Chapter 8
Cognitive Integrated Business Planning

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ABSTRACT

Supply chains of the 21st century are becoming exponentially more complex due to increased mergers and acquisitions, the omni-channel conflict, direct-to-consumer, rapid proliferation of product configurations, same-day delivery, the recall management problem, shrinking product lifecycles, and market volatility. Moreover, today’s consumers are increasingly demanding a personalized, consistent, and seamless experience across retail, online, and mobile. To be able to serve this diverse spectrum of customers, products, markets, and channels and at the same time do so in a win-win profitable manner, organizations need a cognitive integrated business planning process, which has the ability to act with speed, agility, responsiveness, and flexibility, leveraging machine learning and artificial intelligence for predictive and prescriptive analytics, thereby enabling organizations to realign their plans quickly through an always-on, self-learning, and autonomous integrated business planning process.

INTRODUCTION

Following the industrial revolution, over the last 35 years the supply chain has gone through a linear evolution process, spanning material requirements planning (MRP), manufacturing resource planning (MRP II), distribution requirements planning (DRP), lean, vendor managed inventory (VMI), collaborative planning, forecasting and replenishment (CPFR), and business-unit sales and operations planning (S&OP). These improvements were successful and appropriate as supply chains evolved, but companies today are operating in a new world. The very backbone of the supply chain has been shaken by the digital revolution, which is characterized by innovations such as the Internet of Things (IoT), social, news, events, and weather (SNEW) data, 3D printing, quantum computing, robotics, demand sensing, artificial intelligence (AI), machine learning (ML), and neural networks, among other things.
Supply chains of the 21st century are becoming exponentially more complex due to increased mergers and acquisitions, omni-channel conflict, direct-to-consumer channels, rapid proliferation of product configurations, same-day delivery requirements, the recall management problem, shrinking product lifecycles, and market volatility. The outsourcing and globalization culture has resulted in an explosion of the number of supply chain nodes, creating a multi-dimensional supply grid that represents a highly diversified and complex network of connection points in terms of physical assets, processes and stakeholders. The globalization culture of buy anywhere, make anywhere and sell anywhere has its benefits in terms of sourcing the best materials from across the globe, producing them at the cheapest locations and then distributing them to consumers across the world. However, globalization brings with it negative effects such as increased risk associated with natural calamities, labor unrest, tariffs, currency fluctuations, geo-political situations, litigation and trade sanctions. As a result, there is huge pressure to reduce supply chain risks, and the risk of business disruption or failure increasingly worries global firms. Current political, environmental and economic events like tariffs, Brexit, trade wars, flooding in Thailand, and the geopolitical instability in the Middle East have exposed the shortcomings of globalization. Donald Allan, chief financial officer at tool maker Stanley Black & Decker Inc., said the uncertainty surrounding tariffs and trade in the U.S. and globally has roughly doubled the time he spends on contingency planning. (Ezequiel Minaya, Tatyana Shumsky and Nina Trentmann, 2017)

Moreover, today’s consumers are increasingly demanding a personalized, consistent and seamless experience across retail, online and mobile. To be able to serve this diverse spectrum of customers, products, markets and channels, and at the same time do so in a win-win profitable manner, organizations need a cognitive integrated business planning (IBP) process that has the ability to act with speed, agility, responsiveness and flexibility, leveraging ML and AI for predictive and prescriptive analytics, thereby enabling organizations to realign their plans quickly through a continuous closed-loop replanning process. AI and ML have become an integral part of our lives whether we know it or not; personalized product recommendations from Amazon, movie recommendations from Netflix, personalized news feeds from Google, and social network recommendations from LinkedIn or Facebook are all examples of AI and ML. AI and ML help people understand the patterns behind the data – because AI and ML now transcend human computational intelligence across many fields – and leverage those insights to redefine and reimagine an organizations’ demand planning, master planning, inventory planning and IBP processes for competitive advantage. By storing the efficacy of planners’ historical actions, prescriptive and predictive analytics can proactively automate and improve recommended actions in the future. Companies also need exception management capabilities, which will allow organizations to prioritize responses to current and predicted disruptions based on severity and impact, as well as run what-if scenario analysis using real-time insights to better understand trade-offs. Real-time collaboration with trading partners will help organizations resolve exceptions and execute decisions across the supply chain and extended network. Thus, cognitive IBP is infused with AI, which can analyze existing supply chain strategies and data to learn what factors lead to supply chain failures. This knowledge is used to predict future supply chain problems and proactively prescribe or autonomously execute resolutions. This will help organizations make faster and better decisions, which will drive superior customer experiences and significant competitive advantage.