IDC
ANALYZE THE FUTURE

It is the view of IDC that the best supply chains will be those that have the ability to quickly analyze large amounts of disparate data and disseminate business insights to decision makers in real time or close to real time. Businesses that consistently fail to do this will find themselves at an increasing competitive disadvantage.

Unlock the Value of Your Supply Chain Through Embedded Analytics

EXECUTIVE SUMMARY

Organizations worldwide are facing unique changes and are subject to unprecedented challenges in their marketplace: The current economic environment is forcing them to optimize processes and contain costs while the extensive availability of data is empowering the market and making businesses and consumers increasingly knowledgeable about products, prices, and other key features.

- Today's data availability, however, is both a potential issue and a great opportunity for global businesses. In fact, data ubiquity is helping manufacturers, retailers, and logistics companies, for example, foster an integrated decision-making environment supporting real-time, information-based business networks. New IT architectures enabled by big data, Internet of Things (IoT), cloud computing, and other technologies are helping optimize a fast-changing business environment with common real-time data, workflow, and alerting capabilities. Business success will be centered around the timely and effective analysis of the large data sets generated by business and sensor networks and the ways in which organizational insights are used to assess and affect potential impacts and risks to their business.

- It is the view of IDC that the best supply chains will be those that have the ability to quickly analyze large amounts of disparate data and disseminate business insights to decision makers in real time or close to real time. Businesses that consistently fail to do this will find themselves at an increasing competitive disadvantage and locked into a reactionary cycle of firefighting. Analytics really will contribute to the backbone of future supply chains.

IDC
ANALYZE THE FUTURE

CURRENT SITUATION

Today, companies across a broad range of industries are facing three main challenges:

Digital Transformation (DX) is the approach by which enterprises drive changes in their business models and ecosystems by leveraging digital competencies.

- **Slower and more diversified markets.** Most recent economic evidence highlights that there is no single source of growth in today's economies. Growth rates are modest everywhere, even in previously booming emerging markets. This makes betting on a single market or geography a very risky approach. As such, companies looking for stable and steady revenue growth need to have a very diversified approach. This requires a reshuffling of product strategies and forces all organizations to participate in complex and dynamic business networks.

- **Demanding customers.** Modern "connected" customers, whether B2B or B2C, expect and dictate increasing levels of service, forcing business cycles to compress in order to meet requirements related to speed, traceability, transparency, and brand reputation. Supply chain mistakes are as expensive as ever, and there is less and less room for process fine-tuning.

- **Technology advancements.** Today, the Internet of Things (IoT) is transforming the way business processes are run, making them more instrumented, interconnected, and intelligent. Ubiquitous connectivity and pervasive integration foster the opportunity for operational technology, IT, and communications technology interplay, making data and information from every source a central pivot to process execution. As such, operators in all industries are looking for the truth in data as they seek valuable analysis of the volume, velocity, and variety of their data.

These issues are amplified by the lack of control many companies have over their operations.

The growing availability of trusted third-party logistics (3PL) providers that are often better than their clients, such as manufacturers and retailers themselves, at dealing with the complexity of today's transportation, factory, and warehouse management has made operations outsourcing a more viable option across a broader range of dimensions. As such, companies rely more and more on external partners for business success. Companies increasingly contribute to a shared process rather than owning a process.

Recent IDC research (see Figure 1) highlights that while there is still progress to be made with regard to internal collaboration, external upstream collaboration with

suppliers is becoming a major focus, and there are clear opportunities to improve communication, visibility, and business alignment.

Fewer respondents said "downstream with customers" in part because most businesses have already invested in downstream collaboration and it is more mature and because supply disruptions have become more prevalent in recent years.
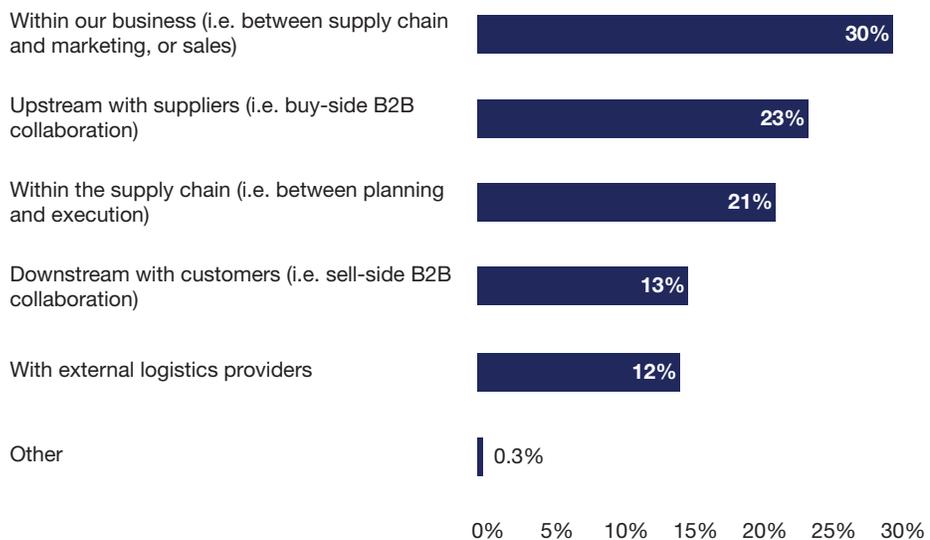
In discussing the topic of intercompany collaboration with supply chain leaders, we identified three clear priorities:

- Improve customer service

- Reduce cost of relationship

- Develop more strategic relationships (i.e., partner of choice)

The focus clearly is on service and cost, but it's interesting that many organizations are also looking for a more strategic dialog with key suppliers.

