Internet Of Things (Iot) In A Retail Environment. The New Strategy For Firm's Development

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Abstract

The mixture of the Internet and emerging technologies such as NFC (Nearfield Communications), real-time localization, and embedded sensors (beacons) transform ordinary objects (things) into smart objects that can recognize the state of the environment and react accordingly to the changing conditions or collect data. Internet of Things (IoT) is a new revolution of the Internet that is driven by the recent advancements in the world of: sensor networks, mobile devices, wireless communications and cloud technologies. Experts forecast that by the year 2020 there will be a total of 50 billion devices connected to the internet. The digitization of machines, cars, and other elements of the physical world is a influential idea. The IoT is starting to have a real impact by changing how goods are made and distributed, how products are serviced and refined. The article discusses the new business models and new strategy for the firms in order to achieve competitive advantage due to use the capabilities of the IoT, especially in the field of mobile sensors (e.g. iBeacons). Such a business model is probably the greatest opportunity in the next years to create growth in the digital economy.

Keywords: Internet of Things (IoT), business model, strategy, retail sector

Introduction

Until now, it is the technology titans and born-digital companies that have taken advantage of digital economy by realizing technology's power and developing new platform business models to gain extraordinary profits. They have dominated in terms of growth, profits, and high market capitalizations gains that have been invested back into new digital ecosystems. Today, there is an opportunity for traditional companies to implement new digital business models.

The Internet of Things (IoT) is a recent communication paradigm that envisions a near future, in which the objects of everyday life will be equipped with microcontrollers, transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another (and with the users), becoming an integral part of the Internet. The IoT could be defined as a cohesive system where physical objects are seamlessly integrated into the information network, and where the physical objects can become active participants in business processes. Services are available to interact with objects over the Internet, query their state and any information associated with them (Haller, Karnouskos, Schroth, 2009).

According to a recent McKinsey study, the IoT can create global added economic value of up to 11 trillion dollars in 2025. This corresponds to around 11% of global economic performance. The Internet of Things has the greatest potential to influence retail networks, factories (up to 3.7 trillion dollars economic surplus value), cities (1.7 trillion dollars) and the healthcare industry (1.6 trillion dollars). In turn, the Industrial Internet of Things (IIoT) is already a reality in many places. As analysts from IDC have discovered, that 1/4 German manufacturing company utilized a predictive maintenance solution in 2014. Multiple sensors record the condition of machines and pass on the data online to analysis software, which then calculates the best time to carry out service and maintenance (McKinsey, 2015).

It's worth to notice, that fast increase in the number of smartphones worldwide, simplicity of use, functionality, together with a widespread and mostly inexpensive internet access - makes the mobile phone and the associated functions an integral part of consumer life.

Fig.1 Growth of the global digital commerce market (US$ bn)
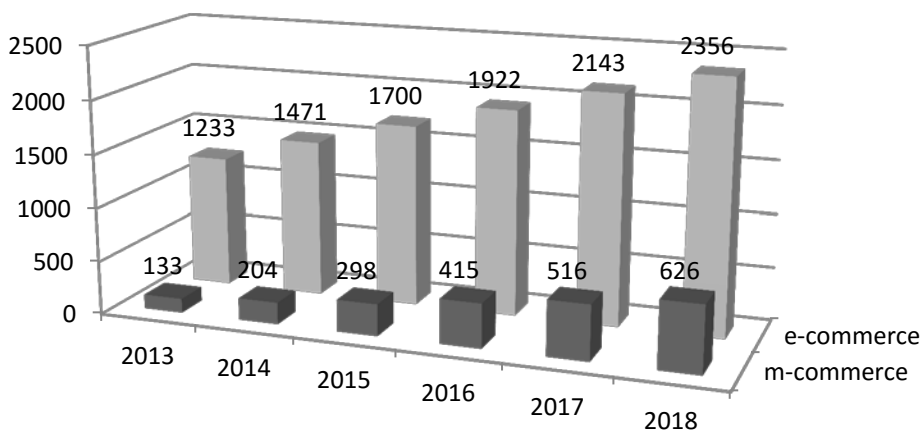
Source: The Mobile Economy 2015.

