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Foreword



The paradigm shift towards the digital transformation among businesses is the need of the hour. Firms are making continuous efforts to digitize their operations and investing huge amounts of money to achieve the same resulting in increased revenue, cost reduction, improved customer satisfaction and enhanced differentiation, and mitigation strategies for the risk of digital disruption.

The transformation is rapidly broadening the range of technologies to be used in the workplace. Among the many, Knowledge Management (KM) is one of the key driving vehicles for the digital transformation. Digital data needs to be appropriately used considering the company's critical knowledge assets: its core competencies, intellectual property rights, market and industry comprehension, and customer understanding and expectations.

KM is the art of transforming information and intellectual assets into enduring value for an organization's clients and its people. The core objective of KM is to provide the right information to the right people at the right times to help people share experiences and insights, and to improve the productivity of teams.

With the help of technology, businesses have developed robust software platforms to leverage KM strategies. These software continues to evolve in response to new demands and challenges. Various data science techniques are being used to accomplish KM objectives. In addition, recently, there has been an increasing interest in how organizations can leverage augmented and virtual reality (AR/VR) in incorporating KM strategies in line with the objective of going digital.

Businesses need to map the strategic and critical knowledge for complete digital transformation. This helps in identifying those knowledge assets that digital transformation can leverage, as well as highlights gaps in an organization's knowledge network. KM prevents staff from constantly reinventing the wheel, provides a baseline for progress measurement, reduces the burden on expert attrition, makes visual thinking tangible, and manages effectively large volumes of information to help employees serve their clients better and faster. KM, in the current scenario, is a necessary game changer.

Hemant Joshi

Message from Confederation of Indian Industry



The world of knowledge management has always been exciting, with the move from data to information to knowledge to wisdom holding out great promise for the future of companies, societies, and the whole world. Today, the exponential search for new knowledge made possible by the proliferation of the internet and smart phones and the dominance of the tech giants – Alphabet, Amazon, Apple, Facebook, and Microsoft has made it imperative for the science of knowledge management to lead new thinking and opportunities for global transformation!

The opportunity is not restricted to technology. The world is seeing rapid advances of cyber-physical systems, changing the processes of manufacturing, distribution and logistics. It is widely believed that Industry 4.0 will lead to the digitization of all physical assets and integration into digital eco-systems with value chain partners. McKinsey & Co has called out four disruptions which make up 4.0 – data volumes, computational power and connectivity, business intelligence and analytics capabilities and human-machine interaction advances like touch systems and augmented reality. Each of these disruptions has enormous potential for change in corporate thinking, but together they create a new knowledge—the world will need new ways to manage the technologies, processes, data analytics and culture needed for people, companies, and societies to compete and succeed in the future!

Companies like DHL, Walmart, and Amazon are already practicing anticipatory logistics where demand is being forecast and sometimes even created by intelligent suggestions to customers. Artificial intelligence has a key role to play in this anticipation process with the entire sequence of demand forecasting, manufacturing, transportation and storage planning and maintenance of transportation equipment riding on the ability to use AI well and deploy machine learning to provide adaptive knowledge through the supply chain. Self-learning logistics processes, enabled by algorithms that recognize patterns and initiate action across the logistics chain, will enable dynamic changes in volume and timing of shipments, inventory and stocking suggestions and pricing to optimize product offtake and movement across the supply chain.

The pace of change is disrupting old jobs and creating new ones. As systems get more complex in every economic sector, the opportunities for human intervention in the design and implementation process will always exist and indeed grow! The demand for customer experience designers, customer behavior analysts, and new knowledge creators and disseminators will grow. We are in for exciting times and the winners of tomorrow will be those who use both human and artificial intelligence and machine learning to build cognitive value chains in all industries. KM practitioners of tomorrow will be at the center of digital transformation and must prepare to lead!

Dr Ganesh Natarajan
Chairman, CII KM Summit

Digital Transformation through Data and KM

Digital Transformation

The usage of digital tools and technologies to transform business operations has steadily increased over the years. While the earlier generation of enterprise business applications such as enterprise resource planning (ERP), customer relationship management (CRM), etc. helped digitize organizational data and streamline information flow within large organizations, advancements in technologies such as cloud computing, cost effective communication systems, and business model innovations such as Software-as-a-Service (SaaS) truly democratized the access of digital tools and made them viable even for small and medium enterprises (SMEs). This eventually brought entire industry value chains into the digital fold, enabling shared data flow and information exchange across the supply chain, such as producers, suppliers, distributors, and retailers, thereby streamlining the delivery experience and bringing efficiencies and transparencies in the value chain. As 'data' assumed center stage in decision making, this resulted in a virtuous cycle of increased investments in technology and data infrastructure, and the vibrant demand environment bringing down costs of digital tools further, accelerating their mainstream adoption across the ecosystem.

On the other side, commoditization of consumer technology and the emergence of web-scale IT systems and e-commerce platforms brought digital technology closer to the end consumers, supported by contemporaneous advancements in smartphones and the penetration of mobile internet.

This spawned an entire generation of tech-savvy consumers who are adept in using digital tools for discovering products and experiences, while also sharing instantaneous feedback through social media channels. For businesses and brands, such consumer technology platforms are not only an important distribution channel to invest, but also an important source of customer feedback, providing real time insights in to the consumption patterns of their products and services.

This intersection of digital technology across producer and consumer markets brought enormous amount of structured and unstructured data into the realm of business operations which, if harnessed properly, has a potential to transform business models, generate new sources of revenue, optimize resource usage, and maximize stakeholder value. Successful organizations will be those with a thoughtful and mature approach to business process re-engineering, design thinking, and technology assimilation to take advantage of such opportunities. At the same time, a strong culture of a data driven decision-making is equally important to effectively harness the power of data, generate information and build knowledge. Exponential technologies such as Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), Robotics, etc. provide more advanced tools to accelerate such transformation, with their ability to collect, and process large volumes of data at a faster rate. Digital first organizations having an integrated approach towards technology driven business operations are more likely to focus on new and emerging

business opportunities using tools such as IoT, AI/ML, etc. thereby transforming themselves and their product/factor markets.

The key challenge for such organizations to harness the real potential of digital transformation is having an integrated strategy and a holistic approach towards Knowledge Management (KM) in the digital context, building internal systems and processes to streamline information exchange and data analytics, along with a strong culture of data driven decision-making. Traditional KM practices and platforms focused on capturing and codifying explicit knowledge in to digital artefacts, making the collective organizational knowledge accessible to the larger section of practitioners. While KM practices and tools achieved considerable success across industries, more specifically in knowledge driven industries such as Consulting, IT, legal, pharma, life sciences, etc. they mostly focused on codifying explicit knowledge artefacts and providing search and retrieve capabilities to discover the artefacts from the repository. The missing element is the availability of contextual knowledge, with predictive and prescriptive suggestions, which can connect the dots specific to the given problem, and suggest suitable solutions. For organizations to maximize the benefits of digital transformation, this capability assumes significance, as they now have access to large volumes of structured and unstructured data across the value chain. An efficient cognitive engine supplementing the KM system that can gather meaningful insights from

the data and provide for a seamless discovery and delivery of contextual knowledge to effectively address business problems is the missing element in the KM value chain, which can enable organizations achieve success with digital transformation.