FIGURE 1 Business Collaboration

Q   From a business collaboration perspective, what will be the key area of focus in the supply chain?

Within our business (i.e. between supply chain and marketing, or sales)	30%
Upstream with suppliers (i.e. buy-side B2B collaboration)	23%
Within the supply chain (i.e. between planning and execution)	21%
Downstream with customers (i.e. sell-side B2B collaboration)	13%
With external logistics providers	12%
Other	0.3%

0%   5%   10%   15%   20%   25%   30%

n = 299
Source: IDC Manufacturing Insights' Supply Chain Survey, 2014

Not being able to understand volatile demand signals and rapidly incorporate them into supply chain management processes leads to higher inventories of unsold products and sudden and often protracted product shortages. But volatile market demand is the "new normal," and the problem is only likely to worsen in the near

future. This requires a completely different management approach and use of tools than traditional, linear supply chains.

As such, companies are restructuring their supply chains to allow them to be quickly reconfigured depending on the order volumes and geographic source of demand. At the same time, operators try to take fixed costs out of the network so that the supply chain profitably operates regardless of demand level. This cost focus is particularly high when serving emerging economies where demand is much less predictable.

Based on a comparison of costs and risks, supply chains are increasingly having to blend offshoring, nearshoring, and local or in-house manufacturing. The design is more and more influenced by supply chain risk officers whose role is to assess and mitigate the risks listed previously. In addition, new models are emerging, such as shared capacity and collaboration innovation. These new models are creating far more responsive, resilient, and dynamic fulfillment networks but only for companies that actively tackle the dynamic of supply chain collaboration.

The inherent complexity of these blended, collaborative operational models means that visibility into information and the use of comprehensive analytics capabilities are critical enablers of success — in terms of both controlling current operations and better understanding future opportunities. A useful way of looking at this is in the emerging notion of volatility, uncertainty, complexity, and ambiguity (VUCA).

The Concept of VUCA

This complex market context can be easily exemplified by leveraging the widely recognized VUCA framework. This concept, born — probably not by chance — in the military field, has been rapidly adopted by business leaders to highlight and assess the state of any given business situation. It leverages four foundational concepts: Volatility, Uncertainty, Complexity, and Ambiguity. For the purpose of this document, IDC ranks these four items on the basis of how a decision maker understands their underlying business drivers, the mechanisms that drive decision-making performance, and their probability, as shown in Figure 2:

- **Volatility:** This describes a situation in which the mechanism of a contextual event is known, as well as the fact that this event will happen, sooner or later. The only unknown variable is when. Volatility describes a situation in which a sudden raw material price or currency fluctuation may impact the final product's price and, subsequently, demand for the product.

- **Uncertainty:** An uncertain situation happens when there is an expectation of an event yet the timing is unclear, which paralyzes the decision making.

Typical examples can be found in situations when looming elections undermine economic confidence or when the market expects a regulation to be issued yet the time frame is unclear.

- **Complexity:** When there is no agreement on the root cause effect of a given decision, the situation is complex. Companies working into scattered and diversified business networks are facing this major problem. This happens because no player in the network has full visibility over the network structure and as such cannot predict what impact a change in a node will have on the broader network. Another example could be a manufacturing company figuring out the impact on product quality when changing from one supplier to another.

- **Ambiguity:** This is the most complex situation — where the unknown is unknown. This is the typical situation of a company experimenting with a new business model, releasing a very innovative product, or entering a virgin geography.

FIGURE 2 Classic VUCA
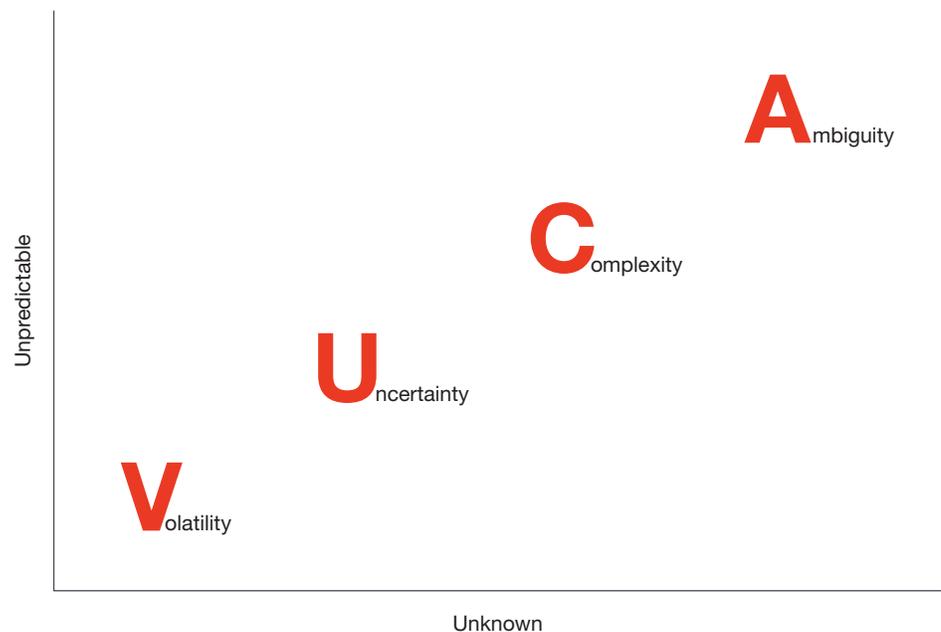
Source: IDC Manufacturing Insights, 2017

