



Predictive Business Analytics as a Strategic Management Capability: Linking Data-Driven Insights with Organizational Agility and Competitive Performance

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Peer Review Information	Abstract
<i>Submission: 19 Jan 2019</i> <i>Revision: 03 Feb 2019</i> <i>Acceptance: 19 March 2019</i> Keywords <i>Predictive Business Analytics, Strategic Management Capability, Data-Driven Decision Making, Organizational Agility, Competitive Performance.</i>	Predictive business analytics has moved beyond a technical support function to become an important mechanism through which organizations interpret uncertainty, anticipate change, and coordinate strategic action. This methodology-oriented paper develops a structured framework for examining predictive business analytics as a strategic management capability by linking analytics resources and predictive modelling practices with data-driven insights, organizational agility, and competitive performance. The study uses a structured literature synthesis of peer-reviewed research published through 2020 and integrates the resource-based view, dynamic capabilities perspective, business analytics capability literature, and organizational agility research. Predictive analytics capability is treated as a higher-order capability formed through data resources, analytical infrastructure, managerial and technical expertise, governance, and business-strategy alignment. Organizational agility is positioned as a key mechanism through which predictive insights are converted into timely sensing, decision-making, and resource reconfiguration, while competitive performance represents the downstream outcome of improved responsiveness, efficiency, innovation, and market positioning. The synthesis indicates that analytics investments alone are insufficient; value depends on the organization's ability to embed analytical outputs into strategic routines and action. The resulting framework provides measurable constructs, proposed relationships, and a research design suitable for future empirical testing using survey data and structural equation modelling.

Introduction

Organizations increasingly operate in environments characterized by volatile customer demand, rapid technological change, intense competition, and expanding volumes of structured and unstructured data. In such settings, managerial decisions based primarily on historical experience may be insufficient because strategic choices often require anticipation rather than simple description. Business intelligence and analytics have therefore developed from reporting-oriented

systems toward advanced analytical practices that support forecasting, pattern recognition, scenario analysis, and decision support (Chen et al., 2012). Predictive business analytics is particularly relevant because it estimates likely future outcomes from historical and current information, allowing managers to identify potential opportunities and threats before they become fully visible.

The strategic importance of analytics is consistent with the resource-based and dynamic

capabilities perspectives. The resource-based view emphasizes valuable and difficult-to-imitate organizational resources, while dynamic capabilities explain how firms sense opportunities and threats, seize them, and reconfigure resources in changing environments (Teece et al., 1997). Predictive analytics should therefore not be treated simply as a software investment. Its strategic value emerges when data, analytical expertise, technological infrastructure, managerial processes, and organizational routines are combined into a capability that improves the quality and speed of strategic action.

Prior research provides strong foundations for this argument. Data-driven decision making has been associated with higher productivity and performance (Brynjolfsson et al., 2011). Gupta and George (2016) conceptualized big data analytics capability as a combination of organizational resources and empirically linked the capability to firm performance. Akter et al. (2016) showed that analytics capability and business-strategy alignment jointly matter for firm performance. Wamba et al. (2017) similarly showed that big data analytics capability can influence firm performance through dynamic capabilities.

Organizational agility provides a critical mechanism connecting predictive insight with strategic outcomes. Agility concerns the ability to sense environmental change and respond through timely decisions and resource adjustments. Research on digital options and IT-enabled agility emphasizes that technological resources create value when they support organizational processes and responsiveness (Sambamurthy et al., 2003; Tallon et al., 2019). Rialti et al. (2019) further found that organizational agility can mediate the relationship between big data analytics capabilities and performance.

Despite these developments, an important methodological gap remains. Much analytics research focuses on big data analytics capability, business intelligence, technology adoption, or firm performance, while predictive analytics can be examined more specifically as a strategic management capability that connects future-oriented insight to organizational agility. The objective is to develop a testable framework for examining whether predictive business analytics functions as a strategic management capability and whether its effect on competitive performance is transmitted through organizational agility. The methodology defines constructs, develops hypotheses, proposes

measurement dimensions, and specifies a quantitative validation strategy.

