White Paper

“Smart & Digitalized Supply Chain”
ACKNOWLEDGEMENTS

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EDITORIAL

For the 27th consecutive year, KEDGE Business School Global Supply Chain Management Programme, ISLI, organizes and hosts the Supply Chain Forum. Unique meeting place and crossroad for ideas and discussions on the evolution of the supply chain, the Forum gathers every year more than 300 international supply chain leaders.

New challenges, technology evolutions, new consumptions models are on the rise. Supply chain leaders have to innovate constantly to face these issues.

This year, the Supply Chain Forum offers to discuss these challenges around 5 round tables animated by high profile supply chain leaders on the following themes:

1. Managing the Supply Chain in a VUCA world
2. Smart & Digitalized Supply Chain
3. End-to-end Supply Chain
4. Omni-Channel Supply Chain
5. Sustainable Supply Chain

The discussion and a summary of the proposed solutions will be grouped together in a White Paper so that each participant can keep some of the elements of the discussion around the main question that we are proposing this year: How to collaborate, perform, evolve, now?

White paper

“Smart & Digitalized Supply Chain”
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After years of practices among the world’s leading companies, digital supply chain implementation study shows that **smart data** is the key asset to implement digital supply chain and optimize the supply network. With more and more companies thriving in a competitive environment, making their supply chain digitalized and smart is priority in their transformation process.

**Technology** becomes a key driver for the business to be successful in the digital age. It can radically improve the way global companies and their partners do business, especially in the wave of globalization and outsourcing, which has and will continue to have profound effects on supply chain operations.

Smart and digitalized supply chain is not just about applying fancy technologies, which will not improve supply chain efficiency but incur unnecessary costs and system redundancy. We consider smart and digitized supply chain eco-system and propose three major hierarchies of segmentation. By looking deeper at each hierarchy, we are able to understand the companies needs precisely, and further start to deploy smart digitalized supply chain guided by a clear structure.

*Figure 1: Digitalized Supply Chain roadmap (ISLI students contribution)*
The first level of digital supply chain hierarchy is at the bottom. The network is built up by numerous smart devices embedded with RFID, sensors, GIS systems that can collect and record numbers and data source, which becomes the basis of digitalization. And the connection of these objects creates massive amount of first hand data and later upload to data warehouse to construct powerful network. The aim in this level is connecting OBJECTS to build up a digital network.

The second level of digital supply chain hierarchy is INFORMATION. At this level, data collected from Internet of Things (IoT) and other sources can be processed and organized into useful and structural information. This step is important to have a real-time information exchange to monitor different activities along the supply chain. It’s a critical step connecting the first level of hierarchy where objects capture the data and third level of hierarchy where analytics can help in better decision making at strategic level through Business intelligence.

The third level digital supply chain hierarchy is at the top of pyramid called DECISIONS, this level is to “Translate the useful information into a better decision making perspective”. After simplifying and organizing number and data into useful and structure information, the utilization of information and how to make the most from it is vital. The best way to bring the valuable information into next level is to gain the insight from it with better and smarter decisions making tools for digital supply chain operations.

![Smart and Digital Supply Chain Hierarchy](image)

*Figure 2: Smart and Digital Supply Chain Hierarchy (ISLI students contribution)*
FINDINGS

Finding 1: Connecting **OBJECTS** to build up a digitalized network

**Introduction**

Smart objects are the basis of digitalization. With the ability of recording and connecting data, it becomes possible to create an intelligent and powerful network. It is a concept called **Internet of Things (IoT)**, where things are assigned an identifiable address (IP) and have the ability to interact and build up a link along the supply chain players. The **Industrial Internet of Things (IIoT)**, also known as the **Industrial Internet**, is an extension of the concept of IoT in the perspective of industry. It connects all the devices, systems and people to a platform with a large amount of valuable data collected from the objects. With the help of advanced analytical tools to interpret the information, managers can make better and efficient decisions.

**Using smart devices to collect information and data**

All smart devices are evolution from standard objects with added connectivity which makes them “smart”. Until recently there was no digital access to the detailed information about objects. Gradually, barcodes and chips are being added to the objects, with the reader linking to the ERP system where data and information are stored. Nowadays, barcodes, QR codes and RFID chips are widely used in industry. With the latest technologies and systems installed, the objects are not only able to store information but capture and record data proactively.