Making effective and sound decisions in a volatile, uncertain, complex, and ambiguous scenario is certainly a daunting task. While business instinct will always have a place in the decision-making process, the reality is that data exists somewhere to facilitate just about every decision — you just have to find it and share it! We have

had more than a few conversations with end users who noted a particular business problem could have been averted if "we had only known what someone, somewhere in the business knew." And it is not just about what a business knows versus what a business doesn't know — it is also about making information available to critical decision makers when and how they need it. Certainly, the notion of big data is in play here, but so is collaboration. Central to the notion of increasing "supply chain" intelligence is the ability to leverage the insights from advanced analytics to enable collaboration with internal or external colleagues around common information. Put another way, it's about expanding the notion of supply chain intelligence to include things previously unknown.

This concept becomes particularly relevant when thinking about intercompany collaboration, particularly as companies continue to outsource capabilities to external partners. What may have been an internal collaboration one year can well be an external collaboration the next. As such, this transformation is driving the adoption of analytics-centric technologies that help improve cross-enterprise decision making through shared business processes such as sales and operations planning facilitated across modern, often cloud-based, business networks. Today, many companies are investing in rejuvenating their B2B/EDI applications for just this reason. In the past, many companies invested in B2B technologies just to comply with external requirements, and they were not seeing a specific return on that investment. However, they are striving to improve supply chain integration, and this is where B2B integration is expected to bring more value in the end.

FUTURE DEVELOPMENTS

IDC expects that analytics-driven business networks will become increasingly pervasive in worldwide economies. For example, IDC anticipates that more than 80% of manufacturers will be actively employing commerce networks in their supply chains to facilitate demand, supply, and the development of new products by the end of 2016, with further progress made in 2017 and beyond. Indeed, it is our view that more than anything else, analytics-centric business networks will transform the way supply chains conduct their business (see Figure 3) in terms of meeting the business' requirement for both speed and higher-quality business decisions.