Knowledge Management and Artificial Intelligence

This is a domain where tools such as advanced analytics, machine learning (ML), artificial intelligence (AI), and cognitive technologies could have maximum impact¹. Early developments in AI started in the 1950s and evolved over the years with progresses in areas such as natural language processing (NLP), text recognition, speech recognition, robotics, etc. The field really took off with the advent of machine learning (ML) and deep learning, which is teaching programs to learn for themselves rather than giving them exhaustive set of instructions

to perform a task. At the core, ML helps create a prediction engine for business applications that maximizes accuracy and minimizes errors. This is achieved through experience (as the algorithms get exposed to more and more training data) and feedback. ML could be beneficial for any application that involves prediction, such as medical diagnostics, image recognition, autonomous driving, predictive maintenance, drug discovery etc. Whereas the focus of AI/ML is towards building an accurate prediction engine to address specific business problems, the focus of KM tools is to help practitioners discover solutions through search and retrieval of the codified knowledge base. Essentially AI/ML and KM are two sides of the same coin. An advanced KM platform with a built-in AI engine can bring contextual knowledge and predictive models for a business problem and help practitioners discover effective

solutions faster. The value of such a tool increases manifold especially when the delivery of such contextual knowledge is seamless. For example, displaying indicative solutions when a practitioner searches the enterprise knowledge base for a specific problem, AI enabled chat-bots to help suggest suitable approaches, etc.

AI/ML can also help organizations address the missing link in their knowledge flow, which is in codifying tacit knowledge. Traditional KM tools and processes are very effective in codifying explicit knowledge artefacts such as operating procedures, know-hows, etc. but fall short of bringing the tacit knowledge, which is more unstructured and people dependent, to the benefit of the larger organization. AI tools such as natural language processing (NLP), speech recognition, text processing can be beneficial in sifting through unstructured data sources such as



emails, community portals, enterprise social networking platforms, etc. to identify patterns and build a knowledge map of the tacit expertise, which can then feed into the AI algorithms to build predictive models for respective business applications.

This combination of AI and KM assumes greater significance in the Indian context, as we move from being a data poor to data rich economy. Technology adoption in India is witnessing an increasing growth, due to the evolving market dynamics and favorable policy environment. The market is also witnessing the emergence of new age enterprises and startups that use technology as a competitive differentiator to optimize operations and provide better quality of experience to consumers. Supported by the domestic technology ecosystem through flexible business models delivered through cloud computing, digital technologies are witnessing widespread adoption across the industry value chains and for businesses across industries, technology is becoming a core element of business strategy. According to a

forecast by Gartner², IT spending in India is projected to reach \$87.1 billion in 2018, which is 9.2% increase over 2017 numbers. While devices (\$31.4 billion) and communication services (\$32.4 billion) contribute majority of this spending, IT Services (\$14.3 billion) and Enterprise Software (\$5.7 billion) are expected to grow at a faster rate, at 13.8% and 15.3% respectively. As Indian enterprises embrace technology led business processes, AI and KM can be an effective way to bring faster internal transformation within the enterprises, providing an opportunity to leapfrog the challenges faced with traditional KM tools and processes.

Another important application of AI led KM is in social sector use cases, specifically in areas such as education and healthcare, which faces significant challenges in the last mile delivery due to the bottlenecks in infrastructure and man power. A cognitive KM can act as an effective decision support system for primary care workers working in remote locations to access the larger institutional knowledge base and provide better services for their

constituency. As programs such as BharatNet bring villages and remote locations to the broadband connectivity network, custom-built KM applications along with sufficiently trained work force can significantly improve desired social outcomes in the target areas.

Digital transformation has the potential to disrupt existing business models, bring new sources of revenue, and redefine value chains. Successful organizations will be those with a thoughtful and mature approach to business process re-engineering, design thinking, and technology assimilation to take advantage of such opportunities. In addition to this, a strong culture of data driven decision-making is equally important to maximize the benefits from the ever-increasing internal and external data sources, and transform the way organizations approach customer, talent, and supply chain ecosystems. Effectively utilizing the organization's explicit and tacit knowledge, accelerated through advanced cognitive tools such as AI/ML will help them address the emerging opportunities better and maximize stakeholder value.

Digital Manufacturing and Supply Networks

Manufacturing 2.0: Renaissance in manufacturing

With the advent of Fourth Industrial revolution (4IR) – the concept of Manufacturing 2.0 is back to life. Convergence of both physical and digital world with the integration of communication and collaboration applications has led to creation of a connected set of platform/s for manufacturing applications.

Manufacturing 2.0 laid the foundation for creating “Smart manufacturing” and “Industry 4.0 architecture” in operations. This is a quantum shift from the conventional automation to a fully connected and flexible system – which involves horizontal integration of all operational systems – enterprise planning, design, warehouse etc. within the organization and vertical integration of manufacturing ecosystem.

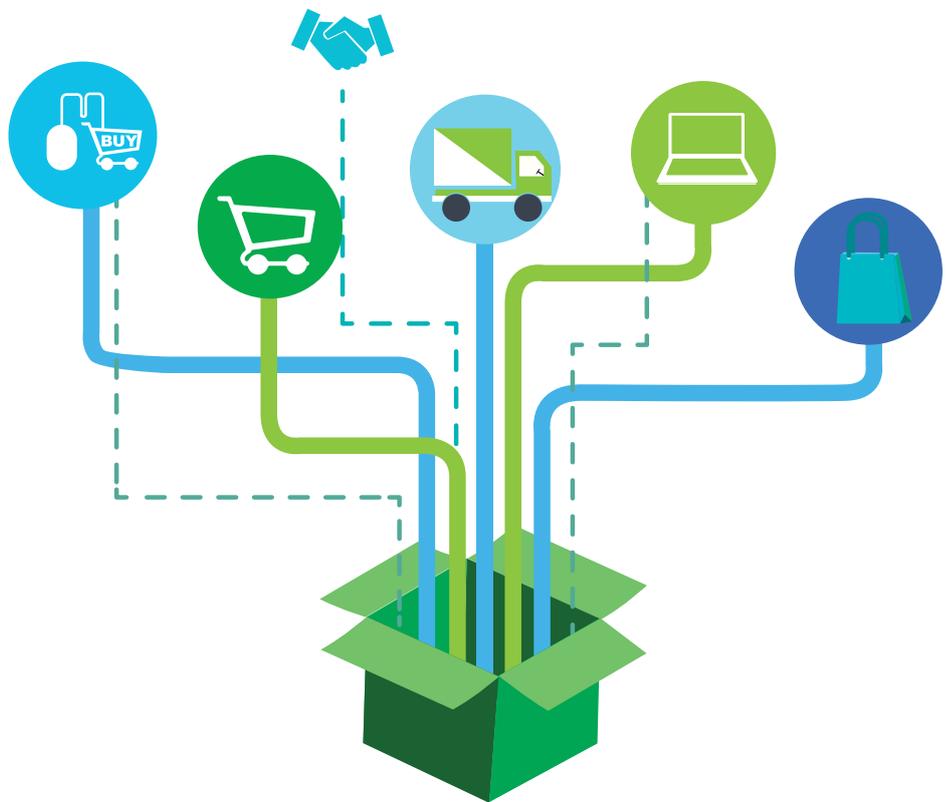
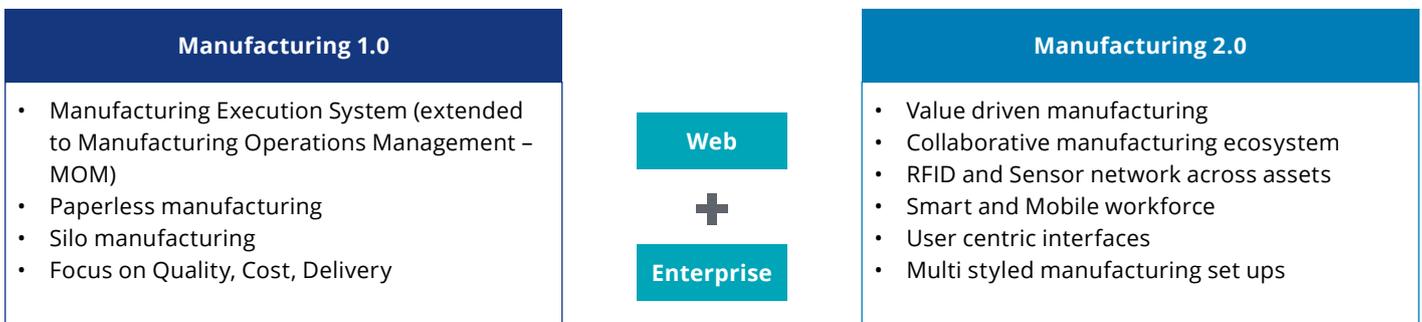


Figure 1: Manufacturing 2.0



Source: Deloitte analysis

This integration has led to a factory gathering constant stream of data from connected systems. This data is further synthesized to learn and adapt to demand, maintain assets, track inventory and digitize operations, thereby, creating an efficient and agile factory.

