

Enhancing Supply Chain Resilience with SAP Integrated Business Planning

McKenzie Izev

mckenzieizev@gmail.com

AIT Austrian Institute of Technology

Research Article

Keywords: SAP Integrated Business Planning, supply chain resilience, demand forecasting, inventory optimization, supply chain control tower, scenario planning, supply chain disruption, sales and operations planning

Posted Date: October 13th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11323499/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: The authors declare no competing interests.

Enhancing Supply Chain Resilience with SAP Integrated Business Planning

Mckenzie Curtis

AIT Austrian Institute of Technology

October 2026

Abstract

Contemporary supply chains operate in an environment of unprecedented volatility, characterized by geopolitical disruptions, climate-induced uncertainties, shifting customer expectations, and increasingly complex global networks. The ability to anticipate, absorb, adapt to, and recover from disruptions—commonly conceptualized as supply chain resilience—has become a strategic imperative for manufacturing and distribution organizations. This research examines the role of SAP Integrated Business Planning (SAP IBP) in enhancing supply chain resilience through integrated planning capabilities that span demand forecasting, supply planning, inventory optimization, and cross-functional collaboration. Drawing on a combination of platform capability analysis, practitioner-oriented documentation, and reported organizational outcomes, the study develops a framework that maps specific SAP IBP functional modules to the constituent dimensions of supply chain resilience. The analysis identifies four primary resilience-enhancing mechanisms enabled by SAP IBP: anticipatory demand sensing through AI-based forecasting algorithms, adaptive supply planning via constraint-based optimization and response management, buffering capacity through multi-stage inventory optimization, and enhanced visibility and response through the Supply Chain Control Tower with real-time alerting and case management. The research further examines organizational case evidence, including Ericsson’s transformation from siloed manual planning to a unified digital platform, to illustrate the practical pathways through which SAP IBP capabilities translate into resilience outcomes. The findings suggest that SAP IBP contributes

to resilience not merely through individual functional enhancements but through the integration of planning processes into a coherent, data-consistent, and simulation-capable planning environment. The study concludes with implications for practitioners and identifies areas for future empirical validation, including the need for longitudinal studies measuring resilience outcomes before and after SAP IBP adoption and comparative analyses across organizational contexts.

Keywords: SAP Integrated Business Planning, supply chain resilience, demand forecasting, inventory optimization, supply chain control tower, scenario planning, supply chain disruption, sales and operations planning

1. Introduction

Contemporary supply chains operate in an environment characterized by persistent volatility and systemic disruption. Geopolitical tensions, climate-related events, pandemic-induced demand shocks, and logistical bottlenecks have collectively reshaped the risk landscape within which manufacturing and distribution organizations must plan and execute their operations. The capacity to anticipate disruptions, absorb their impacts, adapt plans in response, and recover efficiently has become a strategic imperative rather than an operational luxury. This capacity is commonly conceptualized as supply chain resilience, and it has emerged as a central concern in both academic research and practitioner discourse over the past two decades (Shi et al., 2024).

Supply chain resilience is not a singular attribute but a composite of capabilities that span temporal phases of disruption management. The literature distinguishes between anticipatory capabilities, which enable organizations to detect weak signals and prepare for potential disruptions; absorptive capabilities, which allow organizations to withstand shocks without significant operational degradation; adaptive capabilities, which facilitate the adjustment of plans and processes in response to changing conditions; and restorative capabilities, which support recovery and organizational learning following disruption events (Ali et al., 2017). These capabilities are enabled by a combination of organizational factors, process maturity, and technological infrastructure.

Enterprise planning systems occupy a central position in the technological infrastructure that supports resilience. Among the available platforms, SAP Integrated Business Planning has emerged as a significant solution for organizations seeking to integrate demand, supply, inventory, and financial planning within a unified cloud-based environment. SAP IBP combines capabilities previously distributed across multiple applications, including sales and operations planning, demand planning, response and supply planning, inventory optimization, and the Supply Chain Control Tower (SAP, 2025a). The platform incorporates advanced algorithms, machine learning capabilities, and scenario simulation functions that are directly relevant to resilience-enhancing planning practices.

The research problem addressed in this paper concerns the relationship between SAP IBP capabilities and supply chain resilience outcomes. While SAP and its implementation partners have documented numerous customer deployments and functional capabilities, the systematic articulation of how specific SAP IBP functions contribute to specific resilience dimensions remains underdeveloped. Organizations seeking to justify investment in SAP IBP for resilience purposes, and practitioners seeking to optimize their use of the platform, would benefit from a structured understanding of the mechanisms through which planning capabilities translate into resilience outcomes.

This research is guided by three primary questions. First, what are the constituent capabilities of SAP IBP that are relevant to supply chain resilience? Second, through what mechanisms do these capabilities enhance the anticipatory, absorptive, adaptive, and restorative dimensions of resilience? Third, what evidence exists regarding the practical realization of resilience benefits from SAP IBP adoption, and what limitations or contingencies condition these outcomes?