What kind of capabilities make the objects smart? First requirement, is the **sensibility**. A completely independent and automated object that can detect the environmental changes and replace the human workforce, even with higher accuracy. Next capability should be **connectivity**, which is the ability to transfer and exchange information among the objects and systems after collecting the data. We will introduce some technologies and systems that are installed on smart devices.

![Figure 3: The two characteristics of smart devices (ISLI Students contribution)](image-url)

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Radio Frequency Identification (RFID)
RFID is a technology that uses electromagnetic fields to track and identify tags attached to objects. The tag includes a small chip with the storing capability for figures or data along with a small antenna. RFID chips can be categorized into two types, passive and active. Passive RFID chip is working without internal battery supply, but requiring energy transmitted from reader to reach the data. The cost of passive RFID is reducing significantly and has been widely applied in logistics and warehousing to manage assets and inventory. An active RFID chip has the capability of broadcasting signal which enables the tracking of real-time location of materials; however, the cost of active RFID is much more expensive. (Donahue, 2014)

Sensor
Sensor is an object that can detect events or changes happening in the environment, and then transfer real world data to computer cloud system. Sensors are the basis of building up the Industrial Internet world, playing a role of human sense organs like eyes and ears. Their sensibility and connectivity enable the network to operate automatically. A variety of sensibilities are used, such as temperature, humidity, vibration and pressure. The standardization of sensors is important since it allows data being shared among sensors, servers, and computing systems. It is a key driver to expand the scale of Industrial Internet. (Sreedhar, 2016)

Actuator
Once data has been collected and transferred from sensors some necessary actions should be activated. The information provided by sensors either helps managers to make decision or let the systems react automatically to the data collected. An actuator is a device that can convert energy into motion, and it is usually applied to switch on or off the other devices based on the analysis of data. The combined use of sensors and actuators makes the automation of Industrial Internet network possible. (Kithion, 2016)
**Geographic Information System (GIS)**
GIS is a software program that provides mapping and analysis of information collected from the GPS satellites. The application can be categorized into six dimensions: Location consulting, Condition consulting, Trend analysis, Routing arranging, Pattern analysis and Modelling. With a combination of GIS and RFID or sensors, actuators, even small pieces can be easily tracked and then provide an easy to read position information.

**Impacts of smart objects on supply chain**

**Logistics & Transport**
The tracing and tracking function has been widely implied in logistics industry. In today’s world it is not difficult to obtain the information of freight transport. However, we are expecting better communication and visibility with more objects connected to one panoramic network.

**Fleet management control**
Through an interconnected network, where each container and vehicle can be identified, the logistics managers can have a clear control on their assets. They can see information of location and routing timetable, to ensure the cargo arrives at the right place and the right time. It provides visibility and real time data for supply chain managers to respond instantly. For example, controlling miss-routing of shipments and cargo theft situation are made easier.

**Loading optimization**
Sensors can detect the loading level of trucks and containers. With advanced software calculating the spare capacity, managers can optimize consolidation and current routing. The impact can reduce operation cost, fuel cost and increase transport efficiency.

**Enabling Physical Internet**
The Physical Internet is a new concept with the objective of “Transforming the way physical objects are handled, moved, stored, realized, supplied and used, aiming towards global logistics efficiency and sustainability.” (Benoit, 2012)

Through the Internet of Things, The Physical Internet helps the logistics companies in real-time monitoring of the inside of the modular containers instead of the warehouses or the trucks.
**Warehouse**

The warehouse management is relying mostly on the use of systems like bar code scanners or QR code scanners. It has become a necessity for each product and package, to be tracked inside a warehouse.

**Flow control**

With the decreasing cost of RFID tags, it is expected to have more application of this technology on cargos and the equipment of warehouse. The tags can be automatically detected by readers around gateway area, which helps to control inbound and outbound flows in warehouse. The information is not only about the product itself, but also the place of origin, the destination and the delivery time, thus improving real-time visibility and transparency.

**Inventory location information**

With a huge variety of goods moving in and out, the storage and layout of warehouse is very important. We can already see application of sensor-based technology and indoor GPS system in capturing location information. If any parts are being misplaced managers can monitor through integrated platform. In some cases, the sensors can even signal for correction. Forklift driver can receive information of the cargos through sensors, and move to the right direction, hence saving time during all the warehouse operational processes.

**Cargo Damage & Security**

The RFID tags on assets help to prevent goods from theft and the sensors alert abnormal situation such as temperature and pressure, which reduces number of damage goods, hence reducing the loss of products.