Data Driven Transformation

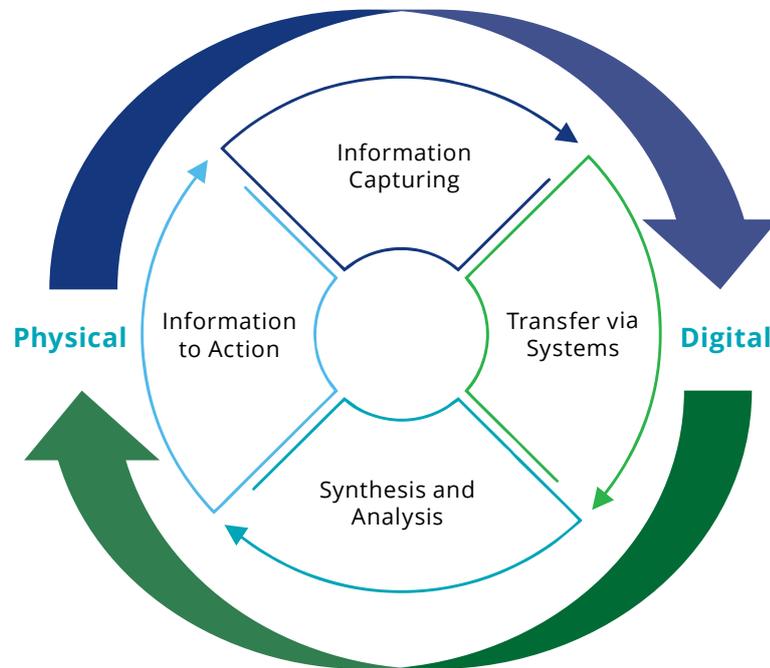
It is estimated that 1.9 billion units will be connected under IoT by 2020 in India³. The first major change these devices will bring is a barrage of information to add to the existing data-complexity challenge. Every interaction and transaction between the supply chain leads to multiple data points, which has to be captured and processed effectively to derive tangible outcome.

With digitalization at the core of every smart factory this end-to-end data / information flow needs to be captured digitally. This is where Big Data analytics plays a pivotal role of processing high volume, high velocity, and high variety of data⁴. When coupled with cloud storage and IoT, which translates physical data to digital form and back to cyber physical systems, organizations are handling tremendous amount of data at higher rates at never analyzed level of granularity for various applications.

As shown in Figure 2, Big Data coupled with Industrial internet of things (IIoT) assist in continuous flow of information from physical and digital worlds. This entire process starts from information and data capturing. This process is enabled by digital interfaces, channels etc. across all stakeholders including suppliers and customers for end-to-end integration.

In case of a manufacturing set up, this real-time data capturing happens via sensors and interlinked systems. Cloud storage assists in storing high volume historical and current data in a single system. It also supports in digital transfer for this information for access

Figure 2: Managing digital data flow: Physical – Digital – Physical loop



Source: Deloitte analysis

across all nodes in the supply chain. The next stage is the analysis of data where Big Data plays a significant role—it not only processes information but also has to ability to automate process, innovate based on findings to provide insights. When translated into action items either via human intervention or automatic feedback loop across people, assets, and

products, these insights can result in productive growth.

This change in the way technology has increased the value of digital information and the related potential to maximize enterprise value has resulted in organizations evaluating their key areas:

Business Process flow	<ul style="list-style-type: none"> • Convergence of business IT and manufacturing IT • Product life cycle management for rapid development • Incorporation of latest Web and Enterprise applications • Shared economy
Application architecture	<ul style="list-style-type: none"> • Manufacturing architecture embedded on existing assets • Intelligent sensors, RFID tags, platform enabling virtual simulations to see impact in real time • AI driven machine learning to identify patterns for automation
Delivery and support models	<ul style="list-style-type: none"> • Augmented reality enhanced operations • Proactive issue identification and resolution • Reduce time to market with minimized cost
Performance areas to address complexity	<ul style="list-style-type: none"> • Inter-company and intra-company platform for coordination (suppliers, out sourcing etc.) • High Product variety mix - Modular structure with ultra-delayed differentiation • Flexible work base

Smart factory: Integral to the broader digital supply network

In this evolution of current organizations to become a smart factory, it is clear that data and technology are major components in the path to creating a network. This smart factory is an integral element in the broader digital supply network which will integrate physical assets and human assets to drive digitization of complex operations. Many sectors have already adopted the smart factory concept in many areas.

Examples of smart factories:

- A large global retailer analyses social media chatter to optimize local inventory assortment and enhance inventory planning
- High-tech semiconductor manufacturing company uses Smart Glasses to remotely support off-shore manufacturing and assembly through on-demand knowledge sharing⁵
- A machinery and equipment manufacturer uses technology for

fleet monitoring, fuel efficiency tracking and translated them into real time data for customers

- An electronics supplier uses IIoT to connect in house devices, so that they learn from mistakes and produce intelligent algorithms independently

These examples illustrate transformation across industries have evolved from linear supply chain to a dynamic network which is digitalized.

Digital Supply Network: Linear to dynamic

As seen in the previous section, as every node in the supply chain becomes digitally connected the conventional linear supply chain moves to an interconnected dynamic supply network. Figures 3 illustrates the set of enablers which will enhance the network to operate digitally to deliver key set of attributes.

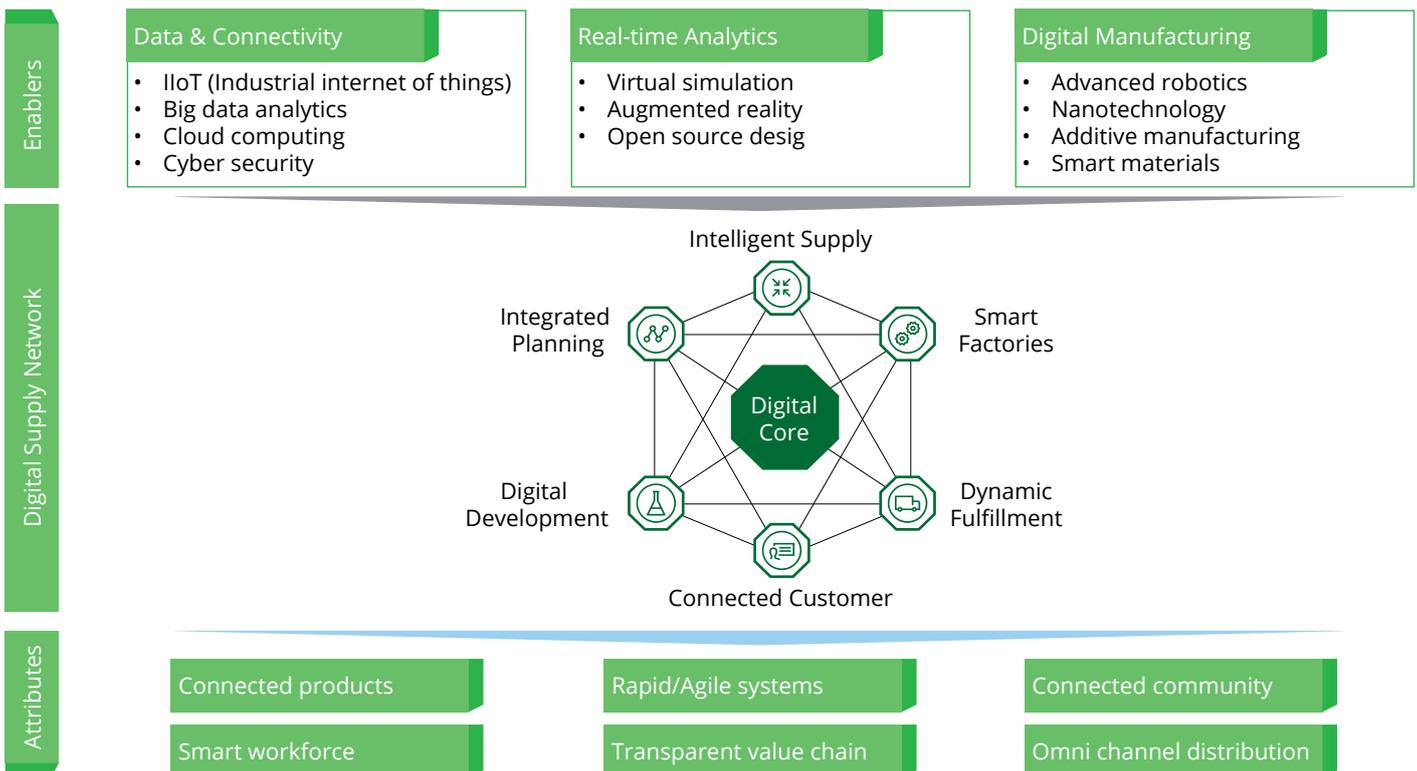
Data & connectivity: Base for supply chain integration with IT. Big data to