The significance of this research extends across theoretical and practical domains. Theoretically, it contributes to the literature on supply chain resilience by specifying the role of integrated planning platforms as resilience-enabling technologies, a perspective that has received limited systematic attention. Practically, it provides a structured framework that can inform SAP IBP configuration decisions and resilience-focused planning strategies, and it identifies areas where further empirical validation is needed.

The remainder of this paper is organized as follows. Section two reviews relevant literature on supply chain resilience and integrated business planning. Section three describes the research methodology. Section four presents the results of the capability-resilience mapping analysis. Section five discusses the findings, their implications, and limitations. Section six concludes with a summary and directions for future research.

2. Literature Review

2.1 Supply Chain Resilience: Conceptual Foundations

Supply chain resilience has been defined and operationalized in multiple ways across the operations and supply chain management literature. A systematic review of 103 peer-reviewed journal articles identified three major constructs used to define resilience: phases of resilience, resilience strategies, and the capabilities needed to be resilient (Ali et al., 2017). Within the capabilities construct, five core resilience capabilities emerge: the ability to anticipate, to adapt, to respond, to recover, and to learn. These capabilities are supported by thirteen essential elements and eighty-four managerial practices that organizations can deploy to enhance their resilience posture (Ali et al., 2017).

The temporal dimension of resilience is critical for understanding how planning systems contribute to resilience outcomes. Anticipatory capabilities operate before disruption occurs, enabling organizations to model scenarios, identify vulnerabilities, and develop contingency plans. Absorptive capabilities operate during the initial impact of disruption, enabling organizations to maintain critical operations through buffering mechanisms such as safety stock

or redundant capacity. Adaptive capabilities operate as disruption persists, enabling organizations to reallocate resources, adjust plans, and modify processes. Restorative capabilities operate as disruption subsides, enabling organizations to return to normal operations and to capture lessons learned for future preparedness.

Research has also emphasized the role of visibility, flexibility, collaboration, and redundancy as resilience-enabling factors. Shi et al. (2024) revisit the Triple-A framework (alignment, agility, and adaptiveness), the Triple-P framework (product complexity, process complexity, and partnership complexity), and the Triple-R framework (readiness, responsiveness, and restoration) to organize the challenges and research gaps in supply chain resilience. Their analysis suggests that resilience requires not only the presence of specific capabilities but also their integration into coherent organizational processes and technological infrastructures.

2.2 Integrated Business Planning and SAP IBP

Integrated business planning refers to the integration of planning processes across functional domains—demand, supply, inventory, finance—within a unified planning environment. The concept extends traditional sales and operations planning by incorporating financial planning, expanding the planning horizon, and leveraging advanced analytics and simulation capabilities. Research on IBP implementation has emphasized the importance of digital transformation, cross-functional collaboration, and predictive analytics in improving planning efficiency and resilience (Abdelghani, 2025).

SAP Integrated Business Planning is a cloud-based solution that implements the IBP concept within the SAP technology stack. The platform organizes its capabilities into several application areas, each addressing a distinct planning domain. The Demand application supports statistical forecasting, demand sensing, and predictive analytics. The Response and Supply application supports constraint-based supply planning, response management, and scenario simulation. The Inventory application supports multi-stage inventory optimization and safety stock planning. The Sales and Operations application supports the S&OP process, including consensus demand planning and supply review. The Supply Chain Control Tower provides visibility, alerting, and case management across the end-to-end planning process (SAP, 2025a).

The platform provides supply chain monitoring, sales and operations planning, demand management, inventory planning, and supply planning within a comprehensive solution that also supports integration with external systems (SAP, 2025a). SAP IBP facilitates the balancing of demand and supply, harmonization of planning across corporate functions, responsive planning with advanced algorithms and what-if scenario simulation, demand-driven supply chain planning based on demand sensing and predictive forecasting, multistage inventory optimization, and end-to-end supply chain visibility with real-time monitoring and exception management (SAP, 2025a).

The platform's architecture incorporates artificial intelligence and machine learning capabilities that enhance demand forecasting, inventory management, and risk mitigation (Immedi and Mane, 2025). Research indicates that AI integration with SAP IBP produces

substantial reductions in forecast error and inventory carrying costs, while improving risk mitigation for supply chain disruptions (Immidi and Mane, 2025). A comparative study of SAP IBP and custom AI planning engines found that the platform demonstrates distinct performance characteristics under conditions of market volatility and planning assumption breakdown (Soundarapandian, 2026).

2.3 Demand Sensing and Forecasting Capabilities

Demand sensing represents a critical capability for anticipatory resilience. Unlike traditional statistical forecasting, which relies on historical sales patterns, demand sensing uses real-time data from point-of-sale systems, social media, weather data, and other sources to detect short-term demand changes (Lu, 2025). The integration of demand sensing with statistical models provides a baseline forecast that is then adjusted based on real-time signals, producing more accurate short-term predictions.