**Safety**

Safety of all employees is the top priority in all working environment. The smart equipment keep away employees from hazardous situations. It should be noted that forklifts accidents in the USA contribute to more than 100,000 accidents per year. (Macaulay and al., 2015)

**Manufacturing**

The concept of industry 4.0 consists of smart devices, equipment and machines, building up a cyber-physical systems factory. With the digitalization, the operational processes are changed and restructured bringing innovations and ultimately improving visibility and quality.
**Optimized assets performance**
Sensors in the machines monitor the conditions like input flow, measure settings and energy curves. The managers can identify whether the part of equipment is running at optimal condition. The data collected helps companies move from reactive to proactive and help reduce unplanned downtime, minimize maintenance costs, improve efficiency, and extend assets life.

**Improve Maintenance, Repair and operations process (MRO)**
The sensors will collect operational data from assets in a remote distance, and identify the possibility of breaking down before they stop running. The sensors can activate the actuators to take necessary actions according to its analysis of the environment. The management team can set up schedule beforehand to order new materials or parts for repair, in this way to reduce the impact on suspending the production. The predictive maintenance on parts can prevent people from life-threatening accidents, especially in industries like aeronautics or nuclear that can never risk system failures.

**Real practices in the companies**
Industrial Internet of things is believed to be a potential and possible future for society and industry. The application of smart device can be found in various industries, such as energy, oil and gas sector, healthcare and aviation.

**General Electric (GE),** is one of the digital industrial leading company. They estimate the IIoT has a potential market of $225 billion by 2020. GE is proposing several solutions for their customers using data from sensors installed on equipment. Jet engines, gas turbines and MRI scanners are collecting and analysing data, and sharing them with GE’s cloud-based Predix platform. It not only improves machine productivity and reliability but save many costs.

“AirAsia Group saved up to $10 million in fuel costs by using Predix to reroute flight paths and optimize air traffic flow, all based on the performance data it collects from GE jet engines.” (Heather, 2014)

Santos GLNG, a pioneering company that produces natural gas from Australia, is conducting an Asset Performance Management (APM) project with GE by analysing data collected from gas turbines. The industrial internet based services will drive productivity gains thanks to the predictive nature of the monitoring equipment.

**Maersk Line,** the Danish leading shipping company is developing its Remote Container Management (RCM) project with Swedish telecom company Ericsson since 2015. They have more than 300,000
refrigerated containers on sea, and these smart containers are able to provide real-time information such as temperature, location and power supply for control tower. The RCM system consists of a GPS unit to track the location, a 3G SIM card, and a GSM antenna.

The refrigerated container needs to go through a pre-trip inspection before releasing to customer. Now they can track the condition of the reefers through devices installed on containers and decide which examination is necessary, thus avoiding costly process and running faster turnover rate. They managed to reduce the visual inspection of reefers by half. (Murison, 2016)

DHL, the world’s largest express and logistics service provider, strives on the development of Internet of things. With millions of shipments and cargos sailing, and the need of managing on such huge network, it is certain that logistics industry is one of the key player that develop connectivity of things to generate new insights and benefit from the IoT revolution.

End to end supply chain risk management is another field that becomes essential to business because of the rising of volatility and uncertainty. DHL Resilience 360 for supply chain management helps to identify the potential risks such as natural disasters, socio-political unrest, conflict and market volatility. Any disruption on a global scale could be detected, and an appropriate mitigation strategies are triggered automatically. “In the future, DHL Resilience 360 could integrate all the data transmitted from assets and respond when a truck carrying urgent cargo is about to break down or when a warehouse has been flooded from a storm”. [...] “It can also move a shipment from airfreight to road freight to compensate for an air strike”. (Macaulay and all, 2015)

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Figure 5: Convergence of Technology and Logistics Trends (Source: DHL Trend Report, 2015)
Finding 2: Simplify and organize the data into useful INFORMATION

Introduction

The word “Information” implies the second level of the smart and digitized supply chain hierarchy. At this level, the data collected from Internet of Things and other sources can be processed and organized into useful and structural information. At this step, it is important to have a real-time information exchange to monitor different activities along the supply chain.

It’s a critical step connecting the first level of hierarchy where objects capture the data and third level of hierarchy where analytics can help in better decision making at strategic level through Business intelligence.