carry out predictive analytics, large scale real time simulations, and cloud computing for distribution of analytics to various nodes in the chain. And for a smart factory strategy which encompasses suppliers to customers, cyber risk will present a great concern and hence, cybersecurity is a priority enabler.

Real time analytics: Virtual simulation – to break down complex activities and create a simulated environment for real time e-learning. Augmented/Wearable glass based enhances effectiveness of operations compared to conventional paper/e-paper instructions in areas such as product prototyping, remote assistance during manufacturing/maintenance, warehouse and logistics management.

Digital manufacturing: Next gen additive manufacturing, smart materials and nano technology coupled with IT convergence will drive the architecture of dynamic manufacturing.

Figure 3: Digital supply network



Source: Deloitte Insights and Deloitte analysis

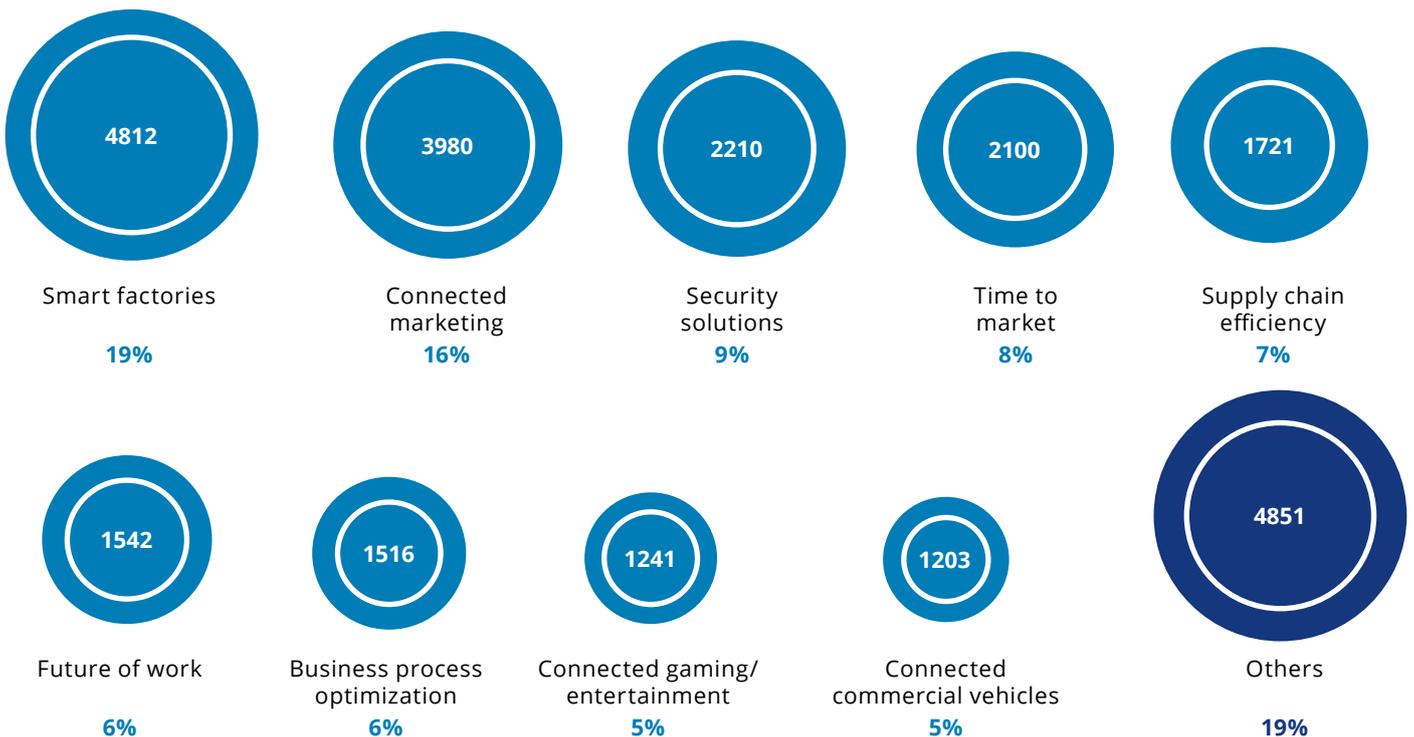
The interconnected network with interactions from each node to every other point of the network, allowing for greater connectivity among areas that previously did not exist, is what differentiates the new digital supply network (DSN). With digital at its core, DSN can minimize all inefficiencies and eliminate risks inherent in a linear supply chain⁶.

Organizations approach towards strengthening the supply chain

Internet of Everything (IoE) is defined as intelligent connection of people, process, data and Internet of things⁷. This IoE will transform passive supply chain into a live digital supply chain to create transformational solutions. By connecting people with process, data and things (which are the core of DSN) organizations have started realizing and embracing the value potential this digital ecosystem brings along. The overall IoE market potential from investments and savings on people, process, data and IoT by the industries (VAS⁸) is estimated to be INR 25000 billion by 2025.



Figure 4: Market potential for IoE in India (in INR billion)



Smart factories, connected marketing, supply chain efficiency and business process optimization contribute to ~ 50% of the total potential opportunities in the private sector. Many organizations have realized that a digital business model and a supportive ecosystem will help organizations achieve tangible benefits in the near term.

Though overall digital transformation of the business is the vital objective, companies have started their migration into the journey by strengthening multiple levers in the supply chain.

They have started building the required capabilities in the network based on the strategic lever they wish to focus and pursue. For example, use of big data analytics for real time demand driven forecasting seems to be one of the major focus areas across all sectors of business.

Figure 5 provides an illustration of key transformation areas followed by companies to strengthen the supply levers to create a positive impact.