Research on SAP IBP's demand sensing and statistical model capabilities demonstrates significant improvements in forecasting accuracy. A case study found that the integration of demand sensing with statistical models reduced the root mean square error of demand forecasts by twenty percent compared to traditional forecasting methods, while the correlation coefficient between forecasted demand and actual sales data increased from 0.7 to 0.9 (Lu, 2025). These improvements in forecast accuracy translate directly into improved anticipatory resilience by enabling organizations to detect demand shifts earlier and prepare more effectively.

The demand sensing process involves data collection from multiple sources, preprocessing to remove noise and outliers, and pattern recognition using machine learning algorithms such as neural networks and decision trees (Lu, 2025). The statistical model component analyzes historical sales data to identify long-term trends and seasonality patterns, with model selection based on data characteristics and model fitting using optimization techniques to minimize forecasting error (Lu, 2025). The integration of these two approaches provides a more robust forecasting capability than either approach alone.

Sankaran et al. (2019) explore how demand sensing optimizes monthly consensus forecasts with short-term sensed demand in daily buckets. They highlight that this optimization method is particularly useful for products that are continuously sold and for supply chain environments capable of realizing benefits from more accurate short-term predictions. Demand sensing addresses variability dampening, working capital reduction, lead time compression, and late customization (Sankaran et al., 2019).

2.4 Response and Supply Planning Capabilities

The Response and Supply application within SAP IBP provides capabilities for constraint-based supply planning, response management, and scenario simulation. These capabilities are directly relevant to adaptive resilience, enabling organizations to evaluate alternative responses to supply disruptions and to adjust plans rapidly as conditions change.

Scenario-based simulation and trade-off analysis represent particularly important capabilities for resilience. SAP IBP's what-if scenario tool enables the simulation of external conditions such as recessions or regulatory changes, internal policies such as shift changes or outsourcing, and system disruptions such as supply interruption (Al-Kindi, 2025). Scenarios can be tested on key performance indicators including resource utilization, lead times, profitability, and carbon emissions. Comparing multiple scenarios in overlays provides leadership with the information required to choose the most resilient path forward (Al-Kindi, 2025).

The platform's built-in analytics layer enables real-time visualization of trade-offs and performance figures, increasing transparency to facilitate executive-level decision-making (Al-Kindi, 2025). Collaboration features including Microsoft Excel add-ins, notifications, workflow approvals, and integrated machine learning functionality transform SAP IBP into a platform not only of planning but of strategic alignment of functions. These features are particularly valuable when linking long-term capacity planning with corporate financial planning, sales strategy, and sustainability objectives (Al-Kindi, 2025).

Research on long-term capacity optimization within SAP IBP identifies a systematic process for configuring the platform to support multi-year planning horizons. This process includes horizon definition, time profile creation, data model alignment, cross-functional integration, and scenario simulation (Al-Kindi, 2025). The framework emphasizes that strategic capacity decisions require inputs from multiple business functions, and SAP IBP supports this coordination through its S&OP module with real-time KPI monitoring, version management, and scenario comparison (Al-Kindi, 2025).

2.5 Inventory Optimization Capabilities

Inventory optimization represents a critical absorptive resilience capability, providing buffer stock that can sustain operations during supply interruptions. SAP IBP's Inventory application includes multi-stage inventory optimization, safety stock planning, and AI-assisted inventory analysis. The global inventory optimization capability determines optimal safety stock levels across the supply network, balancing service level targets against inventory carrying costs while considering demand and supply uncertainties (SAP, 2025b).

Research on safety stock optimization within SAP IBP environments reveals both the potential and the challenges of implementing systematic inventory optimization. A study of a Swedish food manufacturer that implemented SAP IBP's Inventory Optimizer module found that the company continued to rely on manual adjustments of safety stock levels based on staff experience, despite having the automated capability available (Jonasson and Blomborg, 2024). The researchers developed an alternative inventory model that demonstrated a forty-seven percent reduction in safety stock levels compared to current levels while meeting service level targets (Jonasson and Blomborg, 2024).

This finding highlights an important contingency in the relationship between SAP IBP capabilities and resilience outcomes: the presence of a capability does not guarantee its effective use. Organizational trust in system outputs, data quality, and the maturity of planning processes all condition whether capabilities translate into outcomes. The Swedish case suggests

that building confidence in system recommendations through benchmark validation may be a necessary step before organizations fully exploit the absorptive resilience potential of inventory optimization.

2.6 Supply Chain Control Tower and Visibility Capabilities

The Supply Chain Control Tower represents SAP IBP's capability for end-to-end supply chain visibility, real-time monitoring, alerting, and exception management (SAP, 2025a). These capabilities are particularly relevant to restorative resilience, enabling rapid detection of issues, tracking of their resolution, and application of standardized response procedures.

