016; Djerdjouri, 2020; Jiménez-Barrionuevo et al., 2019; Sakhdari, 2016). Business analytics capability from the dynamic capability perspective speaks directly to what SMEs need to weather the current challenges of the pandemic, utilizing technology such as business analytics for processing a vast amount of digital information in the twenty-first century to adjust dynamically.

Furthermore, the theory postulates the significance of absorbing new knowledge—transforming and exploiting knowledge helps organizations create value. The inference suggests value creation is restricted when absorptive capacity, especially realized absorptive capacity, is absent or low (Božič & Dimovski, 2019; Jiménez-Barrionuevo et al., 2019; Sakhdari, 2016). Herein lies a potential implication regarding the study's findings: utilizing the framework and mediation analysis helped discover the nexus between realized absorptive capacity and transforming and exploiting knowledge for improving SMEs' performance through business analytics capability.

Figure 1

Venn Diagram of Absorptive Capacity Dimensions
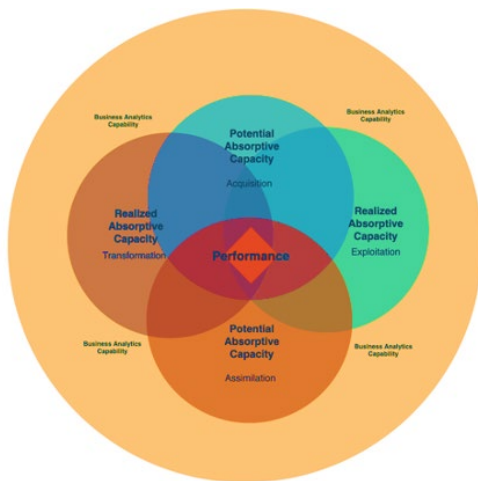
Note: A Venn diagram shows the logical relation between sets.

Observe in Figure 1, the merging of colors or components reaching zenith proportion toward even greater performance. Findings demonstrate knowledge through business analytics capability merges to combustible effect at the realized absorptive capacity dimension. Thereby, as Cohen and Levinthal (1990) and Zahra and George (2002) mention, the trajectory of knowledge changes into new ways. The framework captured the contextual factor of realized absorptive capacity's role in seeing real results from data. If SMEs institute or empower data transformation through realized absorptive capacity, transformation, and exploitation, it could indirectly affect the SME's performance in remarkable ways. Realized absorptive capacity entails the transformation and exploitation of data (Vidgen et al., 2017). It encompasses the intentionality of allowing knowledge to flow freely throughout the organization to achieve ongoing improved performance.

In concluding the results, this study sought to fill the gap in the literature regarding the lack of data usage by SMEs as well as the low adoption of technology such as business analytics among SMEs compared to big businesses. Data alone does not necessarily provide knowledge; realistically, one does not acquire knowledge simply by holding it (Daspit et al., 2016). Added is having the uncanny ability to recognize the value of new information. There is potential misreading in Cohen and Levinthal's (1990) original work positing a firm's competitiveness is its ability to exploit new technological developments. They called it, absorptive capacity, the capability that not only enabled exploitation of new extramural knowledge but predicts more accurately the future.

In Cohen and Levinthal's (1990) deliberation is the power of cumulativeness, a seemingly neglected concept within the literature regarding absorptive capacity. The accumulation of building on existing knowledge affords more efficient accumulation subsequently—hence, exponential reoccurrence. Dynamic progression has the potential to bring about remarkable performance. Succinctly, erudition becomes more precise over time and benefits the erudite. The study supports Zahra and George's (2002) reconceptualization about realized absorptive capacity (e.g., transformation and exploitation), by demonstrating how not embracing technology for analyzing data, not implementing current trends in organizational methods and visual analytics, nor ensuring organizational designs are aligned with the realized absorptive capacity, the study shows how SMEs are following a recipe for disaster.