Figure 5: Key transformation areas

Supply chain levers	Transformation areas	Impact
 Product	<ul style="list-style-type: none"> Data as a product or service Prototyping with 3D printing 	<ul style="list-style-type: none"> Holistic decision making Improvement in Products and Service levels Flexible Supply chain Inventory , Warehouse, Logistics – Lower operating costs Collaborative environment – asset sharing, transparency Reduced supply chain risk
 Process	<ul style="list-style-type: none"> Sensor/data-driven design enhancements Open innovation/ crowdsourcing 	
 Planning	<ul style="list-style-type: none"> Big data analytics-driven demand forecasting Dynamic real time inventory fulfilment 	
 Manufacturing	<ul style="list-style-type: none"> Augmented reality-enhanced operations Automated production Predictive maintenance 	
 Network, Logistics & distribution	<ul style="list-style-type: none"> Dynamic/predictive routing Contracted and Spot Of logistics services 	
 Sales	<ul style="list-style-type: none"> Inventory-driven dynamic pricing Sensor-driven replenishment pushes 	

Source: Deloitte Insights, Deloitte analysis

Total Factor Productivity

In India, manufacturing gross value added (GVA) has been growing at a rate comparable to major economies, but productivity as a whole is a concern. With technology growing at exponential rates effective foray into the evolving stream would increase the Total Factor Productivity (TFP).

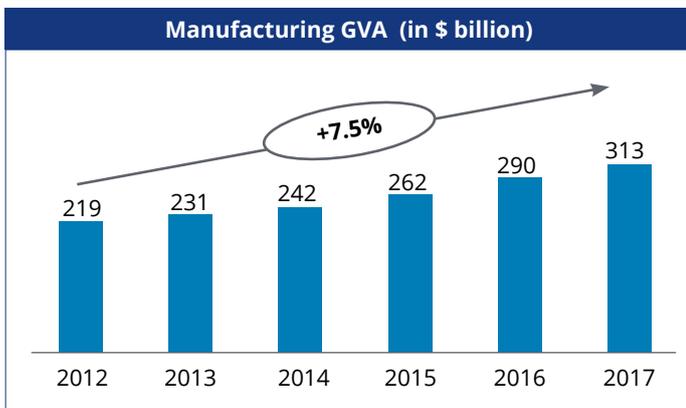
Increasing the TFP would require rapid improvement in two areas:

1. Creating a mobile workforce which can enable resource reallocation from low productive sectors.
2. Increasing productivity through technology.

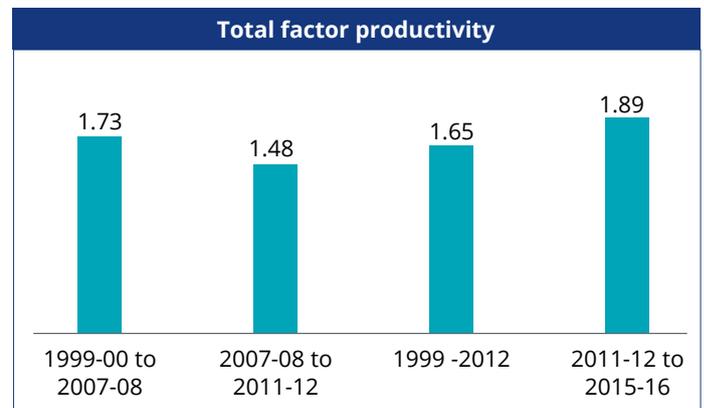
Though the degree of transformation may vary across industry sector and company, creating a collaborative digital supply network can assist in significant productivity benefits and gaining competitive advantage. While the impact of digitalization and intent to implement is evident across segments, DSN is still playing a minor role in 2018.

In order to transform the existing network to digital network, organizations can create a digital blueprint for the organization and start with laying a KM and data foundation where technologies can be leveraged for quick wins.

Figure 6: Manufacturing GVA and TFP



Source: RBI



Customer Knowledge: to Serve them Better

Customer experience is defined as the aggregate of all of a consumer’s experiences with a company’s products, services, and the brand in context, or brands⁹. While a strong customer experience has been shown to produce significant results—more customers, more sales, and more loyalty—many companies still struggle to identify the plan of action that will best achieve them. A strong and focused customer knowledge management can help in this regard.

Customer Knowledge Management is the systematic process of collecting, preserving, sharing and utilizing customer data in order to build up meaningful customer experience journeys and maintain enduring relationships. It refers to the methods that may be used to capture, store, organize, access and analyze data about

customers for the purpose of enhancing sales, customer retention and customer engagement metrics.

Relevance of Customer Data in Digital Transformation 2.0

Customer data is essential for retaining existing customers and for converting prospects into new sales. Implementing new initiatives on delivering an exceptional customer experience would require a comprehensive view of customer data.

Big data has often been shown to create value and generate new revenue streams for organizations. In the case of customers, it can help in making better decisions involving customers, through processes such as:

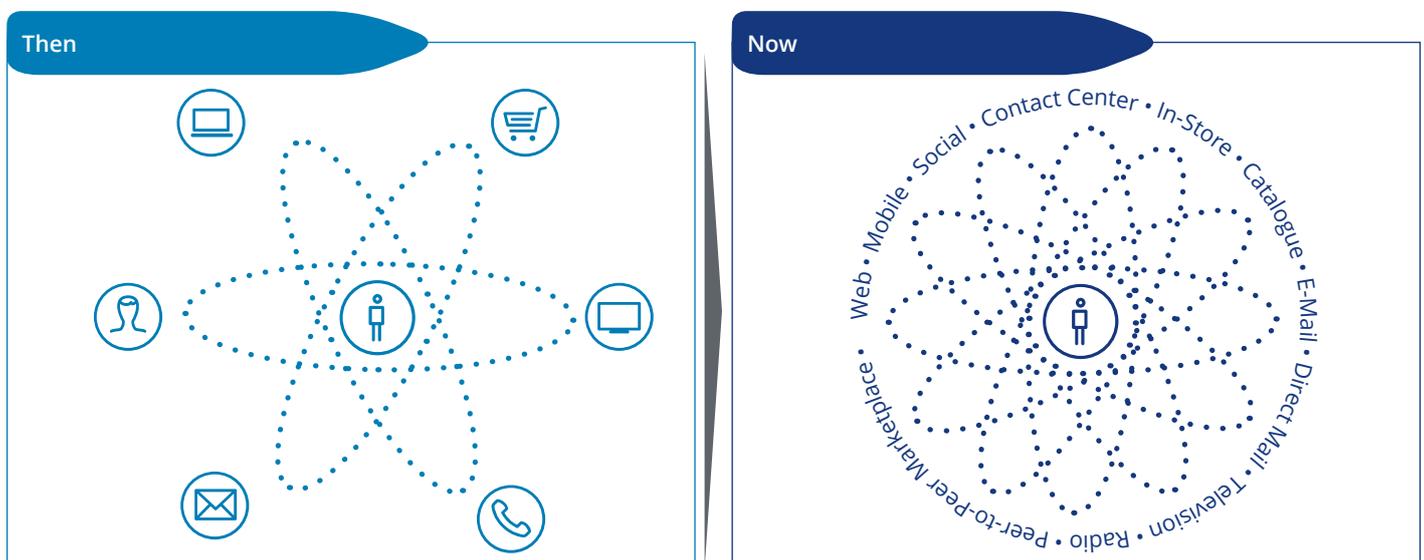
- Mapping comprehensive customer journeys



- Personalizing customer experiences
- Creating deeper relationships through data analytics

From 2000 to 2017, the number of internet users rose from 400 million to 3.7 billion, nearly half of the world’s population.¹¹ Not only are more customers online now, they are also switching between different devices and channels to get the experience that they want.

With the increase in channels, more customer data is available than ever before.