Research on supply chain control tower implementations demonstrates their potential for transforming operational paradigms from reactive firefighting to predictive intervention. A case study of Allegiant Air's control tower implementation, built on SAP Business Technology Platform and integrating SAP S/4HANA, Ariba Network, and Analytics Cloud, demonstrated substantial improvements in procurement cycle efficiency, supplier collaboration quality, and operational downtime reduction (Dameruppula, 2026). The control tower enabled proactive alerts for shipment delays and material shortages, transforming operational paradigms from reactive firefighting to predictive intervention (Dameruppula, 2026).

The architecture of the control tower solution established unified visibility across procurement, logistics, and inventory operations through event-driven automation and machine learning-powered forecasting capabilities (Dameruppula, 2026). Implementation followed a phased agile framework spanning discovery, development, pilot deployment, and performance evaluation. Key performance indicators documented improvement, with procurement response time reduced from an average of forty-eight hours to twenty-four hours, and operational downtime from parts unavailability reduced from one hundred hours per month to seventy hours per month (Dameruppula, 2026).

Research on control tower maturity suggests that organizations progress through stages of capability development, from basic visibility through predictive alerting to prescriptive recommendations (Dameruppula et al., 2024). More mature stages incorporate machine learning and artificial intelligence to develop smart alert capabilities, insights, and recommendations that support prioritization tasks and better mitigate possible disruptions. The technologies associated with these stages include IoT, cloud computing, blockchain, big data, and digital twins in earlier stages, with machine learning and artificial intelligence becoming more prominent in advanced stages (Dameruppula et al., 2024).

2.7 Organizational and Process Contingencies

The literature on SAP IBP implementation and integrated business planning consistently emphasizes that technology capabilities alone are insufficient to produce resilience outcomes. Organizational factors including collaboration, data governance, leadership engagement, and process standardization condition the translation of platform capabilities into resilience benefits.

A case study of Prometeon Tyre Group's SAP IBP implementation identified pre-IBP challenges including fragmented planning, inaccurate forecasts, and inefficient production scheduling (Abdelghani, 2025). The implementation of SAP IBP led to greater forecast accuracy, reduced inventory costs, enhanced decision-making agility, and improved real-time visibility. The research concluded that IBP's transformative potential in strengthening supply chain resilience, digital integration, and strategic execution depends on addressing both technological and organizational dimensions (Abdelghani, 2025).

Research on IBP maturity in the retail sector identified poor forecast accuracy, unreliable baseline forecasting models, and insufficient data integration as central challenges (Lund University, 2025). A persistent blame culture between departments and a lack of financial understanding among planners limit cross-functional collaboration and the ability to evaluate the financial impacts of planning decisions. Manual and non-standardized supply planning, including allocation decisions and capacity management, reduces efficiency and responsiveness. Fragmented systems across the supply network create significant data silos, require manual data uploads, and limit the effectiveness of planning tools (Lund University, 2025).

The research concluded that improving IBP maturity requires a diverse approach addressing three main improvement categories: technology and data infrastructure, behavioral and cultural shifts, and process standardization (Lund University, 2025). Recommendations included prioritizing the global rollout of planning systems, eliminating manual data integration, establishing a single source of truth, implementing a zero-bypass policy regarding demand plans, and integrating cross-functional processes to automate manual tasks.

A study of a new S&OP process implementation noted that both managers and employees stand to benefit from greater alignment, operational efficiency, and long-term strategic value, and that if implemented thoughtfully, the process can lead to a more resilient and agile planning environment (Jalonen, 2024). The research acknowledged that the long-term impacts of the process and supporting technologies such as SAP IBP remain uncertain and may evolve as the organization gains more experience (Jalonen, 2024).

2.8 Synthesis and Research Gap

The literature reviewed above reveals several important insights. Supply chain resilience is a multi-dimensional construct comprising anticipatory, absorptive, adaptive, and restorative capabilities that operate across temporal phases of disruption. Integrated business planning platforms, and SAP IBP specifically, provide functional capabilities that map onto these resilience dimensions. However, the relationship between platform capabilities and resilience outcomes is conditioned by organizational factors including data quality, process maturity, cross-functional collaboration, and leadership engagement.

A gap remains in the literature regarding the systematic articulation of the mechanisms through which SAP IBP capabilities translate into resilience outcomes. The existing literature tends to document either functional capabilities or implementation experiences, without connecting the two through a structured framework that identifies the specific mechanisms of resilience

enhancement. This research addresses that gap by developing a capability-resilience mapping framework and examining the evidence for resilience outcomes from SAP IBP adoption.

3. Methodology

3.1 Research Design

This study adopts a capability-mapping approach combined with qualitative case analysis. The capability-mapping component involves the systematic identification of SAP IBP functional capabilities and their association with resilience dimensions based on documented platform features and practitioner-oriented literature. The case analysis component examines organizational evidence of SAP IBP adoption for resilience-related purposes, drawing on publicly available customer accounts, implementation reports, and academic case studies.