Literature Review

Business intelligence and analytics have evolved from reporting-oriented systems toward advanced analytical practices that support prediction and decision-making. Chen et al. (2012) positioned BI&A as a field in which data, analytical techniques, and organizational applications jointly create business value. Predictive analytics adds a future-oriented layer by estimating likely demand, risk, customer behaviour, operational conditions, or market outcomes. Davenport (2006) argued that analytics can become a strategic weapon when analytical practices are embedded across business activities, implying that analytical value depends on institutionalized decision routines rather than software alone.

Gupta and George (2016) developed a multidimensional approach to big data analytics capability and found a positive relationship with firm performance. Akter et al. (2016) conceptualized capability through management, technology, and talent dimensions and showed the importance of business-strategy alignment. Wamba et al. (2017) linked analytics capability to performance through dynamic capabilities, while Müller et al. (2018) provided econometric evidence concerning big data and analytics and firm performance. Together, these studies support the view that analytical capability is a coordinated organizational resource.

Brynjolfsson et al. (2011) found that firms emphasizing data-driven decision making achieved higher productivity and performance. The implication is that data creates value when analytical evidence becomes part of managerial action. Predictive analytics extends this logic by providing forward-looking evidence for planning, risk assessment, investment, capacity management, customer targeting, and strategic experimentation. Akter et al. (2016) further shows why strategic alignment should be measured alongside analytical capability.

Sambamurthy et al. (2003) linked digital options with organizational agility, while Tallon et al. (2019) reviewed IT-enabled agility and emphasized organizational processes as the route through which technology becomes responsiveness. Rialti et al. (2019) directly supports an agility-mediated relationship between analytics capability and performance, making agility a defensible mediator in the proposed model.

Competitive performance is treated as multidimensional, including operational efficiency, market responsiveness, innovation, customer outcomes, and competitive positioning. O'Neill and Brabazon (2019) examined business analytics capability in relation to organizational value and competitive advantage, while These findings support using multiple performance indicators rather than a single financial measure.

The literature establishes that analytics capability can contribute to performance, strategic alignment influences analytics value, and agility can connect analytics capability with performance. However, predictive business analytics as a future-oriented strategic management capability is less explicitly integrated with insight use, agility, and competitive performance. The present methodology addresses this gap with one testable framework.

Table 1. Selected Literature Foundations

Study	Contribution	Use in present model
Teece et al. (1997)	Dynamic capabilities: sensing, seizing, reconfiguration.	Theoretical foundation.
Sambamurthy et al. (2003)	Digital options and agility.	Agility mechanism.
Brynjolfsson et al. (2011)	Data-driven decision making and performance.	Decision-use pathway.
Chen et al. (2012)	BI&A evolution and business value.	Analytics foundation.
Gupta & George (2016)	Multidimensional analytics capability.	Capability measurement.
Akter et al. (2016)	Analytics capability and strategy alignment.	Moderating condition.
Wamba et al. (2017)	Analytics capability and dynamic capabilities.	Capability-performance pathway.
Müller et al. (2018)	BDA and firm performance.	Performance evidence.
Tallon et al. (2019)	IT-enabled organizational agility review.	Agility construct.
Rialti et al. (2019)	Agility mediates BDA-performance.	Mediation evidence.
Mikalef et al. (2020)	Analytics business-value research agenda.	Strategic context.
Walter (2020)	Agility systematic review.	Construct clarification.

Methodology

This paper uses a methodology-development approach rather than claiming results from a new organizational survey. A structured literature synthesis of peer-reviewed studies published through 2020 was used to identify recurring constructs and mechanisms. The resulting model integrates the resource-based view, dynamic capabilities, analytics capability, data-driven decision making, organizational agility, and competitive performance.

1. Research Design

The proposed empirical design is quantitative and explanatory. The unit of analysis is the organization, with respondents selected from managers and professionals involved in analytics-enabled strategic decisions. A cross-sectional survey followed by PLS-SEM or covariance-based SEM is recommended. PLS-SEM is particularly suitable when the objective emphasizes prediction and theory development and when higher-order capability constructs are included.