Source: Deloitte Analysis

Data, in this century, has become as valuable as oil was in the last century. IDC research predicts that the 'Digital Universe' (i.e., the data created and copied every year) will grow to be ~180 zettabytes in 2025¹⁰ (from ~3 zettabytes in 2012). To understand the scale of data flow, in the duration of 60 seconds on the internet in 2017¹¹:

- 3.6 million Google searches were performed
- 4 million YouTube videos were watched
- 18 million weather searches were carried out, and
- 100 million spam emails were sent

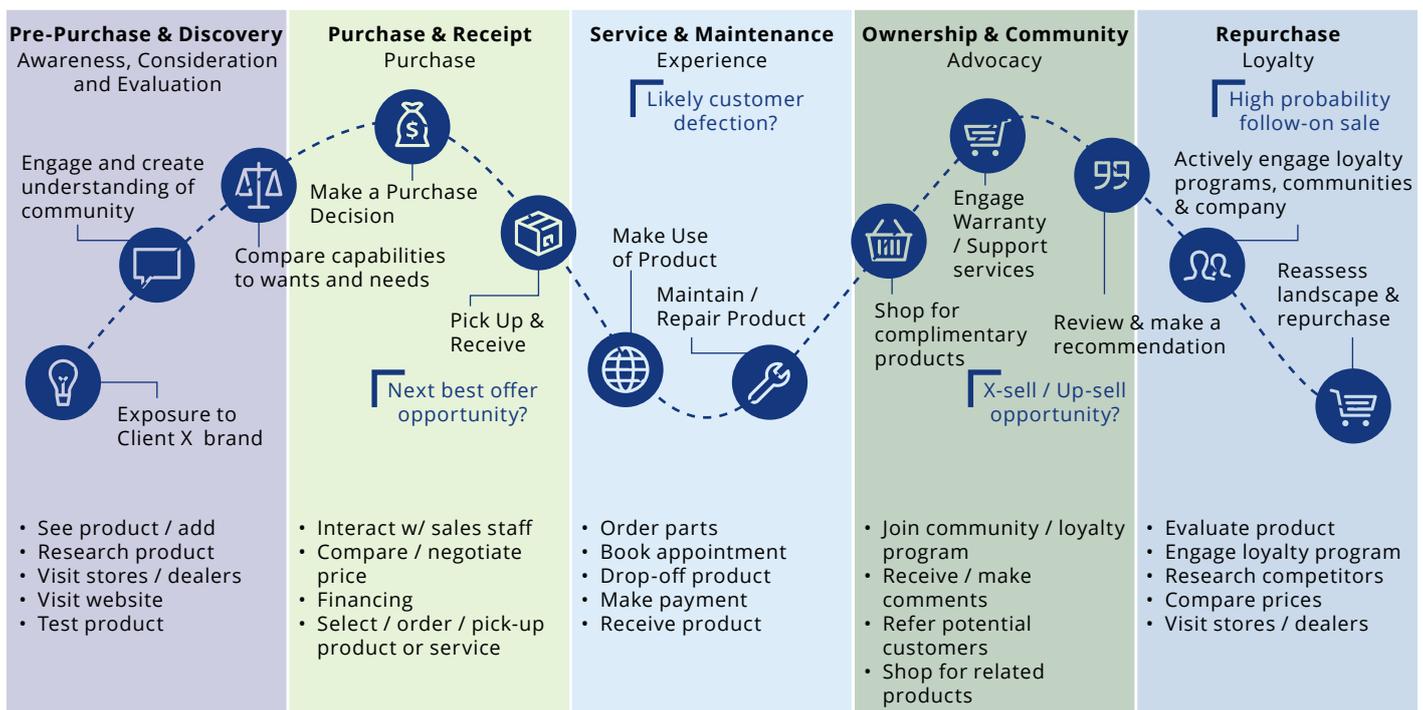
Data is taking new forms, increasing the variety, volume, and velocity of data.



Source: Deloitte Analysis

In the increasingly customer-centric world, the ability to capture and use customer insights to shape products, solutions, and the buying experience as a whole is critically important. Gallup research shows that organizations which leverage customer behavioral insights outperform peers by 85% in sales growth and more than 25% in gross margin¹².

The customer of today is increasingly in control of their own path and a review of the end-to-end customer journey can help identify cut-in points for analytics opportunities.

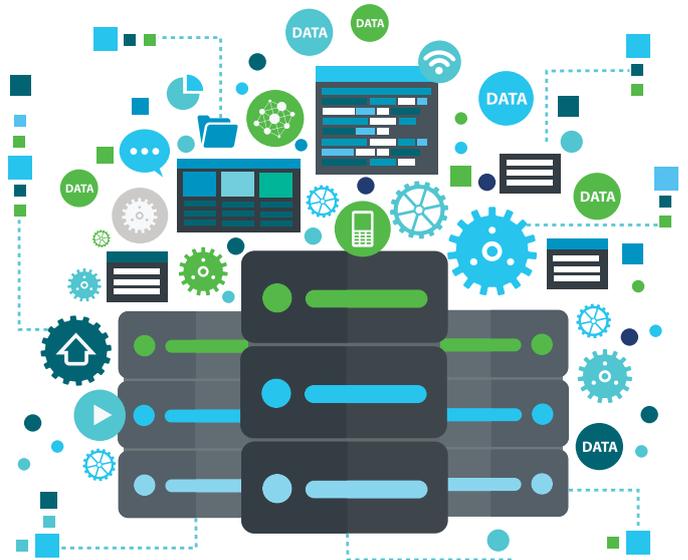


Source: Deloitte Analysis

It has become important to get closer to customers and re-evaluate the way the data about them is used. By going beyond CRM systems and developing smarter ways to learn more about customers, organizations are taking the extra step in assimilating and analyzing customer knowledge (e.g. putting sensors around interactions to detect the subtlest shifts in customer behavior).

With the growing number of sources of data over the years - circumstantial data, situational data, behavioral data, etc. 'Big Data' now presents endless opportunities to uncover patterns about the different types of customers and how they could be serviced in a more efficient manner.

Customer Experience can now be supported by analytics at various points such as:



Source: Deloitte Analysis

Businesses are increasingly using customer knowledge to generate insights, by harnessing and applying data analytics at every opportunity to differentiate its products and customer experiences, across the entire customer life cycle. Some examples of businesses differentiating and winning using insights from customer knowledge are noted below¹⁶.

Examples of Businesses driven by Customer Knowledge

- **Travel** – analyzing customer data to increase sales, ROI and customer satisfaction
Tracking customer behaviors, preferences, purchases and demographics. Customer insights are used to power marketing, redefine the frequent flyer program and broaden business offerings¹³.
- **Hospitality** – personalized, unforgettable experiences for guests
Utilizing master data management, analytics and data governance towards a solution that caters to users across geographies and across the company—from sales, marketing, real estate, finance, and hotel operations. For example, customer preferences and experiences are shared across all hotels, leading to highly valued customer experiences on future visits¹⁴.
- **Banking** – customers get the right product at the right time, over the right channel
Transformation from a transactional bank to a relationship-oriented bank by using data mining, master data management and marketing optimization to delight customers. Also using predictive modelling and optimization methodologies to help business lines identify potential opportunities to improve customer retention¹⁵.
- **Financial services** – attractive student loan pricing for millennials
Providing options at better price points using a customer’s data and is not dependent on credit scores. Collecting up to 100,000 data points per customer and measures and records loan officer actions in detail.
- **Personal shopping services** – algorithms and expertise to provide customized styling at lower costs
Shipping clothing to customers based not only on sophisticated algorithms but also on feeding user profiles, preferences and feedback into their algorithms. As a result, it can sell clothes in a highly personalized way and more efficiently than its competitors.
- **Media** – customer insights for relevant articles and ads
Focusing on measuring and understanding how readers connect and engage to deliver an optimal user experience. Data insights are used to improve newsroom workflow, give journalists an understanding of how readers engage with their work, and allow executives to make data-driven decisions about company strategy¹⁶.

Digital Trends impacting Customers by utilizing Big Data and Knowledge Management¹⁷

With the industry rife with digital innovation and organizational change, consumers have become drawn to the ease and convenience of always being just a click away from user reviews, comparison pricing, and endless aisles and have come to rely on online and mobile shopping. It is no surprise that traditional retailers are bringing digital channels into stores to tap those consumer preferences. At the same time, historically pure-play online retailers are increasingly opening brick-and-mortar shops in high-profile locations, seeking to capitalize on the tangible experiences that cannot be delivered through a device.