Examining Cohen and Levinthal's (1994) statement in *Fortune Favors the Prepared Firm* regarding the then-premier economic rivalry closely: "…between Japan and the United States, that, in large part, Japan's competitive advantage is due to American industry's apparent inability to match Japan's quick and effective use of external [knowledge]" (227). Herein lies solecism: focusing on just knowledge through business analytics and not including realized absorptive capacity will not materialize improved performance. Cohen and Levinthal (1994) misses the essence of Zahra and George (2002) for today: all the knowledge in the world will not bring transformative results. Realized absorptive capacity offers transformative and exploitative power. Hence, revamp Cohen and Levinthal (1994): Perceive, in a world [of so much data] and uncertainty, there is a benefit to [joining business analytics and realized absorptive capacity], it is called [the privilege] to exploit and perform better, which SMEs can.

COVID-19 Pandemic and Research Findings Discussion

The COVID-19 pandemic brought a crisis challenge of Mt. Everest proportions to many small-to-medium-sized enterprises (SMEs), and this had a large effect as SMEs are an important part of our worldwide economy supporting local economic growth, providing jobs, and meeting the needs of their customers (Chan et al., 2019). A study examining the effects of disruptive digital innovation (DDI), a discovery that increases breakthrough capabilities, explained how small businesses must respond and change or risk becoming obsolete. Chan et. al. (2019) shared how Kodak Company failed to keep up with the digital market and died away. Conversely, another example is the rental vacation home service Airbnb, using an online platform, has thrived during COVID-19 by adapting to new demands.

While crisis and threats to business can be commonplace, COVID-19 has brought a much higher level of crisis with a global impact and how long this could go on. Fasth, Elliot, and Styhre (2021) conducted a study of 1,000 SME business leaders in Sweden to understand their crisis management plans. These research findings indicated that many SMEs rarely had a crisis plan and were subject to large revenue losses. The research also suggested, in addition to having a general crisis plan, including analytic methods can help generate new ideas and solutions.

Positive Examples of Absorptive Capacity During the Pandemic

The COVID-19 pandemic has also brought some positive influence on SMEs and entrepreneur endeavors that utilized several factors to build their business including data analytics. Davidsson, Recker, and von Briel (2021) presented a study analyzing the positive effects of using virtual collaboration tools, new customer needs, data analytics, and leveraged technological advances that created booming businesses during the COVID-19 pandemic including the Peloton In-home fitness system to provide workouts from home and customizable meal-delivery services such as Hello Fresh.

In providing further discussion regarding the impact of COVID-19, and in light of the findings of the presented research, SMEs can benefit from pursuing efforts to improve their realized absorptive capacity, thereby increasing their business analytics methods capabilities during COVID-19 and beyond with transforming results (Gudandovskaya & Liniņa, 2021). While many SMEs have struggled during the COVID-19 pandemic, a few have thrived. As SMEs continue to navigate their way through this time of crisis, hopefully, they will find new opportunities. The research study sought to fill the gap in the literature regarding the lack of data usage by SMEs as well as the low adoption of technology such as business analytics among SMEs compared to big businesses. Data alone does not necessarily provide knowledge; realistically, one does not acquire knowledge simply by holding it (Daspit et al., 2016). SME's who make more efforts towards digitalization and adopting of digital technologies can help them better respond to public crises and the current COVID-19 pandemic (Gru et al., 2020).

These results of this study can confirm that knowledge alone may not assist SME survival in times of crisis. Transformative results, like SME's experienced when they exhibited absorptive capacity through using virtual-collaboration tools, data analytics, and leveraged technological advances to develop thriving businesses during the COVID-19 pandemic (Briel, 2021). Adapting Cohen and Levinthal's (1994) statement, "In a world [of so much data], uncertainty, and competition, there is a benefit to merging business analytics capability with realized absorptive capacity. It is called [the privilege] to exploit and perform better" SMEs who can align, modify and reconfigure in a dynamic and volatile business environment, by using data effectively through business analytics and increasing absorptive capacity, have greater potential to provide a competitive advantage and improved business performance. This is especially true when responding to the ongoing COVID-19 pandemic.

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