FIGURE 3 Business Networks
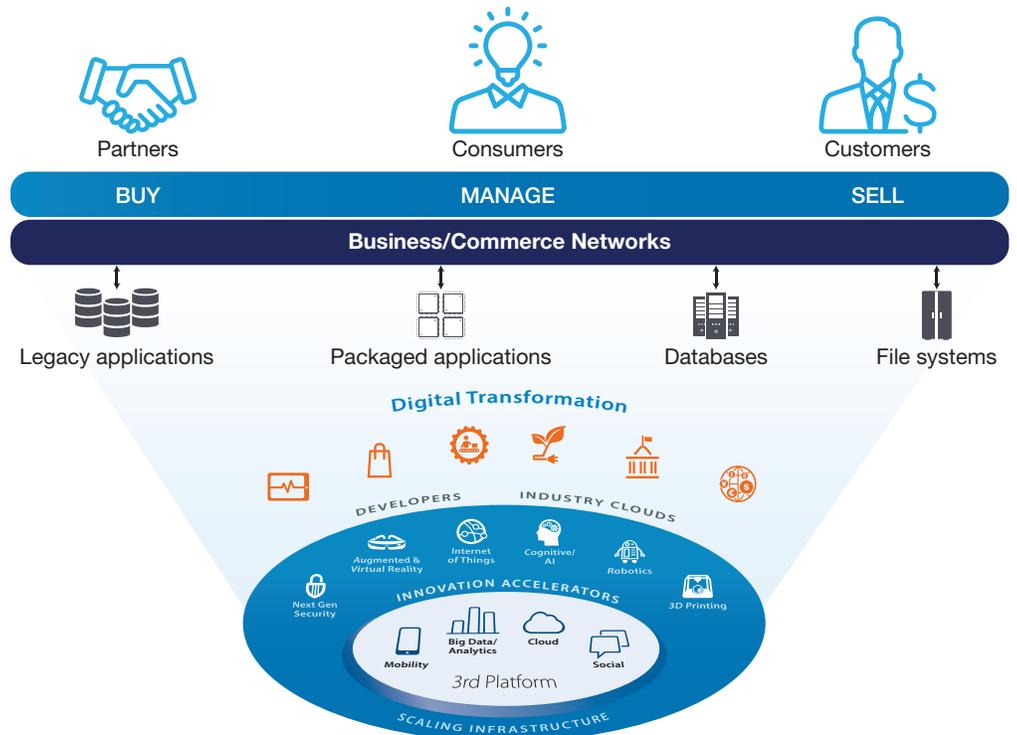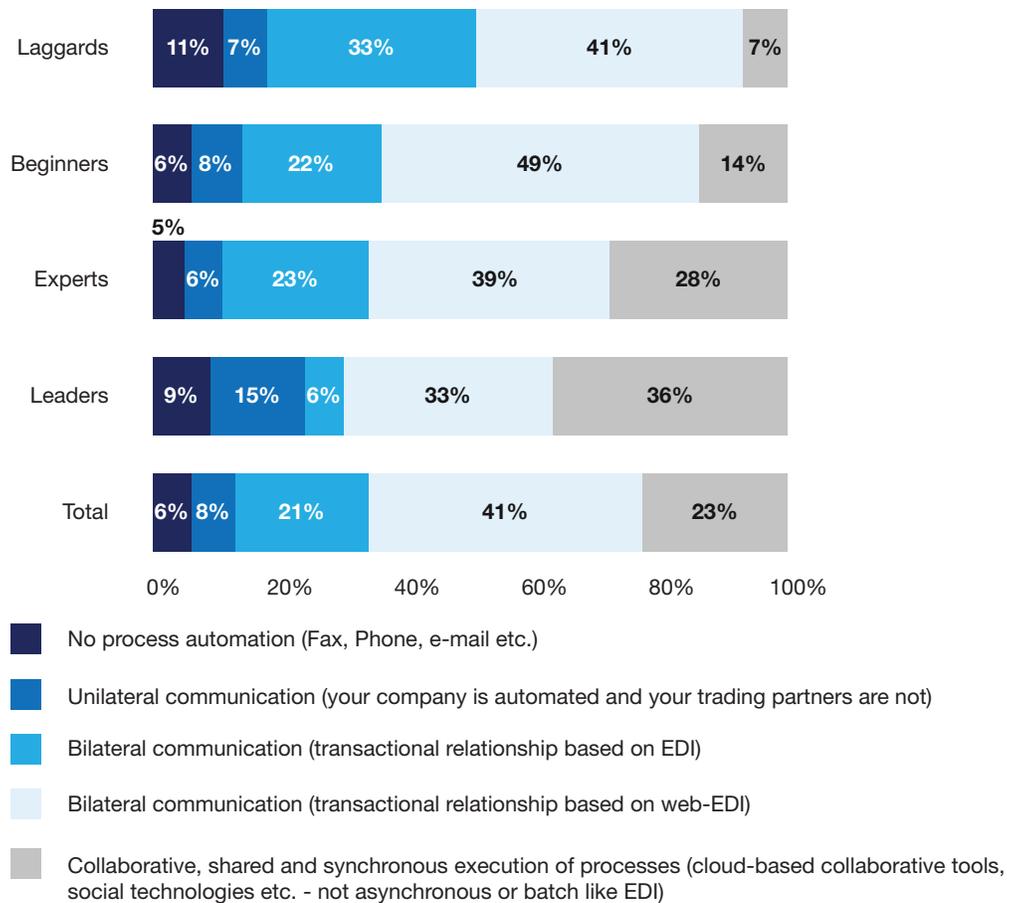

Source: IDC Manufacturing Insights, 2017

The notion of a network is not new, clearly, but in its modern incarnation, the network is characterized by very large data sets and extreme granularity of that data and is enabled by advanced technologies such as cloud and advanced analytics to finally fulfill the long-aspired vision. Indeed to comply with the speed of today's market, companies need to continuously share information with all of their trading partners. Information exchange among trading partners is — by its own definition — a mutual and collaborative process. About 70% of surveyed companies understand there is no space for informal, unstructured information exchange processes or, at the opposite extreme, processes that are too hierarchical. Manufacturers understand that the volume of real-time information will continue to rise. Today, only about 38% of companies exchange information with all trading partners, but by 2018, almost half of the respondents will need to manage a continuous and collaborative — and consequently very complex — flow of information across their value chains. However, failure to manage the information flow results in poor industry performance. For example, in manufacturing, a major pain point for decision makers is in optimizing inventories. Decision makers typically end up buffering out of stocks by overforecasting; however, this creates a serious problem of excess working capital, with a corresponding threat to financial stability. At the same time, underforecasting

is not an option because securing customer service is a key strategy for most manufacturers. This is especially true for consumer-oriented industries because being off the shelf for just a few days can cost them sales in the short term and customers in the long term.

On the other end, IDC research shows that companies using information to run their process experience superior business results because of higher coordination capability. In a recent study (see Figure 4), IDC demonstrated that improved coordination and better information sharing can bring real benefits to companies; an analysis of supply chain metrics shows that evolving the B2B process significantly impacts business performance regardless of the industry. In particular, metrics such as customer order delivery time, perfect order, inventory turnover, time to market, new product launch failures, cash-to-cash cycle, days of sales outstanding, and invoice processing time are all positively impacted by a more mature approach to B2B that entails more collaborative processes supported by modern technology.

