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Mass customization under the internet of things

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Abstract

The study aims to investigate mass customization under the internet of things via comparative qualitative research methods. As a result, manufacturing, supply- chain, and logistics functions will benefit from the broad pene-tration of digital sensors and smart tags that will offer greater potential for visibility, flexibility, and control of product flows, as well as for automation of tasks that enhance product value. In conclusion, the adoption of Mass Customization on the Internet of Things lead to better control and reduce costs and achieve the efficiency of production and this leads to achieving customer satisfaction.

Keywords: Mass Customization (MC), Internet of things (IoT), Customer.

Personalización masiva bajo Internet de las cosas

Resumen

El estudio tiene como objetivo investigar la personalización masiva en Internet de las cosas a través de métodos comparativos de investigación cualitativa. Como resultado, las funciones de fabricación, cadena de suministro y logística se beneficiarán de la amplia penetración de sensores digitales y etiquetas inteligentes que ofrecerán un mayor potencial para la visibilidad, flexibilidad y control de los flujos de productos, así como para la automatización de tareas que mejoran el producto. Valor. En conclusión, la adopción de la personalización masiva en Internet de las cosas conduce a un mejor control y reduce los costos y logra la eficiencia de la producción y esto lleva a lograr la satisfacción del cliente.

Palabras clave: Personalización masiva (MC), Internet de las cosas (IoT), cliente.

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1. INTRODUCTION

Internet of Things has expanded its utility to connect numerous devices for controlling and managing. This high technological paradigm has supported different domains and services to control the connected components remotely. When a user is connected remotely to a huge number of components and manages them, it will be considered as Mass Customization. In Mass customization, all the components will perform similar duties and activities. The remote user needs to activate the initiation of the working of the computers or components (SASSANELLI, SEREGNI, HANKAMMER, CERRI, 2016).

Mass customization is a basic production management and controlling mechanism for highly variant products and services. The Mass Customization enables the user to operate the mass production remotely according to the customers' needs and requirements. When the components are connected to different segments of customer needs and requirements, it tends to prove severally without applying the mass customization. The specific approach provided in IoT is configured with the flexibility to attend the needs of customers specific and customer-centric operations. These applications are designed and customized with the customer orientation spirit to work with the robust operational model. In this operation, the knowledge-based configuration is playing a vital role and connected with software technology operations with mass customization within an organization. The mass customization is a peculiar technological paradigm to support individual operations with individual customer-centric services

and monitored as a whole with a single click of operations remotely by a single user. The higher number of devices are connected to a single user can also be provided with a dashboard to customize the operations and initiate the operations (PARK, PARK, BYUN, PARK, 2016).

When it is connected with the decision making and connected with the customers' interaction it will be customized accordingly to receive the requests from the customers and act accordingly (PATEL, 2016). In Mass Customization the customers are connected to dedicated components or computers to provide the services from the organization. Providing the services to every customer with distinct and customized services needs to be done with a single user for all operations. The MC is enabling the companies to meet the specific requirements of the customers with the global competition with single user management and controlling system. This process has facilitated good leverage to the manufacturers in providing the operational feasibility with a single user operation for more number of customers with global competitive spirit and ease of use operations (SUGINOUCHI, KOKURYO & KAIHARA, 2017).

These operations feasibility has increased the popularity of the Internet of Things and made them grow dynamically into the phase of industries and services. It is estimated that the services extended by IoT can reach nearly 212 billion entities by 2020. The rapid growth of IoT in all segments and domains is incredible. The growth in Mass Customization is also recorded with low-cost maintenance and value creation feasibility. MC also needs the consumer sharing and

interaction with suppliers for product supply and service provision with fast service provision. The following predominant features can be identified in the IoT with Mass Customization.

The properties of Mass Customization	
Goal	To deliver the goods and services at an affordable price with needed customization and variation required by the client.
Economics	To provide better economics for the organizations which are introducing the MC to serve the customers.
Focus	On different services and customization according to the needs of customers.
Product	Variety of products and services with standard modules based on customer needs.
Services	To provide customer-centric services with suppliers' design and delivery models.
Key Features	Provides services to a huge number of customers. Provides customer-oriented and customer-centric services and products with specific time schedules. Provides low cost and efficient services to the client.
Organization	Flexible and adaptive
Customer involvement	Customer involvement will be more to have customer-centric services by the organization with the help of MC

Mass Customization predominantly requires the product consumer sharing and requirements specifications of product delivery, production and design. Mass Communication is facilitating consumers with multiple benefits through the Internet of Things. It is rich with cost-effective and control management and efficiency (DUARTE, SANCHES & DEDINI, 2017).