The mobile industry continues to grow, with a total of 3.6 billion unique mobile subscribers at the end of 2014. 1/2 of the world's population now has a mobile subscription. An additional one billion subscribers are predicted by 2020, taking the global penetration rate to approximately 60%. There were 7.1 billion global SIM connections at the end of 2014, and a further 243 million machine-to-machine (M2M) connections (The Mobile Economy 2015). The result is that the increasing percentage of purchases are made by or with the use of a mobile phone - 28% of all purchases in traditional stores is closely linked to the smartphone. The consumers use online coupons and offers, compare prices and read product reviews, use mobile payments. The producers and retailers are looking for an innovative marketing tools that will help them to identify customers. They want to transfer "marketing message" in an easy and efficient way directly to mobile consumers. This trend will deepen, reaching the point that the smartphone will be used for nearly all types of interaction between merchants and consumers.

The new technologies in the retail environment. The new opportunity for redefining business strategy and business model

Companies will have to open up their business models. The companies should be more agile. There is a need to implement innovative tools related to strategic management (Nowodziński, 2011; 2013). In this case, more ideas will become available to them for consideration, and many more competitive strategies, as well. Companies that effectively build or change theirs business models are more likely to achieve their market goals and even exceed the expectations of stakeholders (Mahadevan, 2000). A contemporary business model performs two important functions: it creates value, and it captures a portion of that value. It creates value by defining a series of activities from raw materials through to the final consumer that will yield a new product or service with value being added throughout the various activities. The business model captures value by establishing a unique resource, asset, or position within that series of activities, where the firm enjoys a competitive advantage (Chesbrough, 2013). So we must agree, that business models are essentially linked with technological innovation, so the business model could be define as a system that solves the problem of identifying who is (or are) the customer(s), engaging with their needs, delivering satisfaction, and monetizing the value (Baden-Fuller, Haefliger, 2013).

So, it is worth considering a new factors affecting the business model which could be helpful to achieve better performance by the company – due to use the potential of IoT.

Internet of Things will provide unique opportunities to penetrate technology and automation into everything we do, and at the same time, provide a enormous playing field for businesses to develop innovative business models to capture market share (Narasimha, Vijaya. 2015).

According to latest McKinsey report on IoT, we define retail environments broadly as physical spaces where consumers engage in commerce – considering or purchasing goods or services. This includes traditional stores and showrooms. It also includes physical spaces where services are purchased, such as bank branches, theaters, and sports arenas. Retail environments have undergone significant change over the last years due to the introduction of IT technologies, including the rise of online shopping. The IoT has the potential to be a source of bigger revolution , but IoT can also provide traditional retailers with the tools to compete—and coexist—with the online retail world as "omni-channel" shopping erases the distinction between online and offline shops. The Internet of Things, for example, can guide the shopper to the item she has been looking at online when she enters the store and text her a personalized coupon to make the purchase in-store that day. IoT technology can also provide data to optimize store layouts, enable fully automated checkout, and fine-tune inventory management. These and other innovations could enable new business models and allow retailers to improve productivity, reduce costs, and raise sales. IoT adoption in the retail setting will depend not only on the evolution of technology but also the development of new business processes. IoT systems require modern store formats and investments in data systems and electronic payment systems. Widespread IoT adoption would affect players across the value chain, including employees and consumers. It has the potential to reduce the need for labor on the selling floor and at checkout, while raising the amount of revenue per customer (increasing the "shopping basket") through customization and cross-channel (online/offline) selling. Consumers would gain more value through convenience, time saving, and more attractive customized promotions. To remain competitive, companies would need to master new ways of operating and learn to collaborate closely with technology and data vendors. Adoption of payments, security, and inventory control systems has accelerated- by adopting Internet of Things technologies, retailers can improve their economics, lowering inventory costs, raising productivity, and improving the customer experience (the largest potential are automated checkout and real-time advertising and promotion) (Manyika, et al. 2015).

In the contemporary economy, one of the significant factors determining the activities of enterprises is that of change in the behaviour of consumers on the market. These changes may be the result of the impact of various circumstances. The most important of these include the impact of the

environment in economic, demographic, socio-cultural, technical and technological dimensions, among others. Each of the aforesaid dimensions has an impact on the formation of new forms of consumption in both the short-term and long-term periods of time. One of the new forms is econsumer behaviour, which involves the realization of the process of consumption on the Internet. Its development is associated with new forms of communication. Mobile equipment (cellular phones, smartphones, tablets) with connections to the Internet facilitate the acquisition and consumption of consumer goods outside of traditional shops, which in turn has an impact on the creation of new trends of consumption (Bylok, Pabian, Tomski, 2015).