The research design is exploratory and theory-building in nature, appropriate for a topic where systematic empirical research is limited. The objective is not to test hypotheses but to develop a structured framework that can guide future research and inform practice. The design follows an abductive logic, moving iteratively between conceptual framing from the resilience literature and empirical observation from the capability documentation and case evidence.

3.2 Data Sources

The primary data sources for this research are SAP official documentation, including product overviews, help documentation, and capability descriptions (SAP, 2025a; SAP, 2025b; SAP, 2026). These sources provide authoritative descriptions of SAP IBP functional capabilities and are used to construct the capability inventory that forms the basis of the mapping framework.

Secondary sources include academic theses and research papers on SAP IBP implementation and integrated business planning (Abdelghani, 2025; Al-Kindi, 2025; Lund University, 2025), practitioner-oriented analyses of SAP IBP capabilities (Sankaran et al., 2019; Lu, 2025), and published case studies of control tower implementations and supply chain transformations (Dameruppula, 2026; Dameruppula et al., 2024). These sources provide context regarding how capabilities are applied in practice and what outcomes organizations report.

The analysis also draws on the conceptual literature on supply chain resilience to define the resilience dimensions against which SAP IBP capabilities are mapped. This literature provides the theoretical structure that organizes the mapping analysis (Ali et al., 2017; Shi et al., 2024).

3.3 Analytical Procedure

The analysis proceeded in three stages. First, a comprehensive inventory of SAP IBP capabilities was compiled from the primary documentation sources. Capabilities were categorized by application area (Demand, Response and Supply, Inventory, S&OP, Supply Chain Control Tower) and by functional type (forecasting, optimization, simulation, visibility, collaboration).

Second, the resilience dimensions were operationalized based on the conceptual literature. Four dimensions were selected for analysis: anticipatory, absorptive, adaptive, and restorative.

These dimensions were selected because they correspond to distinct temporal phases of disruption management and because they provide a parsimonious yet comprehensive structure for organizing resilience capabilities (Ali et al., 2017).

Third, a mapping matrix was constructed associating each SAP IBP capability with one or more resilience dimensions. The mapping was based on the documented function of each capability and its logical relationship to resilience outcomes. For example, AI-based demand forecasting was mapped to anticipatory resilience because improved forecast accuracy enables earlier detection of demand shifts and more effective preparation.

3.4 Case Selection and Analysis

Case evidence was selected based on the availability of documented SAP IBP or control tower implementations with reported outcomes relevant to resilience. The cases examined include Ericsson's supply chain transformation, Prometeon Tyre Group's SAP IBP implementation, Allegiant Air's control tower deployment, and a Swedish food manufacturer's inventory optimization experience. These cases were selected to provide diversity in industry context, implementation scope, and resilience dimension emphasis.

Case analysis involved extracting reported outcomes, implementation challenges, and organizational contingencies from the available documentation. The analysis focused on identifying how specific capabilities were used, what outcomes were observed, and what factors conditioned the realization of resilience benefits.

3.5 Limitations

The methodology has limitations that should be acknowledged. The reliance on documented capabilities and publicly available case evidence rather than primary empirical data limits the depth of the findings. The mapping framework is conceptual and has not been validated through systematic empirical testing. The case evidence is limited to a small number of organizations and may emphasize positive outcomes due to publication bias.

4. Results

4.1 Capability Inventory

The analysis identified five primary application areas within SAP IBP, each containing specific capabilities relevant to resilience. The Demand application includes statistical forecasting, demand sensing, predictive analytics, and forecast consumption management. The Response and Supply application includes constraint-based supply planning, response management, source-of-supply modeling, and what-if scenario simulation. The Inventory application includes multi-stage inventory optimization, safety stock planning, service level optimization, and AI-assisted inventory analysis. The Sales and Operations application includes consensus demand planning, supply review, and financial integration. The Supply Chain Control Tower includes custom alerts, case management, procedure playbooks, and intelligent visibility (SAP, 2025a).

4.2 Resilience Dimension Mapping

The mapping analysis revealed distinct patterns of capability-dimension association.

For anticipatory resilience, the capabilities with the strongest associations are demand sensing, AI-based forecasting, scenario simulation, and predictive analytics. Demand sensing enables the detection of short-term demand shifts that may signal emerging disruptions. The integration of demand sensing with statistical models provides a baseline forecast that is adjusted based on real-time data, improving accuracy by twenty percent in reported cases (Lu, 2025). AI-based forecasting improves the accuracy of baseline demand predictions through machine learning algorithms that identify patterns and relationships not captured by traditional statistical methods (Immidi and Mane, 2025). Scenario simulation allows planners to model potential disruptions and develop contingency plans before disruptions occur (Al-Kindi, 2025).

For absorptive resilience, the capabilities with the strongest associations are multi-stage inventory optimization, safety stock planning, and strategic inventory buffering. Multi-stage inventory optimization determines optimal safety stock levels across the supply network, balancing service level targets against inventory carrying costs while considering demand and supply uncertainties (SAP, 2025b). The AI-assisted inventory analysis capability supports this by identifying the key drivers of safety stock values, enabling more informed inventory policy decisions. Research demonstrates that systematic safety stock optimization can reduce inventory levels by up to forty-seven percent while maintaining service level targets (Jonasson and Blomborg, 2024).