2. METHODOLOGY

Mass Customization is regarded as the marketing and manufacturing technique to combine the flexibility and personalization of custom-made products. It is meant for facilitating the lowest unit costs associated with mass production. MC is used predominantly service industry as well as manufacturing industries. It is linked with different types of customization without increasing the costs (MODRAK, SOLTYSOVA, MODRAK, & BEHUNOVA, 2017).

MC refers to provide personalized and custom-tailored goods and services to cater to the needs of the consumers' diverse and changing needs in accordance with the mass production prices. MC is configured in association with the computer-based hardware technologies, software technologies, internet, cloud computing technologies, sensors and other embedded technologies like RFID etc. The combination of technologies used in Mass Customization is meant for providing the products and services through flexible processes in high volumes in accordance with the customer specifications. MC is a predominant advanced process facilitating the customers through Internet technologies to be operated by the users remotely (TSENG, HU & JACK, 2014).

MC is used for controlling and managing the huge number of components connected to the customers to provide different kinds of services. It is also linked with Do-It-Yourself vision to provide smart and customizable IoT applications. MC is providing the aid of

technology-oriented programming whereas the customers are not exposed and experienced in the technical knowledge for programming. The state of the art prototyping will be controlled and managed by the specific programmer remotely connected with many consumers and customers. The customers are not rich with the knowledge to operate the programming and take services from the companies. So the remote user or programmer appointed by the company will initiate the program and manage the program according to the specific needs of the customers and consumers (ODEKU, 2015).

MC needs to perform the data storage in the local servers and computers and download the information from the servers. At this movement, the consumers need not know the IP address of the servers and need some assistance to get the things from the server. In this paper, the concept of Mass Customization is depicted in a versatile manner (SAMOCIUK & ADAMCZYK, 2017).

MC is working like a tool to capture the market movement in association with IoT technologies. The main goal of the implementation of MC is to reduce the dependency of end-user to use proprietary products. The technique used in association with the method of creating, modifying or repairing the existing technological implementation with the aid of a professional expertization of the company employees operating remotely through the IoT mechanism. MC is working with a peculiar architecture configured on the basis of client-specific requirements and customer-centric needs and

components, products or services that it is providing (O'LEARY, 2013).

The Internet of Things is the base for MC. IoT is the vehicle for the next level operational Excellence improvements and global business transformation. IoT is widely used in manufacturing units. The advent of IoT has enabled the manufacturing field to work efficiently to improve the revenue and safety for the workers with naval business models. The digitization and digital models have been introduced by the implementation of IoT. Many predominant companies are transforming their manufacturing activities into the digital automation process (SIEVÄNEN & HEISKALA, 2014).

The digital automation with the association of IoT has occupied Information and Telecommunication system, Logistics and other services, electronic systems and equipment, Social Infrastructure, power systems, smart life & Eco-friendly systems, Automotive systems, Financial Services, High functional materials, Construction machinery and airline industry. The companies like Hitachi have started mass production with automobile manufacturing with the help of IT systems. In addition to that, it has started the Mass Customization for this home appliances manufacturing in accordance with the consumer whims and fancies (ZENNARO, 2016).

The smart manufacturing process has started in the association of IoT has increased productivity, Quality, Flexibility and safety. The power of mass customization and Virtualization has enabled the

manufacturing industry to achieve the best results to initiate smart manufacturing. The smart manufacturing has developed products like tracking, monitoring, remote control diagnostics and maintenance with the help of the Internet of Technology. IoT has given a way to smart services in the field of manufacturing in association with cloud computing and given a way for introducing the product as a service and monetization of Data.

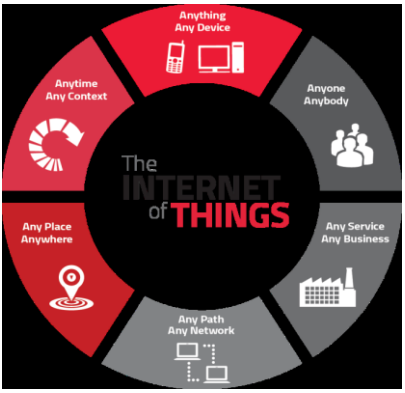

Figure 1: Internet of Things

The implementation of IoT with MC has given path for production shifts to go as planned. It is has enabled the end to end visibility of operations in the poor. The productivity and quality have been improved with the IoT in association with the smart manufacturing automation process.

Figure 2: utility of IoT in Industries

IoT with smart manufacturing has unleashed Point solutions, fragmented databases, standard apps and systems of record and functional excellence. The digital smart automation with IoT has given rise to predictive maintenance, advanced process control, dynamic scheduling, predictive quality, factory qualities management, real-time supply chain optimization, and connected field service. The smart manufacturing automation with IoT is configured with visualization, integration, analysis, predictive, prescriptive and symbiotic automation processes. This has given strength to the companies to achieve the next level of Opex performance with Six Sigma standards.