2. Construct Definitions

Table 2. Study Constructs, Definitions, and Measurement Dimensions

Construct	Definition	Dimensions
Predictive Business Analytics Capability	Ability to acquire, integrate, analyse and use data for forward-looking managerial decisions.	Data integration; infrastructure; predictive modelling; talent; governance.
Strategic Alignment	Degree to which analytics priorities and outputs are connected to business strategy.	Strategic fit; leadership alignment; investment alignment; relevance.
Data-Driven Insight Use	Extent to which predictive outputs are incorporated into decisions.	Accessibility; managerial use; planning; decision integration.

Organizational Agility	Ability to sense change, decide rapidly and reconfigure resources.	Sensing; decision; response; reconfiguration.
Competitive Performance	Superior outcomes relative to competitors and strategic objectives.	Efficiency; innovation; market response; customer outcomes; position.

3. Proposed Research Model

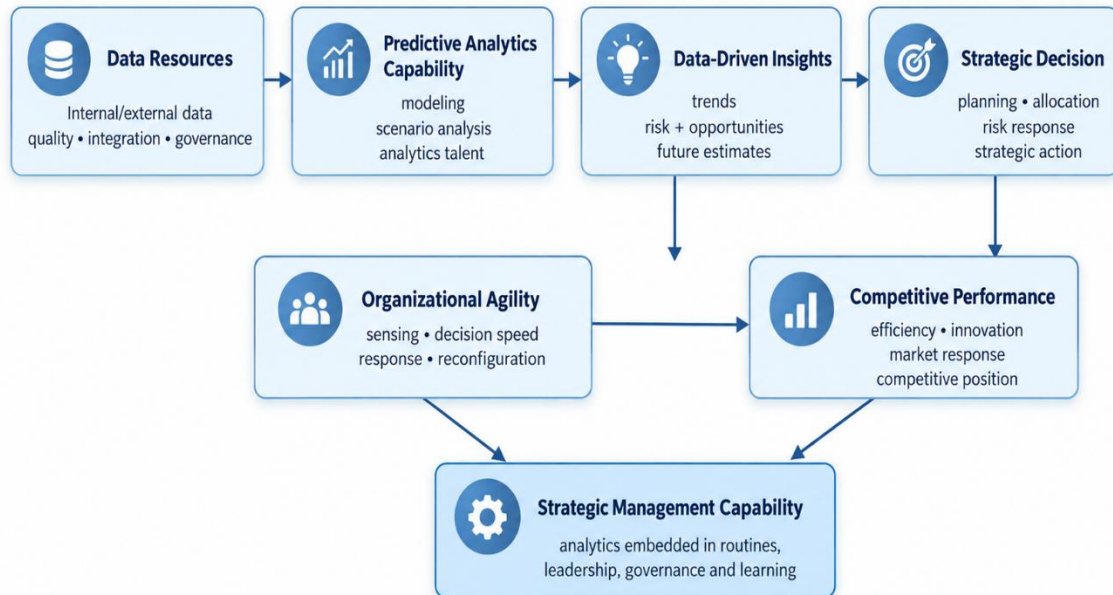


Figure 1. Predictive Business Analytics Strategic Capability Framework

4. Research Hypotheses

- H1: Predictive business analytics capability positively affects data-driven insight use.
- H2: Predictive business analytics capability positively affects organizational agility.
- H3: Strategic alignment strengthens the relationship between predictive business analytics capability and data-driven insight use.
- H4: Data-driven insight use positively affects organizational agility.
- H5: Organizational agility positively affects competitive performance.
- H6: Predictive business analytics capability positively affects competitive performance.
- H7: Organizational agility mediates the relationship between predictive business analytics capability and competitive performance.
- H8: Data-driven insight use and organizational agility form a sequential pathway between predictive business analytics capability and competitive performance.

5. Sampling and Data Collection

For future empirical validation, purposive or stratified sampling can reach managers with direct exposure to analytics-enabled decisions. Suitable respondents include business-unit, analytics, operations, marketing, finance, IT, and senior management professionals. A target of approximately 250–400 usable responses is recommended subject to a formal power analysis. A structured questionnaire using five- or seven-point Likert scales should be used, with confidentiality and voluntary participation clearly communicated.

6. Data Analysis Procedure

Screen incomplete responses, outliers and inconsistent patterns.

Report descriptive statistics and respondent characteristics.

Assess reliability using Cronbach's alpha and composite reliability.

Assess convergent validity using factor loadings and average variance extracted.