Both traditional stores and pure-play online retailers are working towards the same goal: to create a highly

personalized, consistent, and integrated shopping experience across all points of contact between them and “The Digital Customers”.

The key Digital Trends in Customer Experience revolve around “The Digital customer” experience as the pivot, with merchandizing, promotions, loyalty programs as well as point of sale (POS) related digital solutions enriching the overall experience.

Functionality across Touchpoints

Increasingly connected and informed consumers are now digitally influenced across each touchpoint of their purchase journey right from inspiration to purchase validation. According to Deloitte’s Retail sector study, 71% of Indian shoppers use digital before their purchase journey. Nearly 70% of Indian shoppers prefer digital devices (own or kiosk) rather than sales associates for

in-store activities such as comparison of product pricing, obtaining product information, checking product availability, etc¹⁸.

Case study: Amazon Go – A check out-free shopping experience

In December 2016, Amazon introduced Amazon Go, a 1,800 square foot grocery store in Seattle with the most advanced shopping technology so customers can shop and then walk out with their products without waiting in lines or checking out. Shoppers use the Amazon Go app and the store is enabled with their “Just Walk Out” shopping experience, which leverages multiple technologies such as computer vision, sensor fusion and machine learning. The virtual shopping cart tracks items and when leaving the store, the shopper’s Amazon account will be charged.

Digital Merchandizing & Promotions

Digital technologies help address merchandizing challenges (space allocation, store layout, promotion hotspots, etc.) and also hold great promise for improving the presentation of store merchandise. While digitally enabled promotions have been traditionally linked to online sales, retailers are increasingly using them to drive in-store sales through personalized promotions.

Case study: Carrefour – Leveraging Internet of Things via iBeacon to collect consumer data

French supermarket chain Carrefour is one of the first retailers to extensively pilot iBeacon networks across its stores. Customers can use mobile phones or tablets attached to shopping carts to receive in-store routes and personalized promotions. As customers are guided around the store, the beacons collect data about their behavior and purchasing patterns, which the retailer uses to continuously improve operations and store layout. With more than 600 beacons deployed across 28 supermarkets, Carrefour has seen a 400% increase in its digital application's engagement rate and a 600% increase in app users.

Loyalty Programs

Customer loyalty and engagement can make or break companies, and as such, loyalty reward programs represent strategic investments for all types of organizations. The breadth and variety of reward programs is vast, ranging from tiered points program to upfront fee program

As choice increases, loyalty becomes more fragile, and "The Digital Customer"

becomes more empowered. Technology enabled loyalty programs have seen a significant success globally. Loyalty programs have moved beyond paper and plastic to mobile apps.

Case study: Starbucks

Starbucks has been credited with revolutionizing the coffee industry. Starbucks Rewards is often regarded as one of the best retail loyalty programs in existence. They have created a loyal following of customers both with their customer experience and revolutionary rewards program.

1. Starbucks uses **geo-targeting** well when it prompts its customers to enter a store that is close to where the customer is located.
2. **Effective Mobile Experience:** Starbucks' app makes their loyalty program more interactive and more effective. The app makes it easy to see how many "stars" (points) you currently have, as well as make orders and payments right from your phone. You can even use the service to find the nearest Starbucks location.
3. **Collaboration and tie up with other Retail stores:** Starbucks was able to expand the scope of its loyalty program by introducing points for purchases outside of their retail locations. Starbucks sells many products outside of their retail locations, including: coffee beans, tea, K Cups, and ready to enjoy drinks.

Pricing and Point of Sale (PoS) solutions

In this digital retail era, retailers can no longer rely on traditional pricing methods. Sophisticated price comparison engines not only display

competitors' pricing instantly but also track prices over time and forecast changes. Online retailers are following advanced dynamic pricing strategies to respond to price changes in less than an hour. In addition, shoppers are increasingly seeking customized engagement and personalized deals that reflect their needs.

Payments and checkout is a significant pain point for customers in retail stores as they encounter long queues severely impacting shopper experience. Globally, electronic-based payment instruments are extensively adopted due to advancement in financial transaction technology. A drastic decline has been witnessed since 1980 in the use of cash to purchase goods in developed countries such as the United States, France, etc. Electronic payments account for ~ 60% of all consumer transactions in these countries¹⁹.

Instead of legacy payment terminals, Indian retailers too can utilize self-checkout options which can be integrated with digital wallets or Aadhaar Pay/UPI. Initiatives such as Samsung Pay or Apple Pay which are integrated with customer smartphones can also be tapped for faster payment. Retailers can also leverage some of these terminals that are being used to revolutionize the Banking & Public Distribution worlds by providing accessibility to electronic banking service in Rural & Urban Districts.

- **Examples of Services:** Aadhaar Enabled Payment System (AEPS), Aadhaar e-KYC, RuPay, Digital Wallets

Learning and Skilling: Data Empowering the People

Knowledge Management and Organization Learning

The world is moving fast with a humongous impact of technology and the workplace is changing in multiple ways. For organizations, it is imperative to not only move progressively along but also to be conscious of the impact of this technological and digital interventions in the workplace. The onset of digitization in most business processes and the increasing avenues of digitization has created the need for businesses to respond effectively, and in an appropriate and agile manner. This digital output from the business processes are considerably larger in comparison to the hitherto simpler dataset, approached through computations with month-to-date (MTDs) and year-to-date (YTDs) metrics for comparison. Most businesses are yet to come to terms with this amount of data and the necessary mechanisms to derive actionable inferences. Further, businesses are yet to find solutions for employees to help them derive insights from the available data, and are yet to train them on the optimal methods to sieve, understand the trends and patterns, make interlinkages and learn to retrieve the data on an ongoing basis.

At this junction, it is important to note that at an individual level, adoption of technology and its integration with the individual's work flow has improved vis-à-vis the technology adoption at organizations. The other thing to note is that with digital interventions in businesses, the expectations of change from the end-user to the last leg of the change is yet to be managed effectively. In most cases, data, information and

other critical inputs remain unutilized not because of lack of intent, but due to gaps in skills to manage the information, which has not evolved along with the development and implementation progress of digital interventions.

In this scenario, the criticality of KM comes to the forefront. KM has become a necessity to address the realities in the current world of business and operations. This helps in channeling the decision making capabilities in organizations towards a stronger data driven culture. An integrated approach towards developing and implementing Knowledge Management systems and processes will go a long way in data analytics, and in developing and aligning business strategy to achieve targeted business outcomes. There are multiple misconceptions on KM, and the primary concern is that, it is viewed as a one off standalone project that needs to be delivered and done with. Other misconception is that KM is a document management or a technology solution that is similar to that of an online library. As per the definition of Gartner "Knowledge management is a formal 'process' that evaluates a company's organizational processes, people and technology, and develops a system that leverages the relationships between these components in order to get the right information to the right people at the right time to improve productivity."

Knowledge Management is a structured and systematic process that aids the business in retrieving current and past organizational learning valuable to business in increasing positive and profit bearing occurrences and

reducing challenging and limiting features. Identifying and sharing critical business knowledge and developing an enterprise wide knowledge base for problem solving and business solutions are vital features of a well implemented and managed KM program. It is integral to build and develop the processes to touch and align everyday work processes of each job role in the organization. Knowledge Management processes deliver measurable business benefits. However, very few organizations have actually come afar in utilizing and driving an effective and business oriented program. The benefits are multiple as we have seen through our own global KM implementation providing support for a solid grounding in business strategy, operational priorities and organizational learning. Multiple levels and layers of connecting and networking within an organization is possible for sharing information, knowledge and also standardizing the ways of work and problem solving methods.