By building up the information platform, the organized structure of data will improve supply chain efficiency and agility. By sharing information, organization will benefit from information transparency and collaboration. Insight from real time information sharing will enable us to take better and smarter decisions for supply chain operations. There are various tools available for data storage, processing and information sharing at this hierarchy level. But what captures our attention in the recent years is the Big Data and Cloud technologies which can revolutionize the way supply chains operate.

Figure 6: Humour on big data and customers preferences (extracted from Caspory, 2016)

Figure 7: Data analytics (extracted from De Clerck, 2016)
Big Data

“The total volume of data generated by IoT will reach 600 ZB per year by 2020” (McKendrick, 2016)

Big Data is a term used to describe high volumes of structured and unstructured data that is being generated around us every day. With an estimation of 20 Billion IoT devices by 2020, the amount of data captured is so enormous that storing and processing of such vast amount of data would be a challenging task. When it comes to supply chain, it is being generated across all levels from manufacturing, logistics to end consumers. So, it is important for us to understand Big Data and its impact on the businesses. (Gartner, 2015)

Big Data is not only big but has four characteristics - volume (big), velocity (accumulated at fast pace), variety (can be from any type) and veracity (uncertainty of data).

Volume is the main characteristic that defines the ‘big data’. The analyst firm IDC predicts that 40 zettabytes of Data will be created by 2020 from Internet of Things and other data sources that makes it so massive (IDC, 2015). Most companies in the US have at least 100 terabytes of Data stored. (Josh Helms, 2015)

Velocity is the speed at which the data is generated and processed. With Internet of Things, data is being created in batches, periodic or real-time. Analysis of streaming data would be key to real time decision making in the supply chain.

Variety is the type and nature of data that is generated from various sources in the form of text, pictures, audio, video, which can be classified into structured and unstructured data.

Veracity is the trustworthiness of the data that is being captured. Inaccurate and Poor data quality can lead to bad analytical results which we should prevent to the maximum extent.

It can be understood that handling the vast amount of data generated from Internet of Things is a challenging task in the form of storage, analysis, and sharing which makes the traditional data centers and data warehouses incompetent in the future. To overcome these challenges, big data is almost always associated with Cloud Computing which has enough handling capabilities to store and process Big Data. While Big Data is all about extracting VALUE out of "Variety, Velocity, Volume and Veracity" (4V) from the data available, Cloud focuses on On-Demand, Elastic, Scalable and Pay-Per use models.

“By 2020, 92% percent of workloads will be processed by cloud data centers; versus only eight percent being processed by traditional data centers”. (McKendrick, 2016)
Cloud computing is the delivery of computing services—servers, storage, databases, networking, software, analytics and more—over the Internet (“the cloud”). Companies offering these computing services typically charge for cloud computing services based on a pay-for-use basis.

Most cloud computing services fall into three broad categories: infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (Saas). Saas is the most popular among them. With Saas, cloud providers host and manage the software application and underlying infrastructure and handle any maintenance and the companies no longer have to purchase, install, update and maintain the software.

There are three forms of Cloud Computing: public clouds, private clouds, and hybrids clouds. The companies can choose between public, private, and hybrid clouds depending on the type of data they are working with, and based on the security and management requirements for the companies.

In a typical Cloud platform, the data is imported from the devices through Internet using standard protocols like HTTP, CoAP and MQTT. After receiving data, it is aggregated and transformed which can be used for streaming analytics to get real-time information.

The processed data is stored in cloud storage and the full value of IoT is realized in analytics of the stored data which makes the digital supply chain truly smart. Several applications can be used in cloud platform to present the information generated from analytics to the decision maker.

Cloud platforms have several advantages beyond the handling of Big Data. Most notably, the Cloud solutions will typically be more affordable, more efficient, infinitely scalable, offers flexibility in storage and easier to integrate with existing systems. Cloud systems are also less vulnerable to service outages than isolated local solutions.
But the biggest advantage of cloud for Supply chain operations is information sharing.

Information sharing is at the heart of IoT and the Cloud is a key enabler for Internet of Things.

**Impact of Big Data and Cloud on Supply Chain**

Big data together with Cloud can have a transformational impact on the businesses and the supply chain operating model by enabling organizations realize major benefits like ability to accept volatility, end to end visibility and real-time decision making. Increasingly, companies have recognized that there is a direct link between the performance of supply chains and the availability of timely information.