FIGURE 4 B2B as a Performance Enabler

Q   Which tool is your company currently using to exchange information with your trading partners?

Legend:
- No process automation (Fax, Phone, e-mail etc.)
- Unilateral communication (your company is automated and your trading partners are not)
- Bilateral communication (transactional relationship based on EDI)
- Bilateral communication (transactional relationship based on web-EDI)
- Collaborative, shared and synchronous execution of processes (cloud-based collaborative tools, social technologies etc. - not asynchronous or batch like EDI)

Source: IDC Manufacturing Insights, 2015

In fact, in a supply chain survey conducted in early 2016, manufacturers cited a high correlation between above-average or best-in-class analytics with a range of business benefits. Reduced costs and improved service performance are the most commonly cited benefits to better analytics, with over 60% of respondents indicating they've seen both benefits from better analytics. More than half also cited improved productivity as a direct benefit.

The Role of IT: Extract Value from Data

At IDC, we have articulated a vision for the future of the supply chain in *Business Strategy: The Evolution of Manufacturing Supply Chains — Networked, Collaborative, and Transparent* (IDC Manufacturing Insights #MI255229, April 2015). We will not repeat that research in this document other than to suggest that the essence of where we believe supply chains will go (or must go) involves business process and structural change as well as the adoption of modern technologies to facilitate that change and enable new capabilities in speed, efficiency, and effectiveness.

Indeed, IDC's 3rd Platform technologies (IoT, data and analytics, cloud, and mobile technologies) are essential enablers, and we see them as complementary parts to the future of business networks. Figure 5 suggests how this interaction of technologies might work for the network, with data generation from any source (both internal and external to the manufacturer), comprehensive and fast analysis, and then ubiquitous consumption (initially with on-premise access as significant but declining over time). To provide an idea of this transformation size, we can say that IDC projects that by 2018, one-third of all industry leaders will find their business disrupted by a 3rd Platform competitor.

It's also important to understand that data, and the resulting business decisions, exists at different levels within the organization. At one end, there are operational decisions, conducted thousands of times per day based on operational data and associated analytics; at the other end, there are strategic business decisions conducted perhaps just a few times per day based on business data and analytics. Both have a critical role in steering and optimizing the business and in ensuring that it is on strategic course. With regard to the notion of business "value," both operational and business analytics are equally important for a successful enterprise.

FIGURE 5 3rd Platform Interplay for the Supply Chain
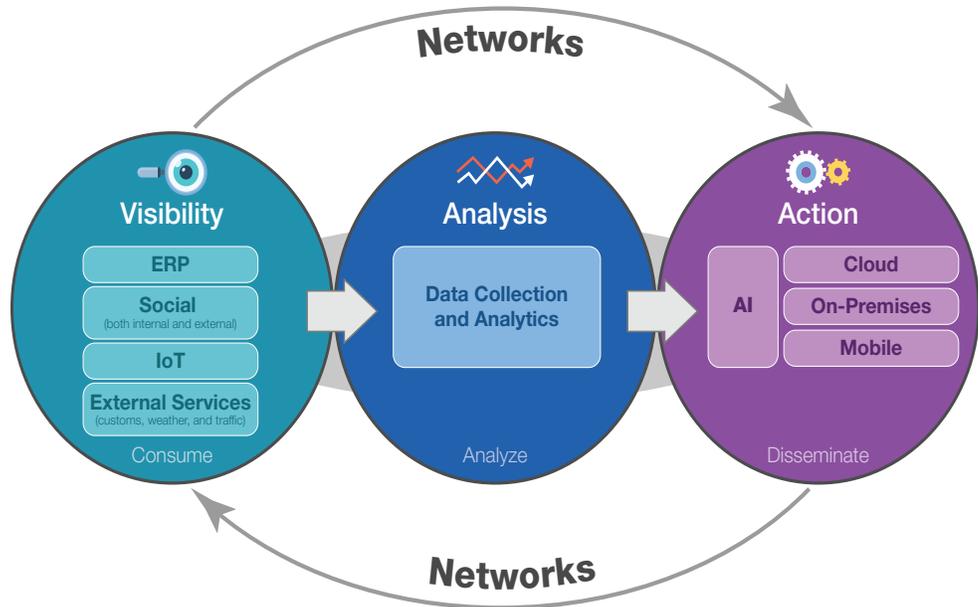
Source: IDC Manufacturing Insights, 2017