The building blocks of the Internet of Things in the retail sector: beacons and mobile applications

Compared with the Internet, IoT provides a wider platform to share more information. In this situation, the information service in IoT is necessary to organize the process of getting and sharing information for the IoT user (Shang, Zhang, Chen, 2012). There are increasingly benefits for consumers from the growing range of new connected services, with a focus on mobile applications and the potential of beacon technology.

Beacon is a hardware transmitter - a class of Bluetooth low energy (LE) device that broadcasts his identifier to nearby portable electronic devices. The technology enables smartphones, tablets and other devices to perform actions when in close proximity to such device. Beacon uses Bluetooth low energy proximity sensing to transmit a universally unique identifier picked up by a compatible app or operating system. Once setup, beacons will continuously broadcast a signal (similar to a radio station) to create a mesh network connected to specified platform and API. By adding such functionality to customer mobile app, merchant can create sophisticated indoor positioning, proximity detection, and personal interaction systems – suitable for a variety of purposes inside the store, for example. The identifier can be used to determine the device's physical location, track customers, or trigger a location-based action on the device such as a check-in on social media or a push notification. One application is distributing messages at a specific POI (Point of Interest), for example a store, a bus stop, a room or a more specific location like a piece of furniture or a vending machine.

By the way, iBeacon is a communication protocol developed by Apple on top of Bluetooth Smart Technology (BST) and Bluetooth Low Energy (BLE). It allows developers to create mobile apps aware of location context provided by beacons. Beacons broadcast small packets of data, containing their iBeacon ID and information about signal strength, so that the e.g. mobile device can recognize which beacon it receives and how far it is. The transmitter may be placed inside a kind of a shell that allows it to be

easily attached to flat surfaces such as wood, concrete or glass. With the help of an beacon, a smartphone's software can approximately find its relative location to an beacon. Retail stores use the beacons for mobile commerce, offering customers special deals through mobile marketing, and can enable mobile payments through point of sale systems. Beacons enable developers and organizations of any size, to create and deliver an astounding range of experiences – from creating new ways to interact with technology, enhancing brand experiences with contextual interaction, to boosting business process efficiencies with actionable data. Beacons can be used for various purposes, as described below (Newman, 2014; Willmott, 2014; Shankara 2015):

— Show customers available product options or provide additional information (e.g. transfer of business information at the POS - coupons, discounts, promotional offers) (Puto, Koscielniak 2015),
— Payments making - Allow customers to pay / identify themselves using their smartphone (Flamme, Grieve, 2014),
— Provide rewards and incentives based on actionable customer behaviors,
— Transmission of information during sporting or cultural events - create an interactive tour through e.g. an art exhibition or historical journey,
— Providing content (free newspapers and magazines in digital form),
— Transmitting of real-time information on train stations, airports, stations, public transport taking account of delays, changes in the schedules or weather conditions (Dziekan, Kottenhoff, 2007).

The application that receives the signal sent by a transmitter beacon immediately sends information about logging within it to analysis software that collects data and presents it in the administration panel formatted and calls on the phone pre-programmed actions. At the present time, the most popular ways to use such technology are those that are related with the displaying the information to customer in retail stores. Analytical engines which is powered by the information based on the behavior of the consumer and application usage patterns sends a personalized offer, notification or commercial information (Niemeier, Zocchi & Catena, 2013).

The customer value is growing steadily, in the oversupply of products era. So, companies have to look for the innovative solutions that enable them in very effective analysis of customer behavior at the point of sale (Skowron-Grabowska, Sukiennik, 2015). Analysis of customer behavior at the point of sale is becoming increasingly important. Companies try their best to meet the consumer requirements and needs their manufacturing capabilities. Only comprehensive knowledge about consumer behavior may provide the market success. The modern market is also about optimizing the operating costs. In this context, the Information about the consumer is necessary in order to better staff management. The managers want to know more and more about

traffic at the point of sale and the average length of time the client spends there. The platform provides information on consumer behavior at the point of sale, based on data from the mobile application. One of the possible features is data management and grouping records according to certain criteria (eg. age of customers, first time customers and returning ones). Unlike other methods of measuring customer behavior beacon technology gives results with 100% accuracy, eliminating uncertainty factor in interpreting the observations and desktop research. Service based on analysis of customer behavior and their customer journey along the store, can be a source of commercial information and gives a possibility to communicate with the customer in real time with the tailored offer. The system is based on the 3 main subsystems, as described below:

— Software engine - collecting and processing the data sent by a mobile application from the phone located within the transmitter (beacon),
— Customer panel - available from the website, along with the software engine generates analysis and allows data management,
— Dedicated mobile application supporting sales and connecting the brand with consumers, supporting mobile marketing channel.