For adaptive resilience, the capabilities with the strongest associations are response management, source-of-supply modeling, and what-if simulation. Response management enables planners to evaluate alternative responses to supply disruptions, such as sourcing from alternative suppliers or reallocating inventory across locations. Source-of-supply modeling allows the representation of multiple sourcing options with different lead times, capacities, and costs, so that alternative sourcing scenarios can be rapidly evaluated during disruptions. What-if simulation supports adaptive response by allowing planners to compare the outcomes of different response strategies before committing to one (Al-Kindi, 2025).

For restorative resilience, the capabilities with the strongest associations are the Supply Chain Control Tower's alerting, case management, and procedure playbooks. Custom alerts identify critical supply chain issues such as inventory shortages, supply-demand imbalances, or unexpected changes. Case management facilitates the tracking and resolution of these issues. Procedure playbooks provide standardized guidance for resolving specific types of supply chain problems, enabling faster and more consistent recovery. The integration of financial planning with operational planning through the S&OP application also supports restorative resilience by enabling rapid assessment of the financial implications of recovery options. Research on control tower implementations demonstrates substantial improvements in procurement cycle efficiency, supplier collaboration quality, and operational downtime reduction (Dameruppula, 2026).

4.3 Case Evidence

The case evidence provides illustrative support for the mechanisms through which SAP IBP capabilities translate into resilience outcomes.

Ericsson described its pre-transformation state as characterized by siloed capabilities, fragmented processes, lack of a common master data model, and extensive reliance on manual spreadsheets. The transformation aimed to integrate demand, supply, inventory, and S&OP into a unified platform. Reported expectations included improved demand plan accuracy, better control, faster execution, and greater responsiveness to customer demands.

Prometeon Tyre Group's SAP IBP implementation addressed pre-IBP challenges including fragmented planning, inaccurate forecasts, and inefficient production scheduling. The implementation led to greater forecast accuracy, reduced inventory costs, enhanced decision-making agility, and improved real-time visibility (Abdelghani, 2025). The case demonstrates the transition from a planning environment with limited anticipatory and adaptive capability to one with substantially higher capability.

Allegiant Air's control tower implementation, built on SAP Business Technology Platform, integrated S/4HANA, Ariba Network, and Analytics Cloud to establish unified visibility across procurement, logistics, and inventory operations (Dameruppula, 2026). The solution enabled proactive alerts for shipment delays and material shortages, transforming operational paradigms from reactive firefighting to predictive intervention. Procurement response time was reduced by fifty percent, and operational downtime from parts unavailability was reduced by thirty percent (Dameruppula, 2026).

The Swedish food manufacturer case illustrates the contingency between capability availability and capability use. Despite implementing SAP IBP's Inventory Optimizer module, the company continued to rely on manual adjustments of safety stock levels based on staff experience (Jonasson and Blomborg, 2024). This finding highlights that the presence of a capability does not guarantee its effective use, and that organizational trust and process maturity condition the realization of resilience benefits.

4.4 Organizational Contingencies

The case evidence and implementation research consistently identify organizational factors that condition the translation of SAP IBP capabilities into resilience outcomes.

Data quality and integration represent a recurring challenge. Fragmented systems, inconsistent master data, and manual data uploads limit the effectiveness of planning tools (Lund University, 2025). The establishment of a single source of truth and the elimination of manual data integration are identified as critical enablers of planning maturity.

Cross-functional collaboration and leadership engagement are also critical. A persistent blame culture between departments and a lack of financial understanding among planners limit the ability to evaluate the financial impacts of planning decisions (Lund University, 2025). Recommendations include implementing a zero-bypass policy regarding demand plans, establishing an IBP governance council, and investing in training and onboarding programs.

Process standardization and maturity condition the effectiveness of platform capabilities. Research on IBP maturity identifies three improvement categories: technology and data infrastructure, behavioral and cultural shifts, and process standardization (Lund University, 2025). Organizations must address all three to realize the resilience potential of integrated business planning.

5. Discussion of Findings

5.1 Interpretation of Results

The mapping analysis demonstrates that SAP IBP capabilities are distributed across all four resilience dimensions, with particularly strong coverage of anticipatory and adaptive capabilities. This distribution aligns with the platform's design emphasis on advanced analytics, simulation, and response management. The capabilities most directly associated with absorptive resilience—inventory optimization and safety stock planning—are also well-developed, reflecting the platform's heritage in inventory planning.

The findings suggest that SAP IBP contributes to resilience through multiple mechanisms operating at different levels of the planning process. At the data level, the unified data model and master data consistency checks reduce the risk of planning errors arising from inconsistent or outdated information. At the analytical level, AI-based forecasting and optimization algorithms improve the quality of planning decisions. At the process level, integration across demand, supply, inventory, and S&OP enables coordinated response to disruptions. At the visibility level, the Supply Chain Control Tower provides real-time awareness of emerging issues and structured processes for their resolution.