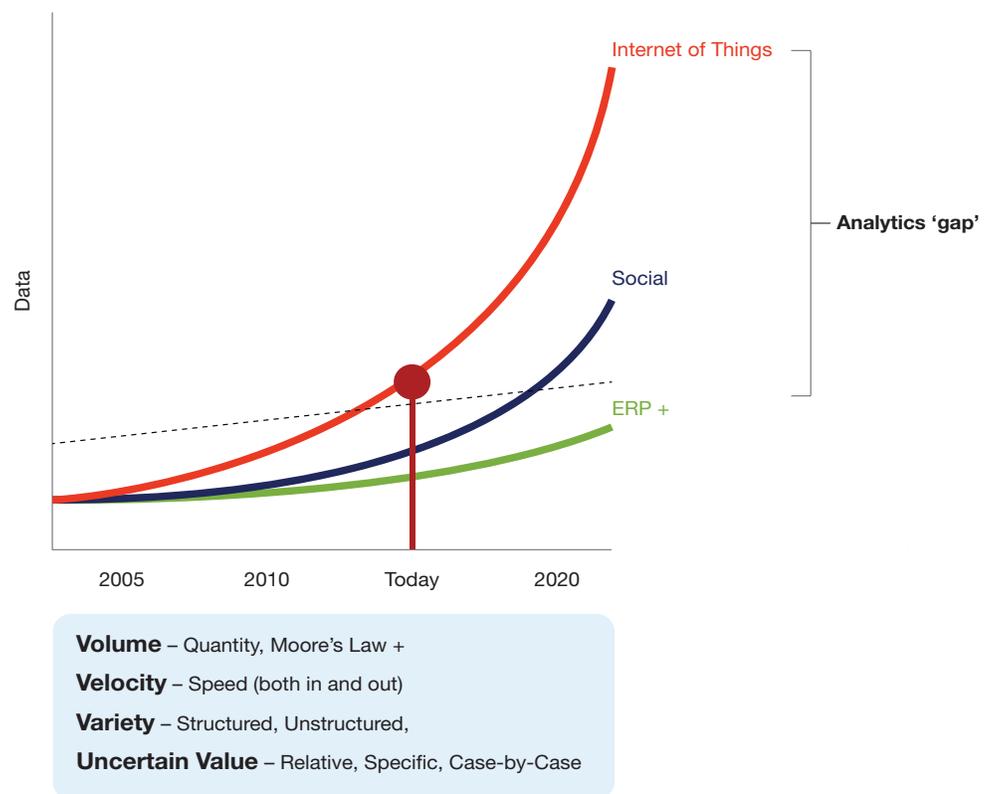## How Are 3rd Platform Technologies Relevant to Support Companies in Managing VUCA?

In an interview article published in The Paris Review in 1964, Pablo Picasso referred to the enormous new mechanical brains or calculating machines that were coming into existence at that time in this way: "They are useless. They can only give you answers." This is becoming truer than ever. Today, for the first time in history, technology power far exceeds the capabilities of business processes to keep pace. Companies are overwhelmed by a data deluge and are struggling to understand which information would be meaningful to their business targets. Information per se has no meaning if it is not put in the right business context.

If one thinks about the varied, and evolving, sources of business-relevant data and the increasingly flexible ways in which this data can be viewed and consumed, the central role for advanced analytics really moves to the forefront. In a number of conversations that we have had with manufacturers, it's not the big in "big data" that really worries them necessarily; it's the inability of analytical capabilities to keep up, thus driving an "analytics gap," as illustrated in Figure 6. If we think about the previously introduced notions of the modern B2B network and the blended, collaborative supply chain, the risk of missing something grows exponentially.

Whether a future factory where all machines are continuously and comprehensively monitored via sensors or a B2B supplier network where transactional/financial data is collaboratively exchanged, it's not enough to just "sample" the data — advanced analytics must also be comprehensively applied.

At the end of the day, all of the modern 3rd Platform technologies are in the service of solving business problems. In the case of advanced analytics, it is all about generating business value in a way that older capabilities simply cannot keep pace with. The reality for most of the big data/advanced analytics projects is that so much is changing (in terms of both technology and available data) that the implementations evolve rapidly over time.

FIGURE 6 The Analytics Gap

Volume – Quantity, Moore's Law +
Velocity – Speed (both in and out)
Variety – Structured, Unstructured,
Uncertain Value – Relative, Specific, Case-by-Case

Source: IDC Manufacturing Insights, 2017

We see many examples of companies either using advanced analytics to address their business problem or exploring ways to do so moving into the future. Moreover, companies realize that the key capability to manage today's VUCA is to be able to effectively delegate important decisions to line-of-business people at the edge of the organization. On the other side, the risk of this strategy is having too many individual decision makers to loosen the core company strategy. In most of the

cases, poor visibility into downstream processes or lack of understanding of the strategic, business-level goals achievable by decisions made in the proper context causes problems when put in the broader context. Even optimal decisions — when considered within a specific business unit, geography, or subject matter — may ultimately threaten the ability of a downstream group to achieve its targets and sometimes negatively impact them.

Avoiding unwanted complications along the business network requires rapid access to and sharing of data regardless of source, format, or location. Companies need to consolidate heterogeneous data into actionable information and deliver it to the most relevant person in an intuitive and consumable format through appropriate devices. This is where companies can really extract true value from the data their process creates.

One of the key barriers users face in this process is the tremendous waste generated in the creation, sharing, and analysis of the information. All too often, the need to hand the raw information created in the process to a data scientist for analysis hampers the timeliness — and therefore the effectiveness — of the information. This is why IDC believes that the key differentiator for any analytics application will be to have its engine embedded within the business process and transaction flow. Applications powered by embedded analytics enable users to gain better insight into a particular transaction, identify and resolve any issues, and then take the necessary corrective actions. When deployed along a business network, these capabilities can help companies collaborate more closely with their most relevant supplier and customers and mitigate business risk by skimming underperforming or overperforming partners. Business networks will gradually become ecosystems based on deep partnerships and a shared value generation process. The more the data and information feed the process, the more advanced and adaptable analytics will be needed. In the future, to fully manage these self-forming and changing processes, users will even have to be able to create and self-service their own business metrics on the fly.

