

The Impact of Business Analytics Tools on Decision Quality in Multinational Enterprises under Digital Transformation

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As multinational enterprises (MNEs) navigate an increasingly data-intensive global environment, the quality of managerial decisions has become a critical determinant of competitive performance. Digital transformation — broadly understood as the integration of digital technologies into core business operations — has fundamentally altered how organizations gather, process, and act on information. Within this shift, business analytics (BA) tools occupy a central role. Yet despite their widespread adoption, a clear understanding of how these tools actually affect decision quality across complex, multi-layered organizational structures remains incomplete. This study addresses that gap by examining the relationship between BA tool adoption and decision quality in MNEs, with attention to both enabling and limiting factors.

Existing literature offers important but partial insights. Davenport and Harris established the foundational argument that analytics-driven organizations consistently outperform competitors across industries, attributing this to superior information processing capabilities [2]. Brynjolfsson and McElheran provided large-scale empirical support, showing that data-driven decision-making correlates positively with productivity growth among US manufacturing firms [1]. More recently, Mikalef et al. developed a dynamic capabilities framework linking big data analytics to improved firm performance, emphasizing that the value of analytics tools depends heavily on organizational context [5]. Studies on MNEs specifically, such as Ghoshal and Bartlett's work on the transnational model, highlight how information flows across subsidiaries shape strategic responsiveness [3]. However, most existing studies either focus on domestic firms or treat analytics adoption as a binary variable, rarely examining how tool type, organizational design, and cultural context interact within MNEs. This study contributes by (1) differentiating among BA tool categories — descriptive, predictive, and prescriptive — and assessing their distinct effects on decision quality; (2) incorporating cross-national organizational complexity as a moderating variable; and (3) grounding the analysis in documented company-level cases.

The research draws on a mixed-methods design combining case analysis of three MNEs with cross-functional survey data. The primary cases are Siemens AG, Unilever, and Alibaba Group — selected because each operates across multiple continents, has publicly documented its analytics transformation, and represents a distinct industry context (industrial manufacturing, consumer goods, and e-commerce respectively). Secondary data were gathered from company reports and academic publications. Supplementary quantitative evidence comes from a structured survey administered to 187 middle and senior managers across MNE subsidiaries in Germany, the UK, India, and China, measuring perceived decision quality along four dimensions: accuracy, timeliness, coherence with strategic objectives, and stakeholder alignment.

The findings reveal a clear but non-linear pattern. Descriptive analytics tools — dashboards, reporting systems, and visualization platforms — consistently improved decision timeliness and transparency across all three case firms. At Siemens, the deployment of MindSphere, the company's Industrial IoT platform, enabled real-time data integration across 16 manufacturing sites in Asia and Europe, reducing production decision lag by an estimated 34% [8]. Predictive analytics showed stronger effects on accuracy and strategic alignment. At Unilever, AI-driven demand forecasting tools improved supply chain decision quality at the subsidiary level — an outcome consistent with the finding by Kulp et al. that information integration between supply chain partners significantly reduces forecast error and improves operational decisions [4]. Prescriptive analytics, while less universally adopted, showed the most significant impact on complex cross-border decisions at Alibaba, where algorithm-assisted logistics routing and

market entry tools contributed to measurable improvements in investment decision coherence [7].

However, BA tools do not uniformly improve decision quality. Three moderating factors emerged consistently. First, organizational structure matters: MNEs with higher subsidiary autonomy (closer to the transnational model described by Ghoshal and Bartlett [3]) showed greater ability to adapt analytics outputs to local contexts, while more centralized structures reported tension between standardized outputs and local decision needs. Second, data governance quality proved critical — firms lacking unified data standards across subsidiaries reported inconsistent analytics results that in several instances reduced decision coherence. Third, managerial analytics literacy moderated outcomes significantly: subsidiaries with lower average analytics training showed weaker gains from tool adoption, consistent with findings by Wamba et al. on the importance of human capital in realizing BA value [6].

These results carry practical and theoretical significance. For practitioners, the findings suggest that investing in BA tools without concurrent investment in data governance and manager training is likely to yield sub-optimal results, particularly in geographically dispersed MNEs. For researchers, the study highlights that decision quality is a multi-dimensional outcome and that BA tool effects vary meaningfully by tool type — a distinction often overlooked in aggregate studies. Future work should extend this analysis with longitudinal data to assess how BA-driven decision quality evolves as organizations deepen their digital capabilities, and should examine how emerging generative AI tools are beginning to reshape analytics workflows within MNEs.

Источники и литература

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