**Enhances Collaboration**

Real time information sharing increases the ease, speed and transparency of communication and collaboration with the supply chain partners. Cloud based information sharing can substantially improve the productivity and efficiency by collaborative planning and forecasting with SC partners.
**Real-time Inventory management**
Real-time inventory management allows the companies to maximize their ability to respond to demand fluctuations. Data flow from the cloud gives more precise control over the inventory levels and eliminates the bullwhip effect across the supply chain partners.

**Increased logistics transparency**
Sharing of information gathered from GPS and RFID technologies not only allows supply chain professionals to automate shipping and delivery by accurately predicting the time of arrival; they can monitor important details like temperature control, which impact the quality of a product in-transit.

**Improved customer service**
Access to real-time supply chain information can provide customers with status updates on their shipments at an unprecedented speed.

**Risk mitigation**
Real-time Information sharing gives a company with transparent visibility into potential delays, trends, and slowdowns giving them the ability to make any necessary changes before they become catastrophic.

**Value added through Big Data and Cloud**
The value added by big data and cloud technologies at this level can be observed in terms of reduced operating costs to the businesses, better understanding customer needs, reduced cycle times, low inventory levels, fulfill orders more quickly, improved forecast accuracy and customer service. Timely processing and exchange of information will not only improve supply chain responsiveness but will also enhance cash flow and profitability to every link in the supply chain and ultimately contributes to consumer satisfaction.
Finding 3: Translating useful information for better DECISION makings

Introduction:

The word “Decisions” imply the third level of the smart and digitized supply chain hierarchy, which involves “Translating useful information for a better decision making perspective”. After simplifying and organizing the data into useful and structural information, the utilization of information to gain the maximum value out of it is vital. The best way to extract the value out of the gathered information is by using better and smarter decisions making tools to gain insights into the supply chain operations. This hierarchy would make a digital supply chain truly ‘smart’.

Introduction to tools & technologies for better “Decisions”

One of the major technologies, which is very practical and proven as a valuable tool in supply chain decision-making domain is Business intelligence (BI).

Business Intelligence is a tool for transforming raw data into useful information for business analysis purposes. It includes reporting, analytics, data mining, business performance management, benchmarking and predictive analytics.

Here, we focus on success factors and methodology of BI implementation, along with the best practices among leading supply chains to illustrate how BI impacts the decision making among company’s supply chain functions, the value added for BI implementation and its applications.  

Impacts on company’s supply chain operations

Public Health Industry: Hospital - Materials Management

When information and numbers are integrated at key points that links various supply chain functions, BI can enhance hospital materials management’s performance significantly. BI analysis points out the actionable insights directly from these logical, well-organized and high coefficient figures linked to supply data management, procurement database, value analysis, sourcing and contracting.

*Bi has already shown a positive impact on materials management in VHA Inc., the largest integrated health care system in the United States.*
Fast Moving Customers Goods Industry: Retailers

The day to day operations of FMCG retailers are so rapid and their business model works on challenging the competitors in terms of pricing, efficiency and flexibility. Retailer Companies with BI architecture can deliver information smartly to end user to meet their customized options and specific needs to thrive in such a competitive environment. With BI solutions, retailers can grasp the sales data, stock information, supply replenishment etc. and by implementing the data-centric applications, the numbers can be translated into a highly cognitive analysis report.

*RealtimePOS identified the retailer’s need of reports and dashboards that provide clear visibility to monitor their performance and developed BI solution software which delivers many useful layouts and charts that are highly customized and specific. Thus, retailer can have individual interface layout & reports and allows them to focus on their business. RealtimePOS firmly believes that when client use their BI module for data analysis, the advanced and feature complete pivot table offers excellent insights for the daily operations of the retailers.*

Oil & Gas Industry: International Petroleum Company - Information & Supplier Management

Due to the scale and complexity of supply chain in oil & gas industry, it is observed that suppliers’ data is scattered across multiple systems and users must interact with multiple sources and systems which is time consuming. In addition, the limited visibility on Supplier Performance and lack of central dashboard provides scope for improvement using BI.

*Tableau, a Software company, is helping the industry to use BI dashboard to support sourcing and supplier management. On using Tableau BI dashboard, companies increased the visibility for Sourcing and Supplier Management. Tableau software allows procurement & sourcing stakeholders to have an integrated view of the situation of suppliers for better actions. At the same time, it provides valuable insights to supply chain managers that help them identify opportunities and drive action.*
Value added for implementation of BI technologies

While there is no panacea for supply chain management, among those technologies which assist a company in making smart strategies and business decisions, Business intelligence is one of the most represented technologies. BI has a built-in architecture and is capable of translating information into actionable knowledge and bring value to the business operations.