As such, the maturity of business networks will evolve from pure transaction exchange and enterprise integration to offering deeper supply chain intelligence and improved collaboration among trading partners. Increased use of supply chain analytics will contribute to this maturity process (see Figure 7). Users will see traditional KPIs and metrics, such as ASN timeliness, invoice accuracy, and price variance, from a completely new perspective provided by the capability of comparing a transaction against the broader enterprise situation. As such, users may find out that the invoice accuracy of their business units is significantly differing from that

of the broader company, that a specific supplier is affected by an abnormal price variance, or that an individual customer is in the top percentile of the company footprint with regard to the quantities ordered for a specific product.

FIGURE 7 Information Exchange
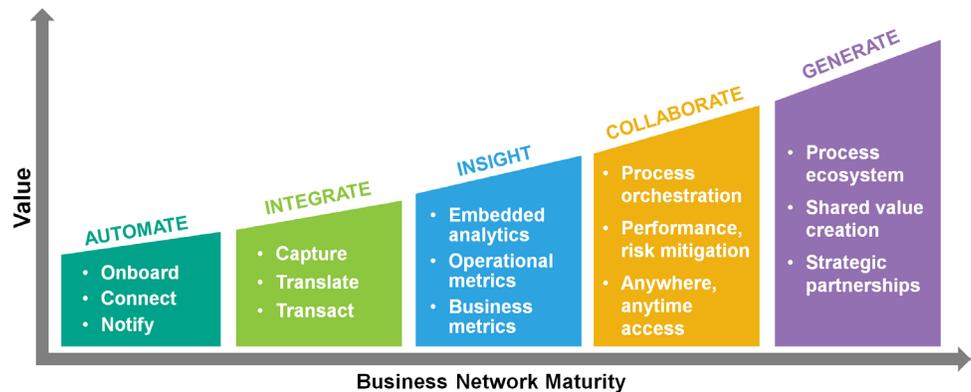
Source: OpenText, 2017

An Overview of Big Data Analytics Investment in Global Supply Chains

A recent research study conducted by IDC and sponsored by OpenText (Digital Transformation Drives Supply Chain Restructuring Imperative, April 2017) provided a wealth of data and insight for both digital transformation (DX) and supply chain restructuring. The study provided five key findings:

- DX is progressing rapidly, although adoption varies significantly by industry segment and country.

- Supply chain restructuring follows digital transformation.

- The highest maturity of new technologies is in cloud, analytics, and B2B.

- The IoT and cognitive analytics are the most interesting, emerging new technologies.

- Most companies — 66% — are considering outsourcing B2B infrastructure and capability; this investment could support faster and more agile digital transformation.

The survey that underpins the study, *IDC's Digital Transformation in the Supply Chain Survey*, was conducted in the fourth quarter of 2016 and included 254 respondents from manufacturing, retail, and consumer products across three company size ranges in seven countries.

In the survey, we asked respondents about a broad range of different digital technologies and where they stood in terms of both current and expected future adoption. Big data analytics, B2B cloud networks, and cloud in general are clearly already mainstream, and companies have both discovered resulting efficiencies and identified new ways of working. We will certainly see new capabilities in these areas, but adoption is already beyond the early adopter phase. In fact, 37% of discrete manufacturers and 31% of high-tech manufacturers indicate that big data analytics is in full use across their supply chain.

Slightly more than 60% of interviewed companies were looking at improved productivity because of big data analytics investments, and a similar share of companies declared this benefit was reached after the investment. Further investments are needed today to improve business performance (42% of companies highlighted this point) and in the future to enable new business capabilities (29%).

All in all, big data analytics appears to be the foundation of the "productivity machine" in the supply chain and an essential tool to prepare for new business models.

Reimagining VUCA

The ability to extract insight through advanced analytics and drive collaborative decision making is invaluable for the business because users can gain a better perspective of their current capabilities as well as adjust their strategies more quickly and effectively.

Indeed, IDC believes that leveraging a more connected, information-centric, and synchronized business network will enable companies to reimagine the very concept of VUCA, as illustrated in Figure 8:

- **Velocity:** To face volatility, companies will need to make their process as quick and as nimble as possible. While lean practices and continuous improvement initiatives certainly contribute to this goal, the game changer will be the capability to pull resources quickly out of the business network to be able to react to any disruption.

- **Unity:** Uncertainty originates by the fact that in too many cases, companies operate in a nonhomogeneous way. A tighter business network is essential to foster more intimate and direct business relationships, thus reducing the overall market uncertainty.

- **Coordination:** This provides the ability to reduce operational complexity and anticipate events by sensing information from the business network. For

example, a company can learn in advance that a quality failure from its supplier's supplier will cause the company a component shortage in the future.