Internet of Things has expanded its service to all other domains and manufacturing industries with the digital automation process. IoT associated artificial intelligence has switched over to automated operations, end-user access to data and algorithms, given scope for IoT use cases, analytics across the business, human and machine data,

given threshold to the centralized logging and object storage process and give a way for developments and onboarding of Information Technology assets. IoT has framed 6 layers in developing the digital automation architecture for many industrial and manufacturing units.

IoT associated Mass Customization has expanded to different modules. Every module is developed with new accounting models. In this time compression, a core idea in the control model design is predominant. Mass production is dominating the centralized hierarchical control. Scientific management and functional oriented layout are designed in this model. In this model mass production, productivity and capacity utilization are need to be executed. The proposed model is focusing on the identification of predicted product demand and required productivity to meet the demand. The new model is working with inline of throughput time compression potential in concern with transport, production, assembly and delivery models.

Every unit is supported by IoT associated Mass Customization modules. Every model is taking care of distinct accounting operations. The association of IoT with Mass Customization has done justification in catering to the needs of the consumers. The consumers' list might be so big and every consumers' whims and fancies are needed to be fulfilled by the services or products through the internet. For products, a separate accounting model has been designed and for services, a distinct accounting model is designed. When the new pricing should affect the customer and how much percentage is needed to be increased over a period of time for products and services will be

decided by the new accounting model. While calculating the pricing for pay for what you use packages the new accounting model is useful and generates the bill for the usage only. In this case, the new accounting modules can be accessed by the system and eavesdrop the information from the server.

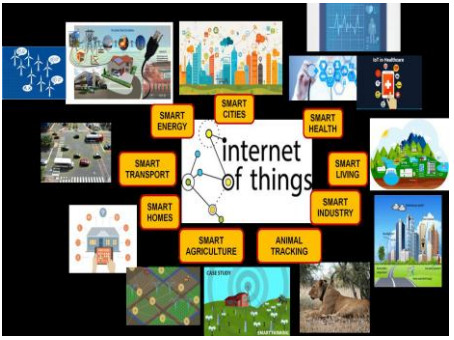

Figure 3: IoT in various fields

Continuous monitoring is essentially required in the European Communities, the United States of America and Germany. The accounting module is facilitating what the customer or consumer is required. RFID tags used in the production environment and management of inventory the continuous monitoring is required.

Database usage and maintenance is essentially required with continuous monitoring. Big data consists of accounting transactions, product design, product demand, customer details, supplier details etc. for this continuous monitoring is required. When the social media transactions and discussions are taking place, the continuous

monitoring is required. The continuous monitoring is definitely required for the for CMA to Implement IoT. IoT will not support the component when the battery is not sufficient. Equipment and Employee Monitoring: all companies need an employee.

3. RESULT

A supply chain is a set of organizations, people, activities, information, and resources that create or move a product or service from suppliers to customers. To enhance supply chains, IoT devices are embedded in products for inventory management systems. This benefits the industry by identifying bottlenecks, reducing inefficiencies, and as a result, reducing costs. IoT devices have been used in supply chain management since the 1990's the term Internet of Things was originally used to reference Radio Frequency Identification tags, a technology primarily used in the supply chain. According to Tata Consulting, a majority of consumer packaged goods companies use IoT devices to monitor the production and distribution of their products. For example, Coca-Cola embeds sensors both in its products and vending machines to remotely detect when a machine is not operating properly. Such integration of IoT devices has allowed companies to address distribution bottlenecks and improve supply management to reduce labor and capital costs. IoT devices can also enable manufacturers to determine exactly how much product is at a location, giving them the information they need to improve their

restocking program. The shipping process uses IoT devices to measure environmental data, such as temperature (OMOERA, 2017).

On the horizon, manufacturing, supply- chain, and logistics functions will benefit from the broad pene-tration of digital sensors and smart tags that will offer greater potential for visibility, flexibility, and control of product flows, as well as for automation of tasks that enhance product value. This is the trend towards the Internet of Things, which blends sensors, standards-based networks, and smart analytics to enable new information architectures for optimizing production.

4. CONCLUSION

The adoption of Mass Customization on the Internet of Things lead to better control and reduce costs and achieve efficiency of production and this leads to the achieving customer satisfaction, so the Companies should move towards the exploitation of technology in the achievement of competitive advantages and must be adopted accounting programs commensurate with the concept of Internet of Things stuff that will rely on a larger size in the future and thus lead to the failure of traditional accounting concepts to keep up with those developments.

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