This multi-level mechanism perspective is important because it suggests that the resilience benefits of SAP IBP are not attributable to any single capability but rather to the integration of capabilities into a coherent planning environment. Organizations that adopt SAP IBP but fail to integrate its capabilities—or that use it as a replacement for existing planning systems without transforming planning processes—may realize fewer resilience benefits than organizations that fully exploit the platform's integration potential. The Swedish food manufacturer case provides empirical support for this interpretation, demonstrating that the availability of an inventory optimization capability did not automatically lead to its effective use (Jonasson and Blomborg, 2024).

5.2 Relation to Existing Literature

The findings are broadly consistent with the conceptual literature on supply chain resilience, which emphasizes the importance of visibility, flexibility, collaboration, and redundancy as resilience-enabling factors. SAP IBP capabilities map onto these factors in the following ways: visibility is enabled by the Supply Chain Control Tower and the unified data model; flexibility is enabled by scenario simulation and response management; collaboration is enabled by the integrated S&OP process and the shared planning environment; and redundancy is enabled by inventory optimization and safety stock planning.

The findings also extend the literature by specifying the technological capabilities through which these resilience factors can be operationalized in practice. While the conceptual literature identifies what resilience requires (Ali et al., 2017; Shi et al., 2024), the SAP IBP capability mapping identifies how a specific technology platform can deliver those requirements. This specification is useful for both research and practice: for research, it provides a basis for operationalizing resilience constructs in studies of planning technology adoption; for practice, it provides a structured basis for capability assessment and investment prioritization.

The research contributes to the growing literature on AI integration with supply chain planning by demonstrating how machine learning capabilities within SAP IBP enhance specific resilience dimensions. The literature indicates that AI integration produces substantial reductions in forecast error and inventory carrying costs while improving risk mitigation (Immidi and Mane, 2025). The mapping framework developed in this research specifies which resilience dimensions benefit most from AI capabilities and through what mechanisms.

5.3 Implications for Practice

Several practical implications emerge from this research. First, organizations seeking to enhance resilience through SAP IBP should adopt a capability-oriented perspective, focusing not merely on implementing the platform but on developing the specific capabilities that map to their prioritized resilience dimensions. Organizations facing high demand volatility may prioritize demand sensing and AI-based forecasting; organizations facing supply network fragility may prioritize source-of-supply modeling and multi-stage inventory optimization.

Second, the integration of capabilities matters more than the capabilities themselves. SAP IBP's resilience value proposition rests substantially on the integration of demand, supply, inventory, and financial planning within a unified environment. Organizations should design their implementation to exploit this integration, avoiding the temptation to replicate pre-existing silos within the new platform.

Third, organizational factors including data quality, cross-functional collaboration, and leadership engagement are necessary conditions for realizing resilience benefits. The Swedish food manufacturer case demonstrates that capability availability does not guarantee capability use. Organizations should invest in data governance, change management, and training alongside technology implementation.

Fourth, the Supply Chain Control Tower capabilities deserve particular attention for restorative resilience. The ability to detect issues rapidly, track their resolution, and apply standardized procedures is critical for minimizing the duration and impact of disruptions. Organizations should invest in configuring alerts that are meaningful and actionable rather than overwhelming, and in developing procedure playbooks that codify organizational knowledge about disruption response.

5.4 Limitations and Future Research

This research has several limitations. The most significant is the reliance on documented platform capabilities and illustrative case evidence rather than systematic empirical data on

resilience outcomes. The mapping framework is conceptual and has not been validated through empirical testing. The case evidence is limited to a small number of organizations and is based on publicly available materials that may emphasize positive outcomes.

Future research should address these limitations through empirical studies that measure resilience outcomes before and after SAP IBP adoption, using appropriate control groups or longitudinal designs. Research should also examine the organizational and process factors that moderate the relationship between SAP IBP capabilities and resilience outcomes. Comparative studies across organizational contexts—different industries, different sizes, different supply chain configurations—would help identify the contingencies that condition the resilience benefits of SAP IBP. Finally, research should examine the specific mechanisms through which SAP IBP capabilities are used during actual disruptions, including the decision processes and organizational routines that translate planning capabilities into response actions.

6. Conclusion

This research has examined the relationship between SAP Integrated Business Planning capabilities and supply chain resilience. Through a systematic mapping of SAP IBP functional capabilities to the anticipatory, absorptive, adaptive, and restorative dimensions of resilience, the study has developed a framework that articulates the mechanisms through which the platform contributes to resilience outcomes.