Assess discriminant validity using HTMT and complementary criteria.

Estimate direct, mediation and moderation paths using bootstrapping.

- Check common method bias and alternative model specifications.

Evaluate explained variance, effect sizes and predictive relevance.

Table 2. Proposed Measurement Framework

Variable	Example indicators	Scale
PBAC	Integrated data sources; predictive models; analytical expertise; model updating.	5/7-point Likert
Strategic Alignment	Analytics investments support strategic priorities; leadership alignment.	5/7-point Likert
Insight Use	Predictive outputs influence planning, allocation and decisions.	5/7-point Likert
Agility	Fast sensing, decisions, response and resource adjustment.	5/7-point Likert
Competitive Performance	Efficiency, innovation, market responsiveness and customer outcomes.	5/7-point Likert

Results

As a methodology-development study, the results are the outcomes of the literature synthesis and framework construction rather than newly collected survey statistics. First, the literature consistently supports a multidimensional interpretation of analytics capability. Data infrastructure, analytical skills, management processes, governance and strategic alignment must be combined before predictive information becomes an organizational capability (Gupta & George, 2016; Akter et al., 2016).

Second, organizational agility emerges as the principal mechanism connecting analytical capability with competitive outcomes. Technology and analytics create information and response options, but organizational processes

determine whether those options become action (Sambamurthy et al., 2003; Tallon et al., 2019). Rialti et al. (2019) provides direct support for agility as a mediator between analytics capability and performance.

Third, competitive performance should be operationalized broadly. The reviewed literature links analytics with operational, market and organizational outcomes rather than a single financial indicator (Wamba et al., 2017; O'Neill & Brabazon, 2019). Finally, strategic alignment is a critical boundary condition because predictive models generate value only when their outputs are relevant to strategic priorities and are embedded in decision routines (Akter et al., 2016).

Table 3. Literature-Synthesis Results

Finding	Mechanism	Implication
Analytics capability is multidimensional.	Technology, talent, management and governance jointly create capability.	Use a higher-order PBAC construct.
Strategic fit matters.	Aligned analytics produces more decision-relevant insight.	Test strategic alignment as a moderator.
Predictive insight supports responsiveness.	Forward-looking signals create time for action.	Measure insight uses and agility separately.
Agility connects analytics with performance.	Sensing and response translate information into action.	Test mediation.
Performance is multidimensional.	Analytics affects efficiency, innovation and market response.	Use multiple performance indicators.
Analytics does not automatically create advantage.	Leadership and routines determine whether insights are acted upon.	Measure governance and decision integration.

Conclusion and Discussion

This paper develops a methodology for investigating predictive business analytics as a strategic management capability. The central proposition is that predictive analytics is strategically valuable when data resources, analytical infrastructure, skilled personnel, governance, strategic alignment, and decision routines are combined to generate and use forward-looking insights. This capability-based interpretation is consistent with dynamic capabilities theory and with evidence linking analytics capability to organizational performance (Teece et al., 1997; Gupta & George, 2016; Wamba et al., 2017). The framework places organizational agility between predictive analytics and competitive performance because a forecast has limited strategic value unless the organization can act upon it. Predictive information can strengthen sensing, decision speed, response capacity, and resource reconfiguration. The model therefore allows both direct and mediated effects, with agility serving as the principal mediator. Strategic alignment is included as a boundary condition because technical analytics teams can produce accurate forecasts that are not strategically useful. The methodology consequently recommends measuring alignment, insight use, agility, and performance together rather than evaluating predictive analytics through model accuracy alone. This follows the literature showing that business-strategy alignment affects the value realized from analytics (Akter et al., 2016). Future empirical work should validate the model through survey data and structural equation modelling, followed by longitudinal or multi-industry studies. Additional moderators such as environmental turbulence, organizational culture, leadership support, analytics maturity, and data governance may further explain differences in realized value. The main limitation is that this paper does not report primary empirical data; its results are literature-synthesis findings and methodological propositions. The framework should therefore be treated as a testable research model rather than as new causal evidence. Nevertheless, it provides a coherent pathway for examining whether predictive business analytics functions as a strategic capability and how analytical foresight can translate into organizational agility and competitive performance.

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