- **Analysis:** The major challenge caused by ambiguous situations is that there is no benchmark or history in the organization to rely upon. Business network analysis can help in understanding what happened to companies that faced a similar situation in the past or understanding the characteristics of an unknown market.

FIGURE 8 Reimagined VUCA
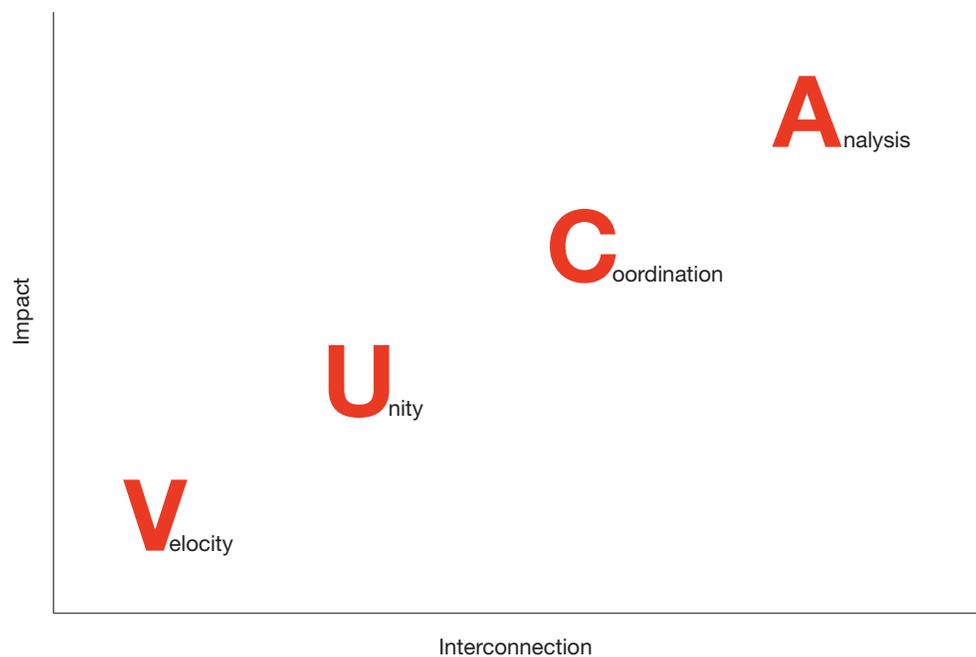
Source: IDC Manufacturing Insights, 2017

ESSENTIAL GUIDANCE

Embedding analytics into the information flows provides deeper and broader supply chain intelligence, driving a business that is both more effective and more efficient. Benefits from better analytics cited by companies in a recent IDC survey include cost savings, improved customer service, increased productivity, and enhanced business visibility. Global businesses aspiring to best-in-class performance must embrace analytics-driven business networks to transform the way they do business:

- Establish an improved method of collaborating with trading partners through a common platform that delivers timely operational information help to minimize volatility among participants across a supply chain.

- Enable end-to-end visibility, in both the physical flow and the information flow.

- Bring together information from multiple departments and countries and help remove the uncertainty of embracing regional compliance issues.

- Improve information availability to help manage a company's B2B operation across the supply web, including trading partners and customers.

- Through analysis, help predict the future outcome of decisions and hence remove ambiguity of unexpected events impacting supply chain operations.

Reaching these goals will help companies completely change their perspective with regard to facing their market and demand challenges, exemplified by the VUCA framework outlined previously. Indeed, it is the view of IDC that the best supply chains will be those that have the ability to quickly analyze large amounts of disparate data and disseminate business insights to decision makers in real time or close to real time. Businesses that consistently fail to do this will find themselves at an increasing competitive disadvantage and locked into a reactionary cycle of firefighting. Analytics-driven business networks will be the backbone of the future of the supply chain.

ACTIONS TO CONSIDER

IDC suggests that businesses look to the following actions as a way to both enhance their analytics capabilities and better leverage the power of business networks:

- **Be clear about the current state of the business in terms of analytics capability.**

- **Move from industrial clusters to information clusters.** Many companies have historically pooled resources to achieve scale and scope. Consider being part of a data trading community to achieve great business results.

- **Think system, not island.** You are part of a system, and if you contribute to the system intelligence, it will come back to you in the form of enhanced velocity, unity, coordination, and analysis in your data processes.

- **Make information available rapidly.** Make sure your employees know what happened in the past and what is happening now. But most important, enable them with the capability of understanding what this means for their business units and wider organizations and what impact it will have in the future.

- **Rethink how you measure trading partner performance.** Moving to real-time,

collaborative supplier engagement, with clarity around both risks and business upsides, can help companies both avoid protracted outages and identify new business opportunities.

- **Look to industry networks and vendor offerings.** This is a way to quickly leverage existing communities of business users and suppliers and quickly close analytics gaps that may exist across your business.

IDC believes that companies should look for ways to better apply analytics across their supply chain to enable the nimble and insightful decision making that will be required for business success.

IDC Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.872.8200
Twitter: @IDC
idc-insights-community.com
www.idc.com

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

IDC
ANALYZE THE FUTURE