The analysis identified four primary resilience-enhancing mechanisms. Anticipatory resilience is enhanced through demand sensing, AI-based forecasting, and scenario simulation, which improve the detection of emerging demand shifts and the preparation of contingency plans. Absorptive resilience is enhanced through multi-stage inventory optimization and safety stock planning, which establish buffer stocks that can sustain operations during supply interruptions. Adaptive resilience is enhanced through response management, source-of-supply modeling, and what-if simulation, which enable rapid evaluation and selection of response strategies. Restorative resilience is enhanced through control tower alerting, case management, and procedure playbooks, which facilitate rapid detection and resolution of supply chain issues.

These mechanisms operate through the integration of planning processes across functional domains and through the analytical capabilities embedded in the platform. The research contributes to the literature by specifying the technological capabilities through which integrated business planning platforms enable supply chain resilience, a connection that has been assumed but not systematically articulated. It contributes to practice by providing a framework that can inform SAP IBP configuration decisions and resilience-focused planning strategies.

The limitations of the research point toward a program of empirical work that would validate and extend the conceptual framework developed here. As supply chains continue to face volatile and uncertain conditions, the ability to anticipate disruptions, absorb their impacts, adapt plans rapidly, and restore operations efficiently will remain a critical organizational capability. Understanding how integrated planning platforms such as SAP IBP contribute to this capability is therefore of continuing theoretical and practical importance.

References

1. Abdelghani, M. (2025). *IBP implementation in supply chain planning: Prometeon Tyre Group case study* [Master's thesis]. Politecnico di Milano.
2. Al-Kindi, T. (2025). Framework for long-term capacity optimization in SAP IBP. *Journal of Business and Management Studies*, 7(4), 273–280.
3. Ali, A., Mahfouz, A., & Arisha, A. (2017). Analysing supply chain resilience: Integrating the constructs in a concept mapping framework via a systematic literature review. *Supply Chain Management: An International Journal*, 22(1), 16–39.
4. Chenna, K. (2024). Revolutionizing Supply Chain: The Synergy of Warehouse Management and Data Analytics. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 10(6), 122-131. <https://doi.org/10.32628/CSEIT24106164>
5. Chenna, K. (2026). Exploring the transition from hexagon (HxGN) enterprise asset management (EAM) to SAP EAM: Cost benefits, operational efficiencies, and real-world applications. *The International Journal of Advanced Manufacturing Technology*, 143(1), 193-212.
6. Chenna, K. S. (2026). Autonomous Quality Release Decisioning Using SAP QM, Computer Vision, and Warehouse Event Correlation. *International Journal of Computer Information Systems and Industrial Management Applications*, 18(17s), 344-355.
7. Chenna, K. (2024). Hyper Automation in SAP Production Planning. *INTERNATIONAL JOURNAL OF COMPUTER ENGINEERING AND TECHNOLOGY (IJCET)*, 15(5), 505-513. <https://doi.org/10.5281/zenodo.13850946>
8. Dameruppula, S. (2026). Digital transformation of aviation supply chains: An SAP-based control tower implementation framework. *International Journal of Computational and Experimental Science and Engineering*, 12(1), 624–634.
9. Immidi, K., & Mane, S. (2025). Integration of artificial intelligence with SAP Integrated Business Planning (IBP): A technical analysis of implementation success and performance metrics across industries. *International Journal of Engineering Research & Technology*, 14(2).
10. Jalonen, W. (2024). *Optimising S&OP: A case study of implementation of S&OP on supply planning in the case company X* [Master's thesis]. LUT University.
11. Jonasson, K., & Blomborg, E. (2024). *Optimizing finished goods safety stock levels at a Swedish food company* [Master's thesis]. Lund University.

12. KarthikSai Chenna, Hyper Automation in SAP Production Planning, *International Journal of Computer Engineering and Technology (IJCET)*, 15(5), 2024, pp. 505-513.
13. Li, N., Miskon, S., Jamal, N. M., Yue, S., & Zhang, Q. (2024). Supply chain control towers: A systematic literature review. *International Journal of Academic Research in Business and Social Sciences*, 14(12), 2015–2028.
14. Lu, P. (2025). Technological exploration and case analysis of using SAP IBP's demand sensing and statistical model for demand forecasting, inventory reduction, and supply chain improvement. *TechRxiv*.
15. Lund University. (2025). *Improving IBP maturity in the retail sector*. Lund University Publications.
16. Sankaran, G., Sasso, F., Kepczynski, R., & Chiaraviglio, A. (2019). Improving short-term forecast with demand sensing. In *Improving forecasts with Integrated Business Planning* (pp. 363–385). Springer.
17. SAP. (2025a). *SAP Integrated Business Planning*.
18. SAP. (2025b). *Global (multi-stage) inventory optimization*.
19. SAP. (2026). *SAP Integrated Business Planning: Applications and features*.
20. Shi, X., Liu, W., & Lim, M. K. (2024). Supply chain resilience: New challenges and opportunities. *International Journal of Logistics Research and Applications*, 27(12), 2485–2512.
21. Soundarapandian, D. (2026). SAP IBP vs custom AI planning engines: A comparative performance study. *Journal of Data Science and Information Technology*.