DIGITAL DISRUPTION AT THE DOOR STEPS OF INDUSTRIAL ENTERPRISE

Digitalization 2.0 and Future of Enterprises

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EXECUTIVE SUMMARY

The first wave of Digitalization (Digitalization 1.0) transformed the way we buy, consume and pay for goods and services – the commercial value exchange between seller and buyer was digitalized. Platform based market place aggregators like Amazon, Uber et al led the disruption in Digitalization 1.0. The key technology stack that enabled digital revolution in Digitalization 1.0 was Cloud, Analytics, Mobile and Social Media.

Digitalization 1.0 was characterized by

► Exponential growth in internet, digital payment platforms and smart phone users gave a fillip to the **ecommerce** business.

► Delivering great consumer experience across all channels became an important aspect to acquire and retain them. Content was completely digitized in media and entertainment industry. Value exchange in these industries was largely digitized

► **Customer acquisition and reach** was enabled by analytics, enterprises were able to target specific customers with targeted promotion and marketing material. Search engine optimization (SEO) was the core online marketing strategy

► **Market place aggregators** emerged as new sales channel and disrupted traditional businesses in mobility and hospitality industries. The market valuation gained by these market place aggregators caught the attention of traditional businesses and forced them into digital adoption.

Digitalization 1.0 largely disrupted industries in the Business to Customer (B2C) spectrum such as media, retail, entertainment and banking. Organizations in Industrial segment that embraced Digitalization 1.0 realized the benefits of leveraging data and analytics were able to build competitive advantage in marketing and supply chain.

Parallel technological advancements is paving way for Digitalization 2.0

The technology landscape has continued to evolve, while data established itself as a key corporate asset, the way data was collected (automatically through sensors, RFID), stored (more cloud computing adaption) and analyzed (Big data) continued to evolve rapidly.

Internet of Things, Artificial Intelligence, 3D printing, smart robots and block chain, emerged as leading technologies in Wave 2 of Digitalization (Digitalization 2.0), these emerging technologies have moved the needle of digital disruption deeper into the value chain – it is fundamentally redefining the way the value is created and transferred to customers. Industrial conglomerates such as Bosch, GE and Siemens along with the digital natives are leading this wave of digitalization.

Digitalization 2.0 is poised to disrupt many of analog incumbent industrial and manufacturing houses. Recognizing the potential and impact of these emerging technologies many governments have formed high tech projects such as Industrie 4.0 (German Government), Factories of Future (European Union) to facilitate industrial adaption of these technologies.

Read on to understand more about Digitalization 2.0 and how they are defining the future of enterprises.

DIGITALIZATION 2.0

Enterprises leveraged analytics and cloud compute abilities to create competitive advantage in Digitalization 1.0 for e.g. An auto OEM could use data from dealers, text messages recorded by customer care, warranty claims information and so on to understand and develop an 'early warning' program to identify vehicle defects. Though, a significant progress this was still a post facto analysis of defects.

With advancements in technology the same auto OEM is in a position to draw real-time data from its vehicle and is able predict the part failure before it occurs, this characterizes Digitalization 2.0. This is now possible as:

▶ Things are able to communicate - Sensors, RFID devices attached to things are able to relay data in real time to cloud based platforms
▶ Systems are able to listen and interpret (IoT and big data platforms are able to collect vast amount of data and, analytical applications are able to interpret data and provide actionable insights)
▶ Systems are able to act (Artificial intelligence has enabled 'systems' to take action with or without collaboration from human beings)
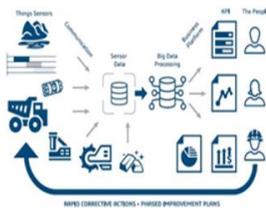
Things are able to communicate	Systems are able to listen and interpret	Systems are able to act
▶ Perceptive sensors (IoT) ▶ Wearable User Interfaces ▶ Machine to Machine communication Services ▶ Augmented Reality, Virtual Reality, Digital Twin ▶ Edge computing	▶ Deep Learning ▶ Big Data ▶ Machine Learning ▶ IoT Platforms ▶ Speech and Image Recognition	▶ Smart Robots ▶ Autonomous Vehicles ▶ Cognitive Expert Advisors ▶ Virtual Assistants ▶ Process Automation ▶ 3D Printing

THINGS ARE ABLE TO COMMUNICATE

A variety of sensors are now able to sense, collect and relay different parameters of an object – pulse rate, tilt, temperature and vibration of goods being transported, product count that have passed through an assembly line, number of parts that a specialized tool in press shop has pressed and so on.