Knowledge Management Framework

A well-established KM framework goes a long way in building a sustainable and progressive organization culture. There are around six critical and core components that make an integrated KM framework²⁰. These include

1. Strategic Alignment
2. Processes and Organization
3. Leadership and Governance
4. Content and Context
5. Technology
6. People and Culture

- Strategic Alignment

Success requires knowledge management initiatives that contribute to the business strategy & goals
- Leadership & Governance

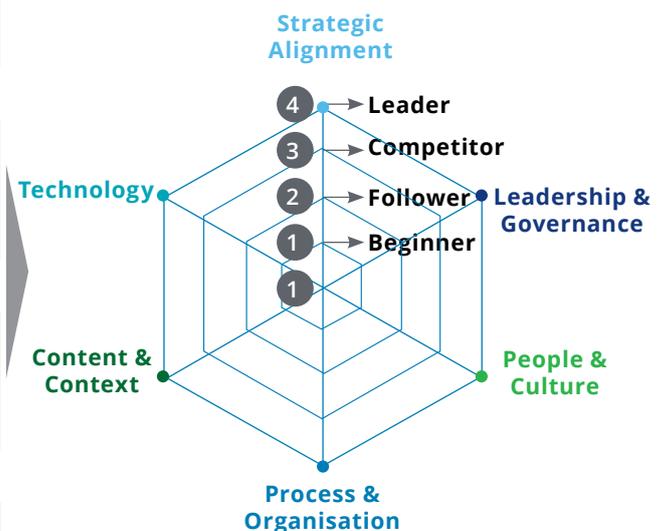
A governance structure with clear roles and responsibilities is essential to defining, driving, controlling and overseeing the implementation of knowledge management.
- People & culture

Creation of a knowledge management culture is essential for a successful execution of the KM strategy. Stimulation of the behaviors of people in terms of knowledge sharing
- Processes & Organisation

Processes provide a structure that allows for consistency and standardization in the capture, organization, maintenance and dissemination of knowledge
- Content & context

Focus on the identification, capture and management of core knowledge „assets" in order to better access and exploit intellectual capital
- Technology

Tooling must be in place to facilitate the knowledge management process of capturing, organising, searching, maintaining and disseminating the knowledge



Source: Deloitte Analysis

Revisiting the components bearing clarity and directed towards business objectives is vital to drive the framework and structure. Conducting a current state assessment, mapping and identifying gap analysis, developing a transitioning plan to the future state learning and KM operating model which includes organization structure, roles and responsibilities, governance model, and decision-making rights. Knowledge management requires tools and technology to support the integration and automation of knowledge sharing

into daily work activities. Technology helps to facilitate collaboration across the organization providing the right content and expertise to the right people at the right time; opting for the right technology and digital interventions is a critical organization commitment.

Challenges

There are however many challenges in approaching the Big Data that organizations churn out today including

customer data, sales data, employee data, process related data, transaction data, operational metrics and ongoing data. Apart from converting, channeling and accessing data and outputs thereof from data through learning solutions and KM framework, there is also focus on how to leverage the benefits of Big Data in other ways including playing a role in driving business insights. Utilizing the data to lead an Insight Driven Organization (IDO) is the way forward in a world where every organization has tried most things in



the maturity continuum to thrive ahead in business. The technical challenges that organizations face today may be as basic as not having a policy or decision in approaching and harnessing the big data. A centralized approach for capturing and analyzing Big Data is yet to be formulated. Identification of proper technology or infrastructure to capture data, even identifying whether captured data as relevant or overwhelming. There is a common thread of a lack of understanding analytics from a deep perspective, though organizations have come to speak of Big Data, AI, Bots as everyone are doing it in the marketplace.

Another challenge is the availability of talent and the capabilities required to understand and leverage Big Data to add value to the organization in a purposeful and meaningful manner. Acquiring Data Scientists with expertise in math, statistics, data engineering, pattern recognition, advanced computing, visualization and modelling may pose challenges or even organizing business analysts' team with strong knowledge of company ecosystem may not be completely feasible.

The acknowledgement of the criticality in converting data into insights that are

not merely metrics and numbers but meaningful to the vision and business objectives of the organization leading to sharp questions that could create resolve and bring about solutions that are impactful.

Learning through Big Data in Organizations

Organizations should proactively develop systems and processes to capture and disseminate for potential learning through the rich data that it generates and circulates. The onus and responsibility now lies with the leaders in the organization to drive this, futuristic leadership has saved many a company from perishing and taking it to the next level of digital transformation catering to a population that is born and thriving in a digital environment. This can only be driven by quickly assessing the organization's current capabilities to drive this agenda and also come up with a digital agenda in learning and reskilling the organization in view of the exponential change in the expectations of customers who come in myriad forms and needs.

Conventional and traditional organizations look at learning from two folds i.e. Technical / Functional learning and Managerial Skills, the nomenclature

having changed from Soft skills to Managerial Skills.

- Technical and Functional Learning is primarily driven through a Skill Matrix and Competency Model
- Managerial Skills are built through standard programs in Effective communication, Decision making, Negotiation and Influencing skills and at higher levels maybe through executive programmes at top schools

This approach may not be effective in addressing the disruptive changes that the economy and businesses are moving towards in this digitally connected globe. In comparison, there are organizations who have taken a leap ahead to drive learning through bite sized portions through mobile technologies that could be effectively on the job, on the go and reap business benefits moment by moment in transactions and operational processes.

Skilling and learning capabilities within an organization should be driven by business priorities, and Knowledge Management and Learning Solutions that deliver customer driven learning in agile, easier forms is the key to today's learning and development teams. Moving away rapidly from annual training calendar and scheduled training format to business operations training in a digital mode is a key enabler for the new age workforce.

Going forward, the supply chain for talent is becoming more mobile, non-structured and over time may not even be full-time employees. In a gig economy the talent and employment contracts will be for fixed terms, sharply communicated deliverables, purposeful network of project teams who may not come together again even as the business objectives are met. Knowledge Management and Learning Solutions have to be creative and innovative to update the teams with business expectations, making them come to speed with business outcomes and perform as they come with no time

for even introductions and settling down with the team. Work is going to be delivered in such environments and organizations need to shoulder responsibilities to help people deliver committed expectations.

Learning and capability building should be a continuous and an ongoing process, empowering people to identify, build on their skills making their work and work lives meaningful, and value driven. In an age where careers are short-lived and horizontal movements and making career choices that are not connected to ones' professional education and training will have a bearing on the organization capability to provide are necessary information and training.

A well deliberated and laid out leadership agenda to drive the social

processes and culture around learning will empower individuals to take up learning and career as their own responsibility and not completely with the organization.

Setting up Centers of Excellence to facilitate and leverage organizations' knowledge assets, and build practices around organizational behaviors, data and insight driven decision making aligned to business objectives and strategy leads to KM success. Many businesses have taken this approach to build business capabilities and skills and deliver Learning & Development expectations through technology, relevant and appropriate content development, live interaction through apps and mining knowledge assets in the organization.

The order today for organizations to stay relevant, competitive and manage profitable operations is to deliberately and strategically create and plan the agenda towards Big Data, analytics, and artificial intelligence in building an Insights Driven Organization (IDO). The impact on people and processes and developing an enabling organization across policies, systems and processes to deliver what has been targeted for. Digital transformation through data driven, insight driven approach disrupts and helps create innovation and big ideas to thrive and flourish making the organization more sustainable for growth and progress. Digital leadership helps leaders and executives glean and understand what makes an impact to their individual businesses, market place and customer expectations.



About Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 8,500 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 265 national and regional sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

As a developmental institution working towards India's overall growth with a special focus on India@75 in 2022, the CII theme for 2017-18, India@75: Inclusive. Ahead. Responsible emphasizes Industry's role in partnering Government to accelerate India's growth and development. The focus will be on key enablers such as job creation; skill development and training; affirmative action; women parity; new models of development; sustainability; corporate social responsibility, governance and transparency.

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