Digital transformation in the era of Industry 4.0 accelerates the Resilience of Supply Chain (RSC)

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Earlier days, working with a typical company resource planning, inventory approach and transport was usually sufficient to satisfy the needs of the industry. However, technological developments have changed the world of supply chain. Nowadays, Data is the modern currency on which either success or failure can be evaluated. It is also important to decide how technologies and data can allow to achieve business and supply chain goals. This transformation can be identified as the Industry 4.0: The 4th industrial revolution. It can be further clarified as the digital transformation for implementation of cyber-physical integration concepts in manufacturing, supply chain and specially in value creation processes. Basically, it uses embedded software systems, latest control systems and get rid of an internet address in order to connect and addressed through Internet of Things (IoT). In this way, products, and productive capacity are interconnected and able to 'communicate', allowing the latest methods of production, time optimization, and value creation techniques. Cyber-physical networks and systems are creating the required skills for industrial automation. These features are as same as that learned from the IoT in the industry, such as remote monitoring or tracking and tracing.

Figure 1 Industrial 4.0; Main components (Source: google)

The concept of Industry 4.0 is also used mutually with the fourth industrial revolution. Many industry expertise defined it as; *1) A bridge between the digital & physical environment by cyber-physical processes, allowed by Industrial Internet of Things, 2) Much higher level of automation than in the 3rd industrial revolution, 3) A move from a typical industrial control structure to where smart products define its development stages.* A common interest was among the diverse views on how data analytics capabilities and digitalization can be demonstrate in forecasting the future and identifying real-time scenarios. Industry 4.0 is designed to enable automated decision-making systems, to track processes and assets in real time, and to enable similarly real-time networked value generation through early stakeholder engagement and horizontal and vertical integration.

In the present situation, the organizational supply chain has become extremely volatile and unstable as a result of the Covid-19 epidemic. The pandemic impacts businesses and institutions that are an important part of everyday life. Just-in-time supply chain firms and countries that rely on manufactured products are the industries most influenced by Covid-19. These developed trade lines influence not just what consumers buy, but also what manufacturers will produce in the first place. Across the world, the problems encountered by Covid-19 impact on their supply chain that people rely on for food, medicine and hygiene supplies. Moreover, supply chain collapses and adaptations in the middle of the COVID -19 epidemic, along with the post-pandemic recovery analyzes, provide undeniable evidence of the immediate needs of digital transformation to chart supply chain networks and ensure visibility. Hence, this COVID-19 pandemic was a victory for businesses that had already developed digital technology within their day to day activities, a reality checks for organizations that are still expanding, and it was a wake-up call for those that haven't started Industry 4.0 integration. Companies that had upgraded their business to industry 4.0 before to COVID-19; are in a stronger position where they can adapt to the crisis. For example, an Asian consumer packaged goods company was upgraded a digital transformation of its supply chain prior to COVID-19. It was useful to run several situations during the epidemic, to brace itself for unexpected lockdowns of manufacturing sites or shortages in raw-material supplies.

Due to the pandemic situation most of the industries still face poor performance and malfunction due to technological and deficiencies in their management and supply chains. Hence, the Industry 4.0 concept becomes one of the highly essential factors to maximize the performance of organizations in the industry and this digital transformation leads to more efficient, agile and consumer-focused supply chain. The transformation of the whole supply chain can be accomplished with the adoption of Cyber Physical Systems (CPS) and implementing Big Data and technologies such as the Internet of Things (IoT) and cloud-based data management systems. These technologies are essential for facilitating the information flow, especially in the supply chain. Cyber Security technology is important to preserve the data and information developed in the industry and across the entire supply chain. (as shown in the figure 02)

Industry 4.0, in its nature, indicate to a collection of intellectual systems that allows to achieve a range of strategic and competitive advantages, with focus on greater stability in decision making process, trends of attainable consistency, reliability in development and improved efficiency. It also involves, versatility in production, cost savings, improvement in quality and productivity of the production process and reduce in the product’s delivery time to the consumer. While the Industry 4.0 concept has

a larger effect on the manufacturing sector, other businesses are also impacted, such as service providers, retailers and others.

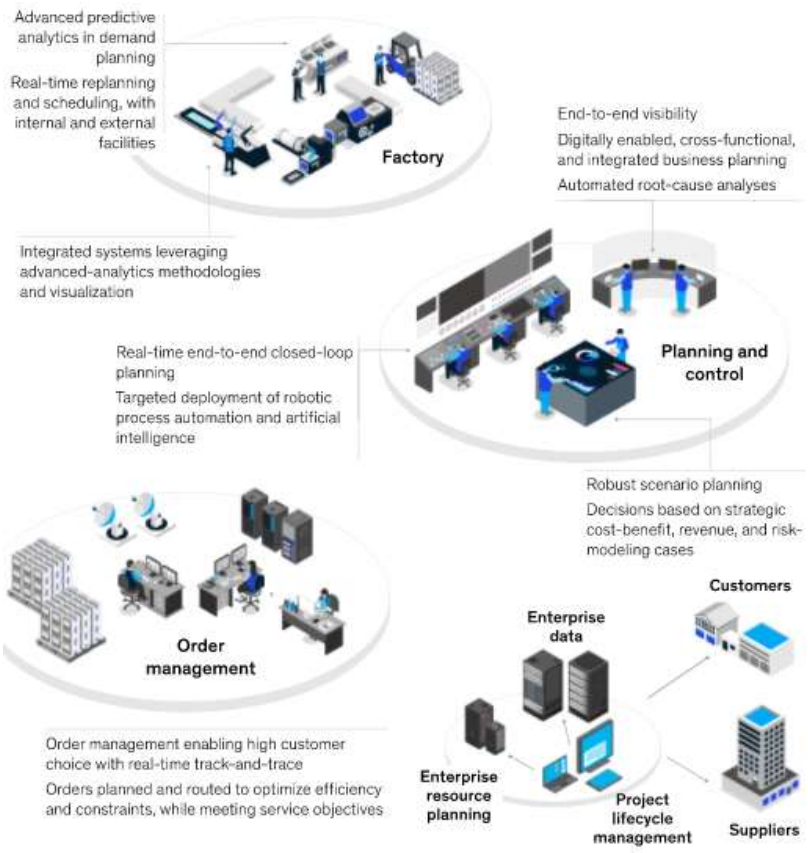

Figure 2 Industry 4.0 turns Artificial intelligence into flexible responsive operations.(Source: google)

However, when evaluating the concept of Industry 4.0, there are various obstacles. Although managing the company's internal operations, processes and other resources with its customers and suppliers enables the company to receive benefits in terms of performance, efficiency and expense, it may also bring great challenges to businesses, particularly with regard to security and privacy. For example, the goal is to reduce the risks of improper data acquisition, leakage and unauthorized disclosure of information, and the implementation of spyware, among other challenges.

Even though there are few negative impacts; the COVID-19 pandemic is forcing organizations to rethink their organization’s direction and operational strategies and the technologies needs to implement. Unsurprisingly, the given unique situations of the epidemic, agility, flexibility and resilience in operations have occurred as top strategic priorities above minimizing cost and raising productivity, which considered as the main objective. Similarly, technologies that enable remote working and its collaboration can be considered as the main priority Industry 4.0. Other priorities are technologies to support collaboration and visibility within the end-to-end supply chain, reflecting the need to manage disrupted and unpredictable supply chain networks.

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