Below is the summary of how various BI tools can add value to the supply chains.

**Product and pricing positioning**
Through leveraging the data structure and simplifying the information framework, BI can provide value added advanced data analytics to improve decision making for product and pricing positioning.

**Strategic business decisions**
The transparency and visibility gain from BI tools is significant. BI tools improve business decisions via the real-time KPI and performance monitoring approach so that managers can have a broad view of their business situation and obtain the insights easily from visualized numbers and figures. Many companies’ strategic plans are inspired by BI actionable insights, where data analytics did improve company’s decision making quality and lower supply chain complexity.

**Empower organizations to gain insight into new markets**
BI can help companies make decisions on whether it’s a best opportunity to enter new markets. BI enables data exploitation and reconstruction of massive information, and through leveraging the data structure and simplifying the information framework, companies can see the big map and take better decisions.

**Evaluate demand**
It’s not easy for a big organization to make an accurate forecast and assess the real demand. Through optimization and integration of information with BI module, forecasting demand becomes more efficient and accurate. In addition, by improving data transparency and visibility, the bullwhip effect can be minimized.

There are many other value-added benefits gained from BI implementation and more and more advanced BI technologies are being developed for better decision making. We believe business intelligence will continue to play a key role in the future of smart digitalized supply chains.

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<tr>
<th>Value Added</th>
<th>Benefit Description</th>
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<tr>
<td>Transparency and</td>
<td>- Real-time KPI and performance monitoring</td>
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<td>Visibility</td>
<td>- Visualized numbers and figures</td>
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<td>Data Exploitation</td>
<td>- Leveraging the data structure and simplify the information framework</td>
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<td>and Reconstruction</td>
<td>- Data mining driving the efficiency and effectiveness of information utilization</td>
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<td>Optimization and</td>
<td>- Dynamic data analytics-driven from supply chain function</td>
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<td>Integration</td>
<td>- Cross-functional trade-offs value chain integration</td>
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<tr>
<td>Actionable Insights</td>
<td>- Advanced data analysis to improves decision making quality</td>
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<td></td>
<td>- Lower supply chain complexity and simplify action signal</td>
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Figure 12: Value added by BI (ISLI students contribution)
CONCLUSION

Deploying Internet of things to capture data and exchange information is a valuable asset for companies. They can manage and integrate the information within the supply chain through digital eyes and ears of the organization. We can see the value it brings: at planning level, by more accurate and abundant data for forecasting, at sourcing level, by the traceability and visibility on controlling inventory levels, at manufacturing level, by improving the efficiency and safety through receiving real-time information. It contributes to reducing cycle times, fulfilling orders more quickly with higher service level, and cutting out millions of dollars in excess inventory.

In the long term, the use of latest technological advancements will not only improve supply chain responsiveness but will also enhance cash flow and profitability to every segment in the supply chain and ultimately contribute to consumer satisfaction.

By building the information platform, the companies can benefit from organized structure of data to improve supply chain efficiency and agility. By sharing information, organizations will become more competitive in terms of information transparency and collaboration. Insights from real-time information sharing will enable managers to take better and smarter decisions for supply chain operations. Big data and cloud can have a transformational impact on the businesses and the supply chain operating model by enabling organizations realize major benefits like ability to accept volatility, end to end visibility and real-time decision making.

Business intelligence is transforming raw data into useful information for business analysis purposes, which includes reporting, analytics, data mining, business performance management, benchmarking and predictive analytics. BI is used to support business decisions for operational strategies, which are the ultimate objectives of implementing latest technologies and digitalizing the supply chain. It helps to provide product and pricing positioning, offering transparency and visibility via the real-time KPI and performance monitoring and finally improve decision making quality. Many companies’ strategic plans are inspired by BI actionable insights, since they lower supply chain complexity and managers can make better decision making efficiently.

Since the use of new and high technologies is improving our living environment and lifestyle but also boosting our businesses, the question that remains is: “how things might evolve in the future?” ‘Smart cities’ provide a glimpse of the future. How will smart technology creates value for cities to compete on a global scale to attract more people and investors? Will the digitalization of their local supply chains permits them to thrive in a more and more complex world? The global issues like cutting CO2 emissions while boosting economic growth in cities needs new answers. Smart and digital supply chains can help territories to build and create a competitive advantage so that their citizens enjoy the best of a sustainable environment and a dynamic technological future.
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