Communication between the transmitter and the mobile device allows to:
— survey the number of visits in a given period of time,
— measure the period of time spent in the store,
— mapping of customers at the point of sale (time and number of visits in a given area),
— create and manage marketing campaigns and events in stores,

Examples of functionality to the end-user (eg. retail network customer):
— The ability to send personalized offers and coupons to customers who visit the shop, they decide to leave the store or looking for a specific product,
— The ability to adjust messages according to data such as the status in a loyalty program or transaction history of the customer,
— Pointing the way to a specific product within the store,
— Notification about promotions in the store,
— Mobile payments.

One of the key challenges for today's retailers is not only to encourage customers to use the service or product, but most of all is to establish strong and real connection, commitment to service or product. The customer satisfied with the level of service will probably come back, and in an ideal scenario even recommend the offers to another customer in the near future (Griffin, et al., 2012; Giovanis, Athanasopoulou 2014). There are a number of marketing tools that allow you to build a loyal customer base and undoubtedly one of the most widely used are loyalty programs including

those using all kinds of loyalty cards, stamping, as well as coupons or discount vouchers. The application not only allows you to store all of the above cards, but first of all eliminate spam advertising and concentrate on offers and brands sought after by consumers (Rego, Morgan, Fornell, 2013). Through personalized selection of brands and spatial capabilities the customer will always receive the most relevant information. Taking advantage of the proximity marketing, and beacon technology the consumer receives only offer tailored to their needs in the most appropriate time, when making purchase decisions, and the purchases made. This property provides marketers with the opportunity to target location-sensitive promotional offers to mobile device users. Conventional marketing media such as billboards also allow location-specific messages, but with mobile devices, such information can be targeted to the location of the individual user based on their stated preferences and revealed behaviors (Shankar, 2012). Loyalty cards transferred to the application are always within reach, and their number is unlimited, helping consumers always use occasions. The mobile application can be adapted to customer needs. It is worth to notice, that mobile channel has 3x greater efficiency of marketing activities in comparison to the online actions.

Conclusion: Strategy for the future. The Internet of Everything

More and more machines, products and everyday items are going to be fitted with sensors and wireless chips, enabling them to communicate with each other. In terms of the overall economy, the Internet of Things seems poised to make a gigantic leap. Experts are predicting that 24 billion devices will turn into "smart" devices and start connecting to the internet in the next four years. This will include at least 10 billion smartphones by 2020.

Potentialities offered by the IoT make possible the development of a huge number of applications, of which only a very small part is currently available to our society (Atzori, Iera, Morabito, 2010).

The 'Internet of Everything (IoE) whereby each human on average is currently connected to about 200 things (smart phones, tablets, sensors and systems) has had a radical impact on business but also on communities. Actually, the idea of IoT transformed into the more broadly conceived Internet of Everything (IoE)—a term described as "bringing together people, process, data, and things to make networked connections more relevant and valuable than ever before—turning information into actions that create new capabilities, richer experiences, and unprecedented economic opportunity for businesses, individuals, and countries". By extension, this concept has much in common with the emerging idea of hypernetworks—all - encompassing nonlinear ecosystems in which discrete, nonlinear networks federate to produce a veritable network of networks (Bojanova, Hurlburt, Voas, 2014).

Decade ago, wearable computerized devices, personalized advertising commercials and billboards and autonomous cars are appeared as a class B science fiction movie. The rapid technological revolution has become a reality. With the spread of smart devices, mobile networks, cloud computing, Big Data analysis, innovative technologies related to sensors and micro controllers the new era of the Internet of Things has finally arrived. Over the last decades new technologies have transformed our lives. Mobile technologies and related to ones have evolved from voice-centered communication to data communication. Today's smartphone-based lifestyle services revolutionizing how people work, communicate and even play. In the IoT era the result of innovations taking place in every industry and sector will be connected and optimized, followed by meaningful convergence, to constantly create greater value and infinite opportunities.

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