Sensing capabilities of these devices have grown significantly, while cost of sensors have reduced. The ability to collect the sensed data has increased with multiple technologies such as Bluetooth, LoRa, MQTTP communication protocols.

Devices with required compute power are able to process minimal required business rule at the device layer itself (Edge computing), this has increased the ability of things / machines to respond in real-time.

Digital Twin technology has literally blurred the gap between physical and virtual world, a digital twin of a vehicle can virtually simulate the wear and team using mathematical models providing invaluable inputs for product re-design.

Products, machines, utility meters, robots and people working on shop floor were largely discreet objects and did not integrate smartly. Products on the field did not integrate to the customer and his ecosystem e.g. a tractor previously did not understand anything about its own health condition or the field it ploughed.

These technologies have enabled smart Machine to Machine (M2M), Human to Machine (H2M) communications providing innumerable possibilities for value creation. They have added intelligence to inanimate objects and environment.

SYSTEMS ARE ABLE TO LISTEN AND INTERPRET

The ability of systems to communicate has been smartly harnessed by systems that are able collect this data, store and interpret. IoT, Big data and Analytical applications platforms have evolved rapidly to collect the vast amount of data being churned out from 'things' and its eco-system. Mathematical and statistical patterns executed on the data is providing insights that were previously in the realm of 'Unforeseen circumstances'. Data is collected and actionable insights are processed and provided in the required time.

On one end of the spectrum, this is enabling overall process and operational efficiency to the enterprise and at another end is fueling growth through new business models and value added services to the customers.

SYSTEMS ARE ABLE TO ACT

The logical extension of growing intelligence of things is there growing ability to act autonomously. Intelligent machines and robots are now able to mimic multiple human actions mainly in the space

of material handling, manufacturing operations, intra-plant logistics, autonomous driving and so on. These improvements further promises to change the landscape of manufacturing and supply chain operations.

Intelligent machine modules re-arranging autonomously as per the production schedule communicated by a software application is another example of applying AI in manufacturing. This can experienced in Bosch Rexroth, Homburg plant.

Support functions such as finance, accounting and procurement also are witnessing huge potential for use of artificial intelligence through deployment of Robotic Process Automation, Virtual Personal Assistants and Cognitive expert for decision making (e.g. buy/sell decisions in commodity market).

FUTURE ENTERPRISES

Digitalization 2.0 is another opportunity for Industrial enterprises to transform and be relevant in the digital era. Enterprises that successfully transform will define the future course of the industry. These Future Enterprises will aggressively drive work and market disruption using digital technologies as a lever.

At the core of the Future Enterprise:
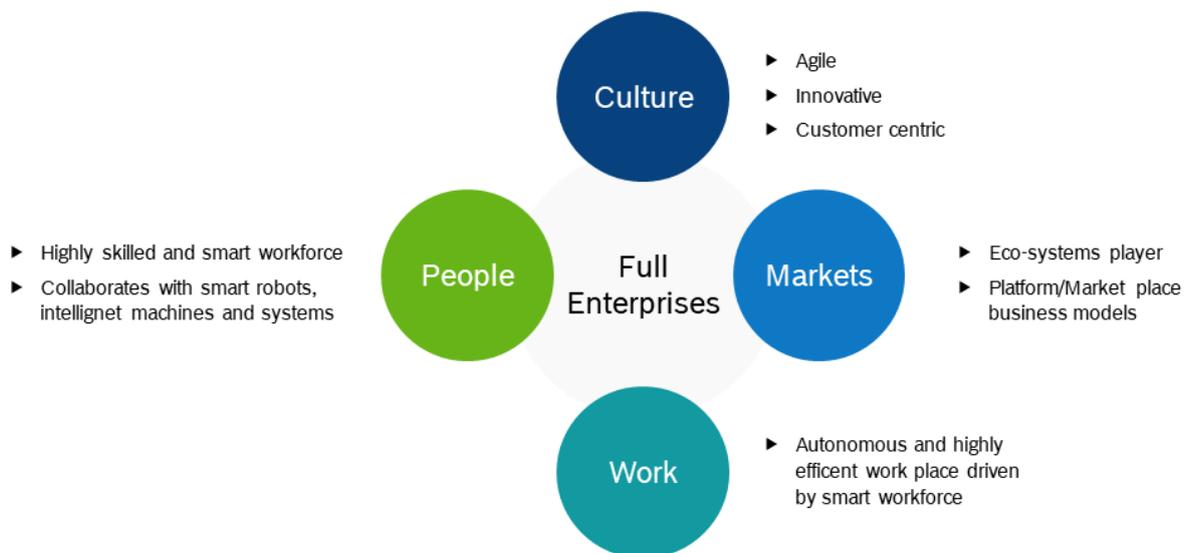
- ► Future enterprises will be an ecosystems player: Enterprises will evolve from selling products to selling customer success
- ► Smart Robots and Autonomous systems will collaborate with smart workforce to create highly efficient work place
- ► Agility, Innovation and customer centricity will be the prevalent culture
- ► Future Business models will be platform / market-place driven – new services and customers will be added at zero or negligible marginal costs

Bosch is helping build the "Future Enterprises", the next section provides insights to some key offerings.

HOW BOSCH IS HELPING BUILD 'ENTERPRISES OF FUTURE'?

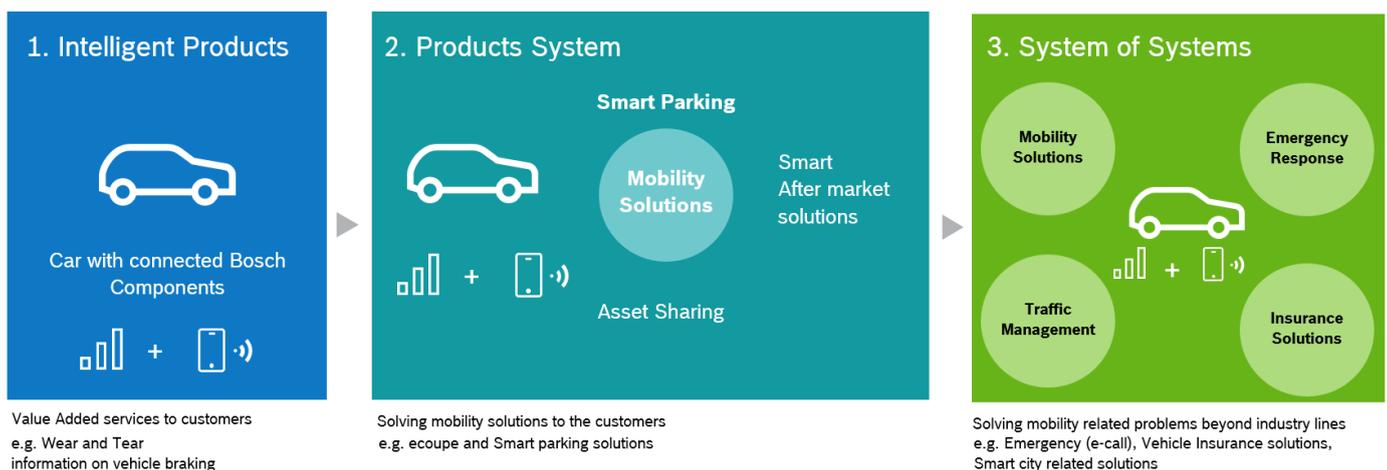Bosch is helping digital transformation of enterprises through its primary service offerings:

▶ #JumpStartDigital, Accelerating digital transformation
▶ Future Products and
▶ Factories of Future

ACCELERATING DIGITAL TRANSFORMATION (#JUMPSTARTDIGITAL)

Digital transformation is akin to any other enterprise transformation initiative, it is an effort to make fundamental changes in the way is business is run it is not incremental in nature. Any such change should be supported from the highest office of the enterprise. It should flow out of a definitive purpose, needs a holistic approach including people reskilling and cultural change. Recognizing the complexities of managing a digital transformation initiative, Bosch has developed "Unified Digital Canvas" as part of #JumpStartDigital service offering to help secure digital initiatives of enterprises.

FUTURE PRODUCTS

Enterprises are increasingly exploring opportunities to expand beyond the traditional industry boundary lines by becoming eco-system players. Products are evolving into intelligent products that not only earn additional dollars but also are intelligent to understand the environment it operates out of and provide extended value to the customer and other stakeholders in the ecosystem


The connected products service offering from Bosch enables an enterprise to become an eco-systems player. Connected Products requires a strong innovation and incubation approach for discovery and development and it is unlike any other technology implementation project.

FUTURE FACTORIES

Work disruption is at the core of Digitalization 2.0 and enterprises are exploring opportunities to digitalize processes, workforce, supply chain and the shop floor. Manufacturing operations and supply chain process transformation are one of the top priorities for enterprises and their pursuing a vision to transform their plants.

At the core of Future Factories
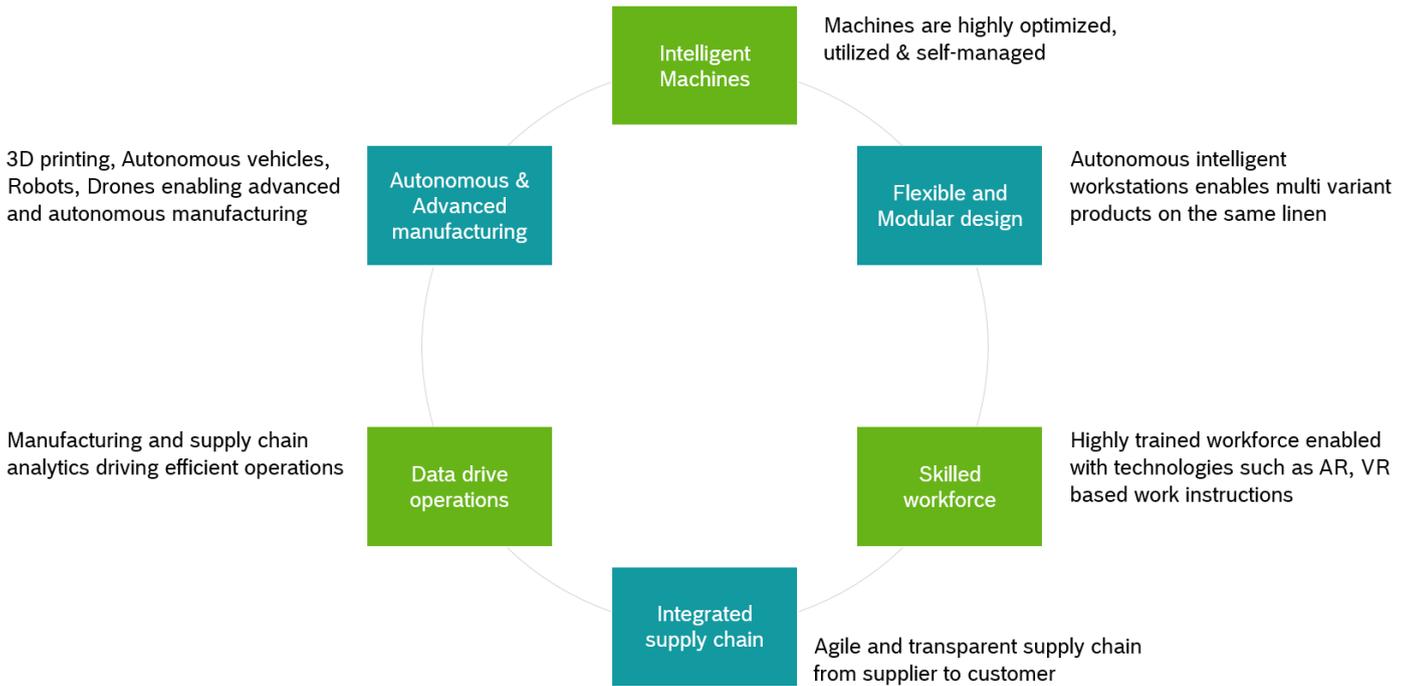
Future Factories solution offering from Bosch helps in transforming the manufacturing operations and supply chain processes.

We are living in one of the most exciting times and have a great opportunity to define and create the future course of our enterprises. Let us together create the Smart and Connected